2017

DRAFT REPORT

Manufacturing
in Queensland
The manufacturing sector is a significant contributor to Queensland’s economy. It generates $20 billion in gross value added per year and employs 169,000 workers.

In September 2016, the Queensland Government asked the Queensland Productivity Commission to conduct an inquiry into manufacturing to identify policies to improve the sector’s productivity and competitiveness.

The inquiry is occurring in a dynamic environment, both within the manufacturing sector and the policy landscape. This includes Queensland Government 2017–18 Budget announcements on innovation (Advance Queensland), trade (Queensland Trade and Investment Strategy) and energy policy (Powering Queensland Plan).

This draft report sets out a policy action plan to support a strong and diverse manufacturing sector.

The Commission is seeking feedback on the analysis and recommendations, as well as further evidence on specific areas such as innovation in Queensland, management skills, red tape and ways to help older, lower-skilled workers adjust to changes.

The final report, submitted to the Queensland Government at the end of October 2017, will incorporate additional evidence provided by stakeholders, as well as more detailed analysis of recent developments and key policy areas.

I would like to thank all stakeholders that have contributed to the draft report, and look forward to the next phase of consultation.

Kim Wood
Principal Commissioner
Manufacturing inquiry: have your say

The Treasurer has asked the Queensland Productivity Commission (the Commission) to undertake an inquiry into the manufacturing sector in Queensland.

This draft report has been released to provide an opportunity for consultation on the issues raised by this inquiry—and, in particular, on preliminary analysis, findings and recommendations.

The final report will be prepared after further consultation has been undertaken, and will be forwarded to the Queensland Government by the end of October 2017.

Make a submission

The Commission invites all interested parties to make written submissions on the draft report.

Submissions are due by close of business 6 September 2017. They can be lodged online or via post:


Manufacturing Inquiry

Queensland Productivity Commission
PO Box 12112
George St QLD 4003

Submissions will be treated as public documents and published on the Commission’s website. If your submission contains genuinely confidential information, please provide the confidential material in a clearly marked separate attachment.

Contacts

Enquiries regarding this project can be made by telephone (07) 3015 5111 or online at http://www.qpc.qld.gov.au/contact-us/

Key dates

Issues paper released
9 November 2016

Initial consultation
late 2016 – February 2017

Release of the Draft Report
July 2017

Further consultation
July-September 2017

Submissions due
6 September 2017

Final Report submitted to the Government
By 31 October 2017

The Queensland Productivity Commission is an independent statutory body that provides independent advice on complex economic and regulatory issues.

The Commission has an advisory role and operates independently from the Queensland Government—its views, findings and recommendations are based on its own analysis and judgments.

After undertaking a public inquiry, the Commission provides a written report to the Treasurer who must provide a written response within six months. Following this, the Commission publishes the Final Report.

Further information on the Commission and its functions can be obtained from the Commission’s website www.qpc.qld.gov.au
# Contents

**MANUFACTURING INQUIRY: HAVE YOUR SAY**

Key dates

**OVERVIEW**

Draft recommendations

Seeking further views

## 1 INTRODUCTION

1.1 What has the Commission been asked to do?

1.2 What is manufacturing?

1.3 Our approach

1.4 Report structure

## 2 MANUFACTURING IN QUEENSLAND

2.1 Introduction

2.2 Sector size and composition

2.3 Trends in manufacturing

2.4 Productivity

2.5 Conclusion

## 3 PRESSURES AND PROSPECTS

3.1 Introduction

3.2 Significant factors that affect manufacturers

3.3 Prospects

## 4 GOVERNMENT POLICIES AND PROGRAMS

4.1 A brief history of manufacturing policy

4.2 Current policy landscape

4.3 What is the role for government?

## 5 INNOVATION

5.1 What is innovation?

5.2 Why is innovation important?

5.3 Barriers to innovation

5.4 Innovation policy

## 6 SKILLS AND TRAINING

6.1 Introduction

6.2 New and emerging technologies—changing workforce needs
Overview

This overview summarises the key findings and recommendations from the draft report for the inquiry into the manufacturing sector. The Commission has found:

• Despite declining as a share of economic activity, manufacturing is a strong and diverse sector in Queensland, thriving where it can leverage comparative advantages, exploit niche markets or quickly deliver bespoke products.
• Ultimately, manufacturing firms and their workers will drive competitiveness and growth in the sector. The Queensland Government can better support the manufacturing sector, through broad-based policy reform—address cost pressures, increase productivity and improve programs.

What is the inquiry about?

Queensland’s manufacturing sector is a significant source of employment and regional and economic activity within the state. Manufacturing links to:

• a wide range of domestic businesses as a supplier and purchaser of goods and services
• associated services such as applied research, engineering, industrial design, process improvement, logistics and client support
• communities as a key employer, particularly in some regional cities and towns
• export markets.

However, the sector’s share of Queensland economic activity has almost halved since 1989–90.

There has been much debate about the changing nature of Queensland’s manufacturing sector and its future prospects. One view is that strong international competition and rising business costs will see a further shift away from manufacturing in Queensland. Another is that greater access to global supply chains and markets, natural endowments and sophisticated service inputs provides rich opportunities.

Within this context, the Treasurer requested the Queensland Productivity Commission undertake an inquiry into the state’s manufacturing sector to identify policies to improve the productivity and competitiveness of the sector.
Manufacturing is a strong and diverse sector in Queensland

Manufacturing in 2015–16

$19.7 billion gross value added
6.7% Queensland economy
16,400 businesses
169,000 workers (sixth largest employer)

93.3%
small business
(<20 staff)

6.2%
medium business
(20–199 staff)

0.5%
large business
(200 or more staff)

Manufacturing sales by industry subdivision, 2015-16—Queensland

Proportion of manufacturing sales

*Food* 28.4%
*Primary Metal and Metal* 11.5%
*Petroleum and Coal* 8.7%
*Fabricated Metal* 8.3%
*Machinery and Equipment* 8.3%
*Basic Chemical and Chemical* 6.7%
*Transport Equipment* 6.2%
*Non-Metallic Mineral* 5.1%
*Beverage and Tobacco* 4.3%
*Polymer and Rubber* 3.5%
*Wood* 3.5%
*Printing* 1.7%
*Textile, Leather, Clothing and Footwear* 1.4%
*Furniture and Other* 1.3%
*Pulp and Paper* 1.2%
But the sector faces significant and ongoing pressures

Declining output—a state, national and global trend

Globally, between 1995 and 2014, manufacturing as a share of world gross domestic product fell 6.3 percentage points. Over the same period it fell 4.4 percentage points in Queensland.

Between 2007–08 and 2010–11, manufacturing output in Queensland contracted by about 20 per cent. Since then, output has remained relatively constant in real terms.

Real manufacturing output—Queensland and Australia

<table>
<thead>
<tr>
<th>Year</th>
<th>Queensland (LHS)</th>
<th>Australia (RHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990–91</td>
<td>125,000</td>
<td>100,000</td>
</tr>
<tr>
<td>1991–92</td>
<td>120,000</td>
<td>95,000</td>
</tr>
<tr>
<td>1992–93</td>
<td>115,000</td>
<td>90,000</td>
</tr>
<tr>
<td>1993–94</td>
<td>110,000</td>
<td>85,000</td>
</tr>
<tr>
<td>1994–95</td>
<td>105,000</td>
<td>80,000</td>
</tr>
<tr>
<td>1995–96</td>
<td>100,000</td>
<td>75,000</td>
</tr>
<tr>
<td>1996–97</td>
<td>95,000</td>
<td>70,000</td>
</tr>
<tr>
<td>1997–98</td>
<td>90,000</td>
<td>65,000</td>
</tr>
<tr>
<td>1998–99</td>
<td>85,000</td>
<td>60,000</td>
</tr>
<tr>
<td>1999–00</td>
<td>80,000</td>
<td>55,000</td>
</tr>
<tr>
<td>2000–01</td>
<td>75,000</td>
<td>50,000</td>
</tr>
</tbody>
</table>

Strong domestic and international competition

Removing tariffs and other forms of protection on Australian manufactured goods has exposed the sector to greater international competition. While many Queensland manufacturers have benefited from more open markets, trade barriers still exist. Many countries levy tariffs on imported products and some foreign governments provide direct financial assistance to key industries.

High input costs

For manufacturers, input costs are the major determinant of production costs and product price. Many stakeholders expressed concerns about rising input costs, particularly energy and labour.

On average, between 2000–01 and 2015–16, electricity prices increased each year by 5 per cent, and gas prices by 2.7 per cent. As most firms are unable to diversify their energy source, this presents a significant commercial risk for energy-intensive manufacturers. Most recently, Rio Tinto’s Boyne Island aluminium smelter announced it would cut production and shed jobs in response to high electricity prices.

Similarly, statistics show growth in unit labour costs in Australia between 1998 and 2015 were the second highest of OECD countries.

Changing consumption trends and new production technologies

An ageing population, increased urbanisation and rising demand from Asia are driving changes in consumer demand. As the market for new products expands, the demand for more traditional manufactured goods has diminished. This may compel some domestic firms to reassess what they are producing and consider alternative opportunities.

In general, manufacturing has become increasingly fragmented, specialised and globalised. It has transformed from a vertically-integrated structure into one dominated by fragmented segments that are centrally coordinated. Modern manufacturing is characterised by global value chains comprising networks of businesses, workers and consumers.
Increasingly, emerging technologies are producing new products that are spurring a new industrial revolution around the world, changing production processes and business models. Advanced manufacturing and automating low-value production improves product quality, reduces the need for a large workforce and commensurately lowers labour costs.

**Difficulties maintaining workforce size and quality**

Manufacturers in Queensland reported difficulties in attracting and retaining staff, particularly in regional areas, as well as concerns about the quality of skills at all levels. Some manufacturing firms and workers indicated education and training did not leave workers ‘job-ready’—an issue that will be further compounded as new technology changes the nature of manufacturing jobs and forces workers to adapt and acquire new skills.

**Despite these pressures, many Queensland manufacturing firms are prosperous**

Aggregate industry data tend to mask the relative performance and prospects of subsectors and individual firms. For instance, several Queensland textiles, clothing and footwear firms are internationally competitive, despite significant rationalisation in their sector. Leading-edge technology, superior design or customisation, high levels of productivity and/or a focus on customer service are contributing factors.

Although there will continue to be some rationalisation and restructuring, those that have, or can, respond to challenges have a range of opportunities. In this context, manufacturers have developed strengths, including:

- targeting niche markets, producing unique or customised products
- responding to fast changes in preferences by shortening the lead time from factory to retailer and customer
- using innovation to drive quality and efficiency
- bundling manufactured goods with services such as maintenance, financing, distribution and insurance, to add value for the customer
- leveraging their proximity to key raw materials and other comparative advantages.

There are many Queensland manufacturers who have leveraged these strengths, among others, to develop their competitive advantage. The box below provides a very small sample of some of these firms.
Manufacturers in Queensland

PACKER LEATHER: Established in 1891, Packer Leather is one of the few leather tanneries in Queensland. It is recognised worldwide for its locally sourced, high-performance kangaroo leathers, which provide superior strength and softness while being naturally thin. The fibre’s unique properties allowed the company to establish a market niche for itself in fit-for-purpose products, including footwear, garments and gloves. While competitors now also produce kangaroo skins, Packer Leather has maintained its market lead with a reputation for quality and innovation, based on its exclusive tanning technologies that complement the natural characteristics of the leather. New technologies have enabled the company to produce products with better moisture management, abrasion resistance, fire retardants and anti-microbial protection.

Packer Leather exports to 19 countries and supplies world leading sports shoe brands. Prior to shipment, it tests products in its in-house laboratory to ensure they are fit for purpose and meet relevant international specifications. The company is committed to protecting the environment by using a renewable natural resource and meeting rigorous environmental standards that are independently audited. It also uses solar power to reduce its energy consumption and recycles at least 40 per cent of the water used in production.

WATKINS STEEL: Watkins Steel is a family-owned steel manufacturer operating since 1968. It specialises in structural steel and metalwork fabrications, serving the manufacturing, mining and construction industries. The company employs 70 staff to undertake steel detailing, fabricating, drafting, 3D scanning and design, estimating and installation services. It recognised a lack of accuracy was costly, both to itself (in the need to undertake reworks) and its customers (in downtime and lost production) and developed a unique end-to-end digital workflow for measurement, fabrication and installation. By combining 3D technology with advanced robotics, it largely eliminated human error. Its four-step linked process involves:

• 3D laser scan of the site to ensure accurate measurements
• 2D shop drawings and 3D modelling
• automated and precise steel fabrication using robotics
• a station set out for on-site installation.

Many of Watkins Steel’s employees who were previously tradesmen, such as boilermakers, have now been trained to operate new machinery. While the business remains a steel fabrication and installation company at its core, the value-added benefits afforded to customers have allowed the company to provide specialist design and 3D laser scanning services.
The Queensland Government can support the manufacturing sector through broad-based policy reform

Manufacturing businesses and workers have access to, or are impacted by, a broad set of Queensland Government policies and programs.

**Figure 4.3 Selected Queensland Government initiatives relevant to manufacturers**

<table>
<thead>
<tr>
<th>Advance Queensland</th>
<th>Industry Accelerator Program</th>
<th>Knowledge Transfer Partnerships Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Technology Program</td>
<td></td>
<td>Innovation Partnerships Program</td>
</tr>
<tr>
<td>Ignite Ideas Fund</td>
<td></td>
<td>Commercialisation Partnership Program</td>
</tr>
<tr>
<td>Business Development Fund</td>
<td></td>
<td>Advance Queensland Industry Attraction Fund</td>
</tr>
</tbody>
</table>

**Advancing Small Business Queensland Strategy 2016-20**

<table>
<thead>
<tr>
<th>Mentoring for Growth Program</th>
<th>Small Business Digital Grants Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerate Small Business Grants Program</td>
<td>Small Business Entrepreneur Grants Program</td>
</tr>
</tbody>
</table>

**Queensland Trade and Investment Strategy 2017-2022**

<table>
<thead>
<tr>
<th>Developing future leaders</th>
<th>Strengthening regional businesses and economies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving the client experience</td>
<td>Expanding international presence</td>
</tr>
<tr>
<td>Supporting businesses</td>
<td>Promoting Queensland globally</td>
</tr>
</tbody>
</table>

**Advancing Education: An Action Plan for Education in Queensland**

| The Schools of the future STEM Strategy                 | #codingcounts: A plan for coding and robotics |

**Annual VET Investment Plan**

<table>
<thead>
<tr>
<th>Certificate 3 Guarantee</th>
<th>User Choice Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Levels Skills Program</td>
<td>Vocational Education and Training in Schools</td>
</tr>
</tbody>
</table>

**Jobs and Regional Growth Package**

| Made in Queensland                                      | Jobs and Regional Growth Fund                |

**Skilling Queenslanders for Work**

**Back to Work**

**Queensland Charter for Local Content**

**Powering Queensland Plan**

<table>
<thead>
<tr>
<th>Cover cost of Solar Bonus Scheme</th>
<th>Return Swanbank E to service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate restructure of government owned gencos</td>
<td>Deliver the Powering North Queensland Plan</td>
</tr>
<tr>
<td>50 per cent renewable energy target by 2030</td>
<td>Facilitate next wave of diversified renewable energy</td>
</tr>
<tr>
<td>Improve large scale renewable project facilitation</td>
<td>Establish Queensland Energy Security Taskforce</td>
</tr>
<tr>
<td>Implement Queensland Gas Action Plan</td>
<td>Seek integrated national climate and energy policies</td>
</tr>
</tbody>
</table>

The Queensland Government also provides significant assistance to manufacturers through tax concessions that are available to all Queensland businesses.

There is, however, no ‘magic bullet’ in terms of policy levers for the Queensland Government for several reasons.

- Many of the underlying issues are outside the influence of government.
- The Australian Government controls many key policies and the underlying policy instruments.
- ‘Picking winners’ has generally come at an overall cost to the community.

In particular, the goal of manufacturing policy should not be to promote a specific sector or firm as an end in itself. There is a long history of missteps and failures when governments have sought to do so at considerable cost to the economy, community and, in many cases, the manufacturing sector.
Caution required—promoting winners, protecting losers or something else?

Governments often attempt to target specific industries or attract investment to increase employment and generate economic growth. However, empirical evidence and reported outcomes do not suggest any convincing link between governments targeting an industry and the performance of that industry.

History details many costly failures. For example, in Queensland in 2001:

- The Queensland and Australian governments offered assistance to the Australian Magnesium Corporation to establish the world’s largest magnesium smelter near Rockhampton. Both governments foresaw large and beneficial impacts for employment (of up to 7,000 jobs) and investment ($4.5 billion). However, the project was not viable and work ceased in June 2003, with the Australian Government required to fulfil its loan guarantee of $90 million, and the Queensland Government losing $70 million to the project.
- The Queensland Government provided incentives to Berri Fruit Juice to relocate some of its manufacturing operations to Queensland. The company had previously received similar incentives from the South Australian Government to locate some operations there. Berri closed its manufacturing operations in South Australia in 2010 and its Queensland plant in 2014, transferring production to New South Wales.

The Australian Government supported the Australian automobile manufacturing industry for more than a century. About $30 billion (2011-12 dollars) in net combined assistance provided to the industry between 1997 and 2012 failed to produce a sustainable manufacturing plant.

Internationally:

- In the late 1950s, the Japanese Government decided to subsidise petroleum and petrochemicals industries while at the same time hindering Sony’s transistor technology venture because it was ‘unpromising’.
- In the United States, the Obama administration had several high-profile failures from funding alternative energy companies, with total losses as of November 2014 estimated at US$2.2 billion.
- Many countries have tried to establish a semiconductor sector as a key industry. The McKinsey Global Institute identified countries that have attempted but failed to create a sustainable industry since the 1980s. These include Singapore (US$5–16 billion in subsidies), China (US$6–17 billion), Japan (US$19–54 billion), Germany (US$2–7 billion) and Malaysia (US$1–3 billion).

Government measures to facilitate a competitive industry are best directed at providing a favourable business environment. This means minimising impediments to efficiency and competitiveness, and ensuring government programs and procurement are effective. The manufacturing action plan sets out a broad-based program for reform.
Manufacturing: Policy Action Plan

Where are we now?
Manufacturing in Queensland creates around $20 billion a year in gross value added for the Queensland economy. It employs 169,000 workers in 16,400 businesses. Manufacturers face pressure from high input costs, strong competition and regulatory complexity.

Government policies and programs for manufacturing are fragmented and dispersed. The sector is generally unaware of government policies and what they aim to achieve. There is limited information available to evaluate program effectiveness or value for money.

What is the aim?
A competitive and productive manufacturing sector will best support economic growth and improve long term living standards in Queensland. Government action needs to effectively and efficiently:

• target market and government failures
• simplify and consolidate programs
• focus on performance and results.

How to get there?
The Queensland Government can best achieve its objectives through three key actions:

1. Address cost pressures
   • avoid further pressure on energy prices by ensuring energy policy and regulation are efficient (Recommendation 2)
   • create a competitive business environment through a more efficient tax system (Recommendation 3)
   • reduce costs on business and improve regulatory outcomes by reducing red tape through stocktake review (Recommendation 7)

2. Increase productivity
   • lift the pool of workers with the right skills by revising the funding and structure of VET to provide the right incentives to providers, students and businesses (Recommendation 5)
   • expand competition for government procurement and improve value for money by simplifying the process (Recommendation 4)
   • support manufacturers, regions and workers, by improving adjustment assistance and removing barriers to labour mobility to assist workers to transition to new jobs (Recommendation 10)

3. Improve government programs
   • increase effectiveness and reduce administration costs by consolidating and simplifying innovation programs (Recommendation 9)
   • make it easier for businesses to locate and do business here by fixing investment facilitation to streamline government processes and offer comprehensive information to all businesses (Recommendation 6)
   • avoid providing attraction incentives to individual firms, but if provided, transparently report the costs and benefits (Recommendation 8)
   • deliberately track, manage and measure the performance of programs (Recommendation 1).
An action plan built on broad-based policy reform will:

- address the main concerns of the manufacturing sector
- avoid perverse outcomes associated with manufacturing-specific policies
- establish a clear policy with fewer programs that achieve more
- provide the greatest opportunity for manufacturing—and all Queensland businesses—to compete and grow.

**Ensure policies and regulation do not place further pressure on energy prices**

Energy markets are the focus of considerable policy attention, with a number of national reviews under way in addition to state-based studies. The Commission also completed an inquiry on electricity prices in 2016.

The challenge is to avoid policy or regulatory changes that will place further pressure on energy prices. The temptation to seek regulatory ‘fixes’ should be resisted. Such responses can distort or discourage commercial investment, leading to higher energy prices in the long term.

In the case of natural gas, LNG exports from Queensland are transforming Australia into the world’s second largest gas exporter and the major gas supplier for east Asian markets. Local consumers are experiencing cost pressures as gas prices rise towards export parity. The Australian Energy Market Operator (AEMO) forecasts the delivered wholesale price of gas in Australia will increase by 48 per cent by 2036, with step changes in 2018 and 2023 as significant contracts expire.

Rising gas prices and uncertainty about future prices and availability can especially affect heavy users of natural gas that are trade-exposed and cannot switch to alternative energy sources. Queensland manufacturing—with its significant metal, mineral, energy and chemical sub-sectors—is particularly exposed. AEMO projects that, by 2021, gas consumed by large industrial users in Queensland will fall by 24.9 per cent (27.3 petajoules).

Some argue for gas to be reserved for local users so they can access gas while being sheltered to some extent from higher prices. However, evidence shows reservation policies are ineffective and impose costs.

The most efficient solution to meet supply objectives of price, quality, reliability and security is likely to involve a combination of options. An approach that reduces regulatory impediments to supply will be challenging to deliver but is more likely to be effective in the long term. The Queensland Government has indicated it intends to release its gas action plan in mid-2017. This plan should remove barriers to supply by:

- paring back costs and removing impediments to gas exploration
- setting out a pathway to resolve land-use conflicts arising from gas activities (including through education and planning)
- increasing transparency to improve market efficiency.

**Reform the state tax system**

Queensland (like other states) relies on payroll tax, land tax on the unimproved value of land, transfer duties, insurance taxes and gambling duties. Payroll tax (28.7 per cent of total tax revenue in 2017-18) is the largest source of state taxation revenue, followed by transfer duty (24.0 per cent), motor vehicle registration fees (13.1 per cent), other duties (11.2 per cent), land tax (9.0 per cent) and gambling taxes and levies (8.9 per cent).

Competition between states has focused on taxation thresholds and exemptions as well as on tax levels. This has contributed to complex tax structures and concessions that, unless carefully designed, can create distortions as people change their decisions to take advantage of concessions. Concessions also reduced revenue by an almost $5.3 billion in 2016-17. Compliance costs, which are proportionately higher for small businesses, increase as tax systems become more complicated.

While there is limited evidence about the specific impacts of state taxes on manufacturing, there is consensus that state tax systems can be substantially improved. Recent reviews provide a strong foundation for additional reform but this has not happened.
Land tax has lower efficiency costs than other taxes, because if properly designed it has little impact on people’s decisions about working, saving or investing. In theory, payroll tax has low efficiency costs compared with other taxes but in practice the costs are higher because tax-free thresholds and other exemptions reduce the tax base.

There is a strong economic argument for Queensland to generate more revenue from land tax and, potentially, from payroll tax, as well as abolishing or reducing more distorting taxes. Land and payroll tax rates could be set at lower levels by reducing or removing the exemptions and concessions that currently apply.

**Facilitate access to a quality workforce**

A diverse range of disciplines and levels of skill are required for Queensland manufacturers to succeed. Skilled workers strengthen the ability of manufacturers to innovate and grow—and a lack of skilled workers can constrain growth.

Some stakeholders have had difficulties finding (or replacing) and retaining skilled staff, particularly in regional areas or niche markets. Concerns include:

- workers are being deterred from the manufacturing sector by the view that it has no future
- there are existing gaps in the workplace skills of the manufacturing workforce, including:
  - ongoing concerns with the level of basic skills (literacy, numeracy, problem solving)
  - differences in the capability and capacity of workers ‘beyond the production line’
  - an apparent disconnect between government, training providers and industry needs, particularly in relation to ‘job readiness’ as well as in identifying and providing for future skills needs.

New and emerging technologies are also placing new demands on workers and businesses, changing the tasks and activities undertaken and associated skill sets required.

Many of these issues are not unique to manufacturing. They reflect the challenges facing the Queensland economy as it shifts to more knowledge-intensive industries and services.

In practice, addressing these issues is a shared task. Workers and firms (and their associations) have a direct interest in addressing skills needs to improve their prospects and the performance of their business and industry. Government shapes the broader institutional framework and the regulatory and policy environment.

Vocational Education and Training (VET) in Queensland is part of a national system. The Queensland Government provides funding towards the cost of training under its Annual VET Investment Plan and provides annual grants to public training providers (such as TAFE Queensland).

A high-quality education and training system should deliver workers with relevant, adaptable skills in a cost-effective and efficient manner. To support this outcome, the Queensland Government and Jobs Queensland should, as part of ongoing broader reforms, restructure the VET system by improving incentives, optimising funding and minimising the level of compliance costs on business.

**Remove impediments for participation in procurement**

Queensland Government departments spent more than $17 billion in 2016-17 on procuring supplies and services. The Commission has not found data on how much was spent on locally manufactured goods, but found about 70 per cent of government expenditure is with local suppliers.

Some Queensland manufacturers are concerned procurement arrangements do not provide a level playing field for them to compete with interstate or overseas businesses. Small firms can be intimidated by complex or prescriptive tendering processes or have difficulty participating when government tenders aggregate procurement to create purchasing economies. Some stakeholders consider local suppliers should be given preferential treatment over those from interstate or overseas.

The Queensland Procurement Policy (QPP) focuses on value for money while requiring agencies to ‘ensure that competitive local suppliers are afforded a full, fair and reasonable opportunity to supply government’ (DHPW 2013).
The Charter for Local Content (the Charter) operates within the framework provided by the QPP, with a focus on maximising local content. This implies the policy intent is to treat local suppliers preferentially even though local procurement is not mandatory. The Charter does not define local content or explain how to measure it.

The government provides or supports services that help local businesses to participate in procurement processes. For example, Industry Capability Network Queensland (ICNQ), a not-for-profit organisation supported by the Queensland Government, offers services to help link project proponents with capable local suppliers. There is a sound rationale for such services, as enabling local firms to participate in procurement processes can improve value for money by increasing the number of potential suppliers.

The rationale for preferential procurement of local content is less persuasive as it may lead to the rejection of supply offers with the best quality-price combination, consequently increasing costs to Queensland taxpayers. Moreover, procurement agencies are unlikely to have the sophisticated skills and information required to achieve the multiple objectives put forward by proponents of preferential procurement.

Submissions and various reviews have identified agencies can improve procurement processes in ways that improve value-for-money procurement while enabling local content. These include:

- simplify the tendering requirements, including the structure, breadth, scale and complexity of contracts
- provide clear advice to tenderers on the definition and methodology that will be used in applying the value for money principle
- improve the capability of the public service to review and assess tenders, including providing ongoing expert assistance to purchasing officers in applying the value for money principle
- to the extent possible, specify contracts in terms of the desired outcomes rather than how an outcome is to be achieved (input controls), as this will provide tenderers with greater flexibility
- publish a pipeline of supply opportunities.

Make it easy for business to relocate to Queensland and do business here

Many factors influence business location decisions. Often, firms are mobile because important factors of production (such as raw materials or skilled labour) are available in many places. Governments compete for mobile investment through:

- investment facilitation, which can involve:
  - providing information about legislative and regulatory requirements
  - assisting with site identification
  - identifying infrastructure and utility needs
  - coordinating and brokering development approval processes
  - assisting with business development programs
  - introductions to industry networks
- investment assistance, through financial incentives that increase the return on investment in a specific location.
Reshoring

Reshoring of manufacturing involves transferring an activity, commonly a production process, from an overseas location back to a country of origin.

Around the world, there has been a growing interest in reshoring as a corporate strategy and public policy objective, along with some high-profile cases of firms reshoring to the United States and United Kingdom. However, the quantitative evidence on the extent and opportunities for reshoring overall is mixed. The employment gains from foreign direct investment in the United States have been steadily outstripping the number of jobs created by reshored production for some time.

Few firms have returned production to Queensland. It is likely the factors driving reshoring elsewhere—low energy costs, closer proximity to large domestic markets—are less relevant for Queensland manufacturers.

There is a lack of publicly available information on the effectiveness of government reshoring policies, both in terms of the direct benefits (such as the number of companies that repatriated production and the number of jobs created) and the cost of those policies. Reshore UK, Britain’s high-profile government initiative to reshore manufacturing production, closed in 2016.

On balance, the evidence suggests reshoring will occur if it is in the financial interest of the manufacturer. The primary role for government is to ensure firms have accurate and accessible information to make location decisions.

Trade and Investment Queensland (TIQ) and the Department of State Development (DSD) both provide facilitation services. The Commission has not found a clear statement of the outcomes that investment facilitation is intended to achieve, and there is limited convincing evidence about its impacts and if current government expenditure on investment facilitation is effective. As services are provided without charge, some users may value them less than it costs taxpayers to provide them.

Reorganising facilitation activities towards addressing information barriers for all firms, rather than selected firms, is likely to produce greater benefits. In addition, gathering and publishing information about which government processes are most challenging for investors could identify opportunities for the government to simplify regulatory processes without undermining outcomes. This would help to address the information barriers to firms locating in Queensland. It would also reduce and streamline regulation so there is a less complex and lower-cost system for potential investors to navigate.

Evidence suggests financial incentives to attract investment are unlikely to provide a net benefit to the Queensland community. However, if the government decides to provide a financial incentive, then these factors should be publicly reported:

- the criteria for allocating grants
- the number, names and size of firms assisted
- the value of assistance
- expected outcomes and an evaluation against those outcomes.

Consolidate and improve the design of innovation programs

There are many policies and programs across all levels of government that affect manufacturers. These include broad framework policies (such as taxation and employment relations) as well as targeted policies such as grants and subsidies, industry facilitation, and support programs to bolster research, increase collaboration and accelerate commercialisation.

In Queensland, manufacturers can access programs that support small business (Advancing Small Business Queensland Strategy), encourage innovation (Advance Queensland), improve education and training outcomes (Advancing Education and Annual VET Investment Plan) and support employment and regional growth (Jobs and Regional Growth Package).
Specific to manufacturing, the Queensland Government recently announced three key initiatives:

- 10-year roadmaps and action plans are being developed. Biofutures and Advanced manufacturing are under way, and there are plans for aerospace, biomedical and life sciences, defence and mining equipment, and technology and services.
- An Industry and Manufacturing Advisory Group will help to develop and implement the 10-year plans.
- The Made in Queensland program ($20 million) provides funding to improve business capabilities and adopt innovative processes and technologies.

Although it is too early to assess if the new Queensland Government programs will be effective, good program design principles and feedback from stakeholders suggest some improvements can be made.

There is a case for consolidating existing programs and improving their design.

Large numbers of small programs tend to have high administration costs. For example, the Queensland Competition Authority previously found that while the cost of administering industry assistance measures averaged around 10 per cent, this cost for some programs was 50 per cent. That means for every dollar of assistance, a dollar is spent administering the program. For a small number of programs, the cost of establishing and administering the program was higher than the amount of assistance provided.

Although there is a sound basis for some programs, such as the positive spillovers generated by research and development (R&D), there is limited evidence to support others. Few have specific or measurable objectives for the community to judge their success.

Many manufacturing firms participating in this inquiry indicated they tend to avoid government programs based on a view the programs would not be useful, or the costs of navigating, applying and complying with the program were too high compared with the expected benefits. Some firms were either not aware of the available programs or found it too difficult to find the program that suited their needs. For example, there are more than 25 Queensland Government innovation and entrepreneurial programs.

Given the alternative uses for program funding, especially with tight fiscal conditions, it is imperative that government initiatives achieve what they are designed for. If program beneficiaries find the landscape too complex to access, and agencies are unable to transparently and easily demonstrate performance, there is a question as to whether the programs should continue to be pursued.

Instead, the government may consider:

- simplifying and consolidating the support it offers to focus on fewer, well-designed programs
- clearly promoting the support available, and what it will achieve
- measuring and managing performance.

Fewer programs—based on robust design that focuses on outcomes, measures benefits and accompanied by transparent evaluation to demonstrate ‘what works’—are more likely to:

- establish a clear government plan for industry understood by firms, workers and the community
- make it easier for manufacturing firms to access and participate, increasing the chance that the best firms can access programs, rather than those with the time and resources to navigate the system
- better achieve the government’s objectives and demonstrate success (or if not, how to improve programs or identify if resources would be better deployed elsewhere).

Assist workers to transition to new employment and remove barriers to labour mobility

Structural change has been a prominent feature of Australia’s manufacturing industry after tariffs were removed on manufacturing imports in the 1980s and 1990s. While structural change ultimately results in a better use of the community’s scarce resources, it can result in significant financial and social costs for workers, firms and communities as the economy transitions from industries in decline.
Queensland’s manufacturing sector is smaller and more diverse than in other states. Given this diversity, and a relative absence of sectors that were previously supported by high trade barriers, Queensland’s manufacturing sector has been less exposed to many of the structural shocks that have beset manufacturers elsewhere.

It is difficult to identify with certainty the Queensland industries or regions more likely to be affected by structural change and when problems may emerge. In the short term, those with the greatest exposure to risk would appear to be:

- energy-intensive industries where higher energy prices are continuing to erode their financial position and, ultimately, commercial sustainability
- communities or regions that rely heavily on a major business as a primary source of employment.

Over a longer-term horizon, technology, such as advanced manufacturing, will affect established firms in terms of the level of capital investment, the manner in which they produce, the amount of labour they employ, and their ability to compete with domestic and international rivals. It will also have an impact on workers in affected firms.

Between 2000 and 2012, governments around Australia spent more than $88 billion on structural adjustment programs. There are few publicly available reviews of how effective past adjustment assistance has been. However, analysis suggests the programs tended to have a high cost per job, insignificantly affected overall long-term regional employment trends, and did not enhance regional performance relative to other regions that lose a major employer but did not receive assistance.

As a result, although adjustment assistance has the potential to play a role in facilitating change and easing the adverse transitional impacts of adjustment, it needs to be justified, well-targeted and effective.

Where government adjustment assistance is warranted, these actions will likely have benefits:

- directly target workers who face significant barriers to re-employment, such as older manufacturing workers with low or non-transferable skills
- before planned closures, extend non-financial assistance measures to affected workers to make them ‘job-ready’ and smooth the transition to alternative employment
- establish a longitudinal study of retrenched workers who received assistance to determine which programs best led to permanent reemployment.

Geographic labour mobility is an important mechanism in adapting to labour market shocks associated with structural change.

Labour mobility improves community wellbeing by enabling workers to move to locations where they are more productive and highly valued. This can increase employment and incomes across the state. However, regional labour markets are adversely affected when mobility is low. Unemployment is likely to be high and there could be greater inequality in income and social conditions.

The Queensland Government should remove state-based barriers to geographic labour mobility, including:

- improve land-use planning processes to expedite the release of land for residential development that would otherwise limit the supply of housing
- remove unnecessary occupational and/or business licensing and ensure the remaining regulation is the minimum necessary to achieve consumer protection, safety or environment objectives
- reform stamp duty to reduce the additional costs on property transfers.

**The way forward**

The key finding emerging from this inquiry is that manufacturing firms and their workers will drive competitiveness and growth in the sector. The Queensland Government can best support this outcome by reforming the business policy environment. The Commission has set out a draft action plan—to address cost pressures, increase productivity and improve government programs—to facilitate feedback from all stakeholders and to prepare a final report for government.
Draft recommendations

Draft recommendation 1

The Queensland Government should adopt an action plan for the manufacturing sector, centred on broad-based policy reform rather than on firm- or manufacturing-specific assistance. The plan should address three key action areas:

- address cost pressures
- increase productivity
- improve government programs.

Policies and programs underpinning the plan should be designed and managed for performance: target market and government failures; avoid funding activity that will occur anyway; minimise compliance costs for industry and government; establish accountability, and properly measure, review and publicly report outcomes.

Draft Recommendations 2–10 set out the detailed policy reforms to support the action plan.

Draft recommendation 2

The Queensland Government should ensure that its energy policies and regulation promote the long-term interest of consumers and efficient energy prices. This includes:

- avoiding policy or regulatory changes that impede the efficiency of the electricity market and place further pressure on energy prices
- structuring the Queensland Government’s gas action plan (due for release mid-2017) to remove supply barriers by:
  - reducing the costs and impediments to gas exploration and development through, for example, measures to improve land release and tenure management, and cooperation between different mineral and energy regulators
  - improving processes to resolve land-use conflicts arising from gas activities (including through providing better information to landholders and an evidence-based approach to regulation)
  - increasing transparency to improve market efficiency, through measures such as reporting sector-wide performance and regulatory compliance.

Draft recommendation 3

The Queensland Government should reform the state tax system by removing or reducing distortionary taxes (such as stamp duties and insurance levies) and moving towards less distortionary taxes (such as broad-based land and payroll taxes).
Draft recommendation 4
In developing the new procurement model, the Queensland Government should:

• establish a single procurement policy based on a single objective—value for money
• remove impediments to local firms participating in procurement, including by:
  – simplifying tendering requirements including the structure, breadth, scale and complexity of procurement contracts
  – improving the capability of the public service to review and assess tenders
  – providing clear advice to tenderers on the definition and method that will be used to apply the value for money principle
  – to the extent possible, specifying contracts in terms of the desired outcomes rather than inputs
  – publishing a pipeline of supply opportunities.

Draft recommendation 5
As part of ongoing broader reforms to the education and training sector, the Queensland Government and Jobs Queensland should:

• reform the Vocational Education and Training (VET) system to:
  – adapt and respond to provide for thin and emerging markets
  – reduce unnecessary compliance costs on businesses and students
  – encourage the right level of training for the right people, both within VET and across tertiary education
• establish the right incentives for providers—including TAFE, other agencies and private sector providers
• develop a funding model by determining:
  – an efficient price for each qualification
  – the optimal balance between public and private contributions.

Draft recommendation 6
The Queensland Government should reorganise the investment facilitation activities of Trade and Investment Queensland and the Department of State Development to:

• address the information barriers to firms locating in Queensland
• identify opportunities to reduce/streamline regulation—so there are fewer government requirements to navigate, at a lower cost.

Draft recommendation 7
The Queensland Government should commission an independent stocktake of the regulations that affect key subsectors of the manufacturing industry and complete it as soon as possible.

The stocktake should identify priority areas for reform that will contribute to improved productivity for Queensland manufacturers as well as the wider Queensland economy. This includes areas where there is the most scope to:

• reduce unnecessary regulatory burden and pursue regulatory objectives in more efficient (least cost) ways
• better coordinate action across (Australian, state, local) governments to reduce unnecessary overlaps.
Draft recommendation 8
The Queensland Government should avoid providing investment attraction incentives to individual firms unless it can be demonstrated that there are likely spillovers that would otherwise not occur. If the government does provide incentives it should:

• publish the criteria for allocating grants to attract mobile investors
• provide assistance in transparent forms, rather than through less transparent forms such as tax concessions
• link grants to measurable deliverables
• publish the number, names and size of firms assisted; the value of assistance provided to each firm; and the details of contracts with individual firms
• report annually the expected outcomes and performance milestones agreed in the case of each grant and the performance of each project against these milestones.

Draft recommendation 9
The Queensland Government should consolidate its more than 25 innovation and entrepreneurial programs to target three key areas—increase beneficial knowledge spillovers; improve information access; and address coordination problems.

For each remaining program, the government should:

• establish measurable objectives aimed at inducing additional activity
• measure and monitor the program for performance from commencement
• evaluate programs within three years and publicly report the outcomes, including administration costs and if the program achieved its objectives (effectiveness) and the benefits exceeded the costs (efficiency).

Draft recommendation 10
The Queensland Government should:

• where appropriate, provide early training assistance where there are planned firm closures
• remove barriers to labour mobility across regions in Queensland, particularly in relation to housing, occupational/business licensing and stamp duty
• go beyond retraining programs and adopt practical alternatives for older, low-skilled manufacturing workers who are displaced.
Seeking further views

The Commission is seeking feedback on the findings and recommendations outlined in the draft report. It is also seeking further specific input on management capabilities, innovation, regulation and structural adjustment.

Management capabilities

Management capabilities in Australian manufacturing appear to be below global leaders. The Commission is seeking further views about the role of management training and education in manufacturing businesses.

What stops businesses and workers from investing in management education and training?

Are the current programs delivered by TAFE Queensland, universities and private providers sufficiently available to, designed for and targeted at Queensland manufacturers and are there any gaps?

If there is a role for improved management training and education, who would be best placed to deliver it to Queensland manufacturing businesses?

If there is a role for improved management training and education, what capabilities should be focused on and what format should courses be presented in, to ensure they meet users’ needs?

Innovation and commercialisation

The Commission is seeking further information on innovation.

Are there state-based impediments to businesses and universities collaborating to commercialise R&D that could be reformed or removed? Do current Queensland and Australian government policies effectively target barriers?

Are there specific ways that the government can facilitate networks, hubs and clustering? Are there any state-based impediments to businesses forming effective networks and clustering?

Are there any other state-based barriers to innovation?
Regulation

The Commission is seeking stakeholders’ evidence and views to identify regulations that could be reformed and which subsectors could be given priority in undertaking a stocktake of the regulations, having regard to the greatest potential opportunity for gains.

Which regulations are unnecessarily burdensome, complex, redundant or of questionable benefit? Where will reform provide the greatest benefits (for manufacturers or the broader community)?

Structural adjustment

The Commission is seeking further views on potential measures for displaced older, low-skilled manufacturing workers.

Are there alternative options to retraining programs for older, low-skilled manufacturing workers? Are there examples where such programs have been successful? For some groups of workers, is there a case to shift beyond retraining and redeployment objectives to transition to other forms of work or retirement?
1.0 Introduction
The Queensland Government has asked the Queensland Productivity Commission (the Commission) to investigate and report on manufacturing in Queensland. This draft report sets out key findings and recommendations for stakeholders to test and provide feedback, which will be drawn on to prepare a final report to government.

1.1 What has the Commission been asked to do?

Manufacturing contributed $19.7 billion in 2015–16 to the Queensland economy and has links to other businesses, workers, communities and export markets.

Over recent decades, there has been considerable debate on the changing role of manufacturing and its future prospects. There are two views:

- that strong international competition and rising business costs will see a further shift away from manufacturing
- that greater access to global supply chains and markets, natural endowments and sophisticated service inputs provide rich opportunities for Queensland manufacturers.

The Queensland Government has a range of programs and policies that affect the manufacturing sector. It has identified an opportunity to determine what policy settings will support a competitive and productive manufacturing sector.

Within this context, the Commission has been asked to undertake an inquiry into Queensland’s manufacturing sector to investigate and report on:

- the role and changing nature of Queensland manufacturing, including its performance and potential
- the characteristics of competitive manufacturers with respect to innovation and productivity
- international reshoring initiatives
- changes to the regulatory framework to reduce the regulatory burden on manufacturers
- the effectiveness of current policy settings to facilitate performance, productivity and competitiveness.

The full terms of reference are provided in Appendix A.
1.2 What is manufacturing?

Manufacturing is the physical or chemical transformation of materials, substances or components into new products (ABS 2006). It generally transforms raw materials from agriculture, forestry, fishing and mining, and intermediate manufactured products into new products.

The boundaries between where manufacturing stops and other industries start can be blurred. Many manufacturing businesses, for example, also harvest or mine their raw materials; have wholesale, distribution, retail and customer service elements; and undertake their own support services, such as applied research and development, engineering, industrial design, customer services and process improvement.

Advanced manufacturing is about the adoption of technologies to improve production processes and business models, rather than the type of product made (AMGC 2017, p. 13). Advanced manufacturing techniques, such as robotics and 3D printing, can be applied to both traditional low-tech products and high-tech products such as equipment or pharmaceuticals.

1.3 Our approach

The Commission’s approach to this inquiry consists of three main components:

• assessing the size, nature and trends in Queensland manufacturing, drawing on Queensland and Australian data
• identifying challenges and prospects based on research, the feedback from consultation, and case study evidence
• setting out a plan for the Queensland Government to effectively support a competitive and productive sector.

The Commission received the terms of reference on 15 September 2016 and released an issues paper for consultation on 9 November 2016.

To prepare the draft report, the Commission:

• has benefited from discussions with around 40 stakeholders, meeting with various manufacturing firms, government agencies, unions, industry associations and individuals, as well as undertaking a range of site visits
• has received 13 written submissions and convened roundtable discussions on innovation and structural adjustment, as well as participating in an industry led discussion on the textile, clothing and footwear industry
• has taken into consideration the work occurring in several other reviews and programs, including the work undertaken by Jobs Queensland and the Advanced Manufacturing 10-Year Roadmap and Action Plan.

This draft report has been released to provide an opportunity for consultation on preliminary analysis, findings and recommendations.

The Commission would like to thank all organisations and individuals who have contributed to this inquiry to date. A full list of submissions and consultations is provided in Appendix B.
1.4 Report structure

The structure of this report is as follows:

Part A — Size, scope and nature of manufacturing in Queensland

Chapter two outlines manufacturing in Queensland, its characteristics and trends.

Chapter three investigates the pressures faced by Queensland manufacturers and potential prospects.

Chapter four provides an overview of existing government programs and discusses the role of the state government in enabling a productive and competitive manufacturing sector.

Part B — Options to improve productivity and competitiveness

Chapter five investigates barriers to innovation, innovation policy and options for reforming Queensland Government programs.

Chapter six analyses how skills and training influence the productivity and competitiveness of manufacturing, and how government can address skill challenges as part of broader reform to the education and training sector.

Chapter seven defines reshoring, examines the extent and possibilities for reshoring, and experience with international policy initiatives.

Chapter eight discusses regulation and opportunities to reduce red tape.

Chapter nine examines the drivers and impacts of structural change, and the characteristics of past and present government assistance measures.

Chapter ten reviews and identifies opportunities to improve broader framework policies that affect manufacturers in Queensland.

Appendices A and B provide the terms of reference and a consultation record. A separate technical supplement provides supporting analysis and material.
2.0 Manufacturing in Queensland
The terms of reference for this inquiry asks the Commission to report on the composition, location, employment, structure and changes to manufacturing in Queensland. This chapter outlines the characteristics of Queensland manufacturing, both now and over time, and includes some indicators of performance, such as profitability and productivity.

Key points

1. Manufacturing is an important industry for Queensland. In 2015–16, it contributed $19.7 billion of gross value added, or 6.7 per cent of the state’s economy. The industry’s outputs are largely related to food production, minerals, metals, coal and petroleum processing, and production of machinery and equipment, largely corresponding with Queensland’s natural strengths.

2. Manufacturing employs 169,000 people and is the sixth-largest employing industry in Queensland (7.1 per cent of the workforce). Manufacturing is spread across the state, but contributes the largest share of employment in Brisbane’s outer suburbs and the Darling Downs–Maranoa and Wide Bay regions.

3. Globally, manufacturing has been contracting as a share of the economy. Between 2000 and 2014, it fell 4.2 percentage points globally. Over the same period it fell 3.3 percentage points in Queensland.

4. While the gross value added of Queensland manufacturing has fallen in real terms, manufacturing exports have risen. Since 2007–08, exports have increased 28 per cent in nominal terms, or about 7 per cent in real terms.

5. Labour productivity in Queensland manufacturing grew until 2007–08, but has declined since. Multi-factor productivity has been in decline since 2002–03. This is largely due to fluctuations in output and increased capital investment throughout the 2000s that has not been fully utilised.

6. The level of Australian manufacturing productivity is lower than for many developed nations. The productivity gap between Australian manufacturing and other nations has also risen.
2.1 Introduction

Queensland manufacturing in 2015–16:

• comprised 16,400 businesses
• contributed $19.7 billion of gross value added, or 6.7 per cent of the economy
• employed 169,000, or about 7.1 per cent of the workforce, the sixth-largest employing industry in Queensland
• exported about 24 per cent of production ($17.4 billion).

The complexity of modern manufacturing can make data comparisons difficult (see Box 2.1).

Box 2.1 Defining manufacturing: some statistical issues

The definition of manufacturing is an imperfect one, which can impact statistical trends. Where services (such as accounting and IT) are undertaken within a manufacturing firm, it is counted as manufacturing activity. However, if those services are outsourced, it is considered to be within the services sectors.

About 17 per cent of the change in output as a proportion of the economy was estimated to be due to outsourcing of related services in the 1980s and 1990s. As a result, long term statistical trends may appear slightly more negative than reality. But, this trend plateaued in the 2000s and would explain little of recent manufacturing changes (Barnes et al 2013, p. 221).

In addition, modern production does not always fall into traditional classifications. For example:

• Information technology spans traditional manufacturing of hardware as well as services such as software services, systems design and system management.
• The pharmaceutical industry encompasses research and development, testing, regulatory approval and marketing services in addition to traditional manufacturing.

Australian data, rather than Queensland data, are used in some sections of this report where Queensland data is not available, has a shorter time series or is not as disaggregated as Australian data. Australian data is also used for like-for-like comparison with international peers.

2.2 Sector size and composition

Figure 2.1 illustrates the breakdown of Queensland manufacturing by sales and employment. Food product manufacturing was the largest subsector both by sales ($21 billion) and employment (47,800). Metal products ($8.4 billion in sales and 8,300 employees) and petroleum and coal products ($6.4 billion in sales and 1,000 employees) contributed the second and third most sales. Although furniture/other product manufacturing and textile, leather, clothing and footwear made relatively small contributions to total sales ($1.3 and $0.9 billion, respectively), they had relatively high numbers of employees (6,000 and 4,700, respectively).
2.2.1 Business size

Queensland manufacturers are on average larger than all Queensland businesses—6.7 per cent of manufacturing businesses are medium (20–199 employees) or large (200+ employees); compared with 2.6 per cent of all businesses.

Around half (48 per cent) of manufacturers businesses are small employing businesses, with 1–19 employees, and a large proportion (45 per cent) are non-employing businesses. There are 1,006 (or 6.2 per cent of all businesses) medium size businesses and 86 (or 0.5 per cent) large manufacturing businesses.

2.2.2 Workforce

Manufacturing is an important source of labour income. On average, manufacturing workers earned about $63,400 in wages and salaries in 2015–16. They were relatively better paid than Queensland private sector workers who earned $50,000 on average. Average manufacturing wages in Queensland were slightly below corresponding wages in most other states.

Some parts of manufacturing provide high income jobs. For example, petroleum and coal product manufacturing employees in Queensland were amongst the nation’s highest earning employees ($139,000) (Figure 2.2).
### Figure 2.2 Total and average wages and salaries by subdivision, Queensland, 2015–16

<table>
<thead>
<tr>
<th>Sector</th>
<th>Total Wages and Salaries (Millions)</th>
<th>Average Wages and Salaries (LHS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Product Manufacturing</td>
<td>$160,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>Beverage and Tobacco</td>
<td>$140,000</td>
<td>$35,000</td>
</tr>
<tr>
<td>Wood</td>
<td>$120,000</td>
<td>$30,000</td>
</tr>
<tr>
<td>Textile, Leather, Clothing and Footwear</td>
<td>$100,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Paper and Converted Paper</td>
<td>$80,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Pulp</td>
<td>$60,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>Printing</td>
<td>$40,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Petroleum and Coal</td>
<td>$20,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Basic Chemical and Chemical</td>
<td>$10,000</td>
<td>$2,500</td>
</tr>
<tr>
<td>Non-Metallic Mineral</td>
<td>$10,000</td>
<td>$2,500</td>
</tr>
<tr>
<td>Primary Metal and Metal</td>
<td>$9,000</td>
<td>$2,250</td>
</tr>
<tr>
<td>Fabricated Metal</td>
<td>$9,000</td>
<td>$2,250</td>
</tr>
<tr>
<td>Transport Equipment</td>
<td>$8,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Machinery and Equipment</td>
<td>$7,000</td>
<td>$1,750</td>
</tr>
<tr>
<td>Furniture and Other</td>
<td>$6,000</td>
<td>$1,500</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>$5,000</td>
<td>$1,250</td>
</tr>
</tbody>
</table>

**Source:** ABS 2017h.

Food product manufacturing contributed almost a quarter of all manufacturing wages.

On average, manufacturing workers in Queensland are more likely to be employed full-time (88 per cent) than all workers in Queensland (70 per cent), and work more hours per week (38.4 hours) than employees generally (34 hours). At the national level, the manufacturing workforce is slightly older than the total workforce and has a lower female participation rate than the broader workforce (about 27 per cent of the manufacturing workforce was female, compared to 46 per cent of the total workforce in 2015–16).

#### 2.2.3 Location

Queensland manufacturing activity is distributed across the state, but is concentrated in Brisbane’s outer suburbs and some regional areas.

In terms of output, more than half (55 per cent) of Queensland manufacturing was located in Greater Brisbane, in the most recent estimates for 2010–11 (Queensland Treasury and Trade 2013). The Brisbane, Townsville and Wide Bay economies were most reliant on manufacturing, with manufacturing comprising about 9 per cent of gross regional product.

In terms of employment, more than half (54 per cent) of Queensland manufacturing jobs are in Greater Brisbane, about a fifth in the rest of south east Queensland (Gold Coast, Sunshine Coast and Toowoomba) and about a quarter in regional Queensland, in 2015–16.

Figure 2.3 illustrates the spread and relative importance of manufacturing across regions of Queensland. The regions where manufacturing contributes the largest proportion of jobs are Brisbane’s outer suburbs—in Logan–Beaudesert (13.1 per cent), Ipswich (11.4 per cent), Moreton Bay–North (9.2 per cent) and Brisbane East (9.4 per cent). Darling Downs–Maranoa, Wide Bay and Mackay are the most manufacturing dependent regions for employment outside of Brisbane—with manufacturing accounting for 9.5, 8.3 and 7.9 per cent of employment, respectively.
2.2.4 Exports

In 2015–16, Queensland exported $17.4 billion manufactured products, which was about 24 per cent of manufacturing sales. As shown in Figure 2.4, four subsectors accounted for 97 per cent of manufacturing exports:

- food and beverage—$9.1 billion or 52.4 per cent
- metal—$5 billion or 28.6 per cent
- machinery and equipment—$1.8 billion or 10.2 per cent
- petroleum, coal and chemical—$950 million or 5.5 per cent.

Most (53 per cent) Queensland manufacturing exports were destined for China, South Korea, Japan and the United States. China was Queensland’s largest customer, importing $2.7 billion of manufactured products from the state.
2.3 Trends in manufacturing

2.3.1 Globally, manufacturing has been contracting as a share of the economy

Manufacturing has declined as a proportion of GDP internationally (Figure 2.5). In every income group, manufacturing has decreased as a proportion of output between 1995 and 2014, falling 6.3 percentage points globally. Over the same period it fell 4.4 percentage points in Queensland.

Figure 2.5 Manufacturing gross value added as a proportion of GDP

Manufacturing employment as a proportion of total employment has been declining for over 40 years in developed countries (Figure 2.6). Across the OECD, between 1993 and 2013 manufacturing employment fell on average 5.5 percentage points as a proportion of total employment. Even where manufacturing has grown significantly, it has not necessarily raised its share of employment. In China, the proportion of workers employed in manufacturing was lower in 2010 than in 1980.
The reasons for the relative decline of manufacturing over the last half a century include:

- Income-related preferences—as incomes increase, people tend to spend a smaller proportion of their additional income on manufactured products and more on services
- Measurement error, due to service parts of manufacturing being outsourced—some of the statistical decline may reflect changes in business structure rather than real activity
- Technological changes and efficiencies of scale—it is no longer necessary to manufacture some products, such as newspapers and recorded music. For example, since 2007–08, the Australian printing and recorded media subsector lost about 40 per cent of its output
- Shifting trade patterns—where countries or regions have comparative advantages, production has increased and with it exports, while in areas where they have comparative disadvantages, production has decreased and imports have increased.

2.3.2 Queensland and Australia are experiencing a similar trend

Around federation, manufacturing contributed a similar share of the Australian economy as it does today (PC 2003, p. 19). Manufacturing grew very strongly in Australia until the early 1970s to become its largest industry. Over the last 40 years, however, it has been the slowest growing industry in Australia, declining as a proportion of the economy. Similarly, manufacturing has been Queensland’s slowest growing industry over the last 25 years. Figure 2.7 shows that as a result, at the state and national level, manufacturing output has declined by 5.2 and 5.6 percentage points, respectively, as a share of output over the last 25 years.
Between 1989–90 and 2006–07, manufacturing in Queensland experienced a relative decline—from 12.2 per cent of the economy to 10.6 per cent. Manufacturing output grew—around 3.7 per cent per annum in real terms—but slower than the entire Queensland economy at 4.8 per cent. Queensland's performance was stronger than Australian manufacturing, growing more than twice as fast as Australian manufacturing (1.6 per cent per annum) and faster than the Australian economy (3.3 per cent). Until 2007, it generally remained Queensland’s largest industry.

In 2006-07, manufacturing output peaked at $25 billion. It fell slightly in 2007–08 by around 1 per cent, while Australian output continued to grow.

The global financial crisis (GFC) and the resources boom, including the LNG construction impacted Queensland manufacturing particularly heavily (Figure 2.8). In 2008–09 it contracted more than any other Queensland industry, almost 14 per cent, and more than any other state’s manufacturing industry—the rest of Australia’s manufacturing industry decreased 2.8 per cent. The contraction continued for several years and by 2010–11 Queensland’s manufacturing had lost about a fifth of its output.

Since then, Queensland manufacturing output has fluctuated. In 2015–16 it declined about 3.3 per cent to approximately the same level as 2010–11. By 2015–16, manufacturing output in the state was $19.7 billion.

The GFC saw global demand for many manufactured products fall. This, combined with a strengthening Australian dollar, made manufacturers less competitive. At the same time, the mining and construction industries that were competing with manufacturing for the same skills expanded, increasing labour costs. This period also saw electricity prices increase and, in later years, higher gas prices with the commencement of the LNG plants. Some of these pressures eased as the boom receded and the Australian dollar fell towards historical norms.
There are mixed signs of recovery in manufacturing. In May 2017, the Australian Performance of Manufacturing Index (PMI) indicated some recovery in manufacturing at 54.8, and all seven performance sub-indices showed positive signs (Ai Group 2017c). This was the eighth consecutive month of expansion. Exports were cited as driving growth, while input prices and specialised labour shortages are posing challenges for some manufacturers. That said, the March quarter national accounts reported manufacturing output decreased 0.9 per cent (trend) over the quarter (ABS 2017i).

2.3.3 Employment

Manufacturing was the largest employer in Australia through most of the 20th century. In 1910, it employed around a fifth of the Australian workforce, second only to agriculture (ABS 2001, p. 244). Manufacturing recorded a peak of 33 per cent of all employment during the mid-1940s, but since the mid-1960s it has declined in relative importance.

In Queensland, manufacturing represented 12.2 per cent of the Queensland workforce in 1985–86, but by 2015–16 it had declined to 7.1 per cent. Manufacturing jobs grew by about 41 per cent between 1985–86 and 2007–08, from 132,000 to 187,000 (Figure 2.9). The decline in jobs since the GFC has been less severe in Queensland than in the rest of Australia. In Queensland there were 169,000 jobs in 2015–16, 18,000 fewer than in 2007–08.

Recent data suggests that Queensland manufacturing may be recovering. Employment rose in the May 2017 quarter—there are on average an estimated 1,100 or 0.6 per cent more jobs in 2016–17 than 2015–16 (ABS 2017i). Nationally, manufacturing employment increased 3.1 per cent in 2016–17.
Figure 2.9 Manufacturing employment, by state

Source: ABS 2016k.

Figure 2.10 illustrates that, although employment in Queensland manufacturing has fallen since 2007–08, some subdivisions now have higher employment, including food, textile, leather, clothing and footwear, petroleum and coal, chemical and machinery and equipment. Printing and recorded media, paper and pulp, metal and fabricated metal and transport equipment, have all contracted in terms of employment.

Figure 2.10 Manufacturing employment by sub-industry, Queensland

Note: The figure does not include all manufacturing employment. It excludes unclassified manufacturing data.

Source: ABS 2016k.

As illustrated in Figure 2.11, most Queensland regions employ less people in manufacturing in 2015–16 than they did in 2007–08. The growth for the Gold Coast, Mackay and Darling Downs–Maranoa regions are exceptions (with 3,700, 1,400 and 1,000 additional jobs, respectively).
Greater Brisbane had 15,700 fewer manufacturing jobs in 2015–16, accounting for most of the 18,000 fewer Queensland jobs over the period. Over the longer term (between 1999–00 and 2015–16), manufacturing employment has grown in the rest of Queensland by 5,700, but shrunk in Greater Brisbane by 4,200.

Some regions have been more heavily impacted by the contraction in manufacturing. In Ipswich, Toowoomba and Townsville, manufacturing as a proportion of total jobs has declined by 6.1, 5.1 and 3.5 percentage points respectively, since 2007–08.

2.3.4 Exports and imports

While the gross value added of Queensland manufacturing has fallen in real terms since 2007–08, manufacturing exports have increased (Figure 2.12). Exports fell in 2009–10 but have recovered since, reaching a historic peak in 2015–16. Exports increased 28 per cent in nominal terms, or about 5 per cent in real terms, since 2007–08. Over the last 15 years, real exports increased by about 11 per cent.

Queensland has been a net importer of manufactured products every year for the last decade. Imports have fluctuated more than exports, peaking in 2012–13 but declining about 19 per cent in real terms since then.

While manufacturing output has decreased substantially as a proportion of the economy, manufacturing exports have not fallen to the same extent, possibly indicating increasing specialisation or that export orientated businesses and industries have higher growth.
Note: Import and export values have been deflated by Brisbane CPI. Industry subdivision price indices have not been used to deflate export values, therefore individual price changes impact on export values.


In terms of subsector performance, food and beverage exports have grown strongly since 2007–08 (45 per cent, or about $2.8 billion) in real terms (Figure 2.13). Metal products exports have not fared as well and have fluctuated in value, such that exports were worth 23 per cent less in 2015–16 than in 2007–08 in real terms. This would appear to be largely due to unfavourable international prices, given that aluminium, copper, silver, lead and zinc smelting export volumes increased 20 per cent over the same period.

Note: Import and export values have been deflated by Brisbane CPI. Industry subdivision price indices have not been used to deflate export values, therefore individual price changes impact on export values.


China is now Queensland’s largest manufacturing export destination, with exports increasing from $0.6 billion to $2.7 billion between 2005–06 and 2015–16 (Figure 2.14). Other key export destinations include South Korea (up from $1.3 billion to $2.4 billion), Japan (down from $2.9 billion to $2.2 billion) and the United States (up from $1.3 billion to $2 billion). Exports to Indonesia, India, Papua New Guinea and the United Kingdom have also risen over this period.
2.3.5 Profitability, business entry and exit

Australian manufacturing profits increased between 1995–96 and 2007–08, from $10 billion to $26.5 billion, in current prices (Figure 2.15). Since then, profits have fluctuated. After reaching a low of $10.6 billion in 2012–13, profits have partially recovered to $17.3 billion in 2015–16.

However, as a proportion of total profits, manufacturing has generally declined over the last two decades. Manufacturing’s contribution to total profits decreased from 36 per cent in 1995–96 to 12 per cent in 2015–16.

Food manufacturing had the largest profits in 2015–16, while metal manufacturing had the largest profits in 2007–08 (Figure 2.16). Between 2011–12 and 2014–15, metal manufacturing profits were negative, reflecting low international prices; however, it returned to profitability in 2015–16.
In Queensland, the business exit rate was lower for the manufacturing sector (11.8 per cent) than for all businesses (12.7 per cent), in 2015–16 (Table 2.1). Within the sector, entry and exit rates were highest for non-employing and small manufacturing businesses. Medium and large businesses were more difficult to form but more likely to survive. Between 2012 and 2016, the survival rate of Queensland manufacturing businesses (62.5 per cent) was slightly better than the survival rates of all businesses, both in Queensland (60.2 per cent) and Australia (62.1 per cent).

Table 2.1 Manufacturing business number, entry and exit rate, Queensland, June 2016

<table>
<thead>
<tr>
<th>Non Employing</th>
<th>1-19 Employees</th>
<th>20-199 Employees</th>
<th>200+ Employees</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Businesses, June 2016</td>
<td>7,431</td>
<td>7,834</td>
<td>1,006</td>
<td>86</td>
</tr>
<tr>
<td>Proportion of businesses</td>
<td>45.4%</td>
<td>47.9%</td>
<td>6.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Entry rate 2015–16</td>
<td>14.6%</td>
<td>8.9%</td>
<td>1.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Exit rate 2015–16</td>
<td>17.5%</td>
<td>7.7%</td>
<td>4.7%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Survival rate (2012 to 2016)</td>
<td>49.2%</td>
<td>72.1%</td>
<td>84.9%</td>
<td>83.5%</td>
</tr>
</tbody>
</table>

Note: Entry rate refers to new businesses formed and exit rate refers to businesses that cease to exist, as a proportion of the stock of businesses. Survival rate is the proportion of businesses at the beginning of the period that are still going at the end of the period.

Source: ABS 2017b.

2.4 Productivity

Productivity measures how efficiently inputs like labour and capital are used to produce outputs. Productivity is the main driver of long term growth in living standards. It is also important to the competitiveness of industries. Greater productivity potentially allows a manufacturing business to:

- offer higher wages and better working conditions for employees
- increase returns to shareholders
- fund investment in new capital
- reduce prices offered to customers (QPC 2016d, p.1).

Overall, Queensland manufacturing has performed poorly in terms of productivity compared to manufacturing in other states of Australia. The substantial build up in capital prior to the GFC and decrease in output during the GFC and resources boom have driven performance. Australian manufacturing productivity is lower than most developed countries and the gap appears to be increasing.
2.4.1 Labour and multifactor productivity

Through the second half of the 20th century, labour productivity in Australian manufacturing grew much faster than in the total market sector (PC 2003, p. 161). Labour productivity in Queensland manufacturing grew at roughly the same rate as in the Australian market sector between 1989–90 and 1999–2000. It then grew much faster than in other industries until 2006–07.

Between 2006–07 and 2009–10, Queensland manufacturing experienced a large decrease in labour productivity—it fell by a similar proportion to output (18 per cent). This contraction was not matched by industry generally or manufacturing in the rest of Australia. Since that time, manufacturing labour productivity growth in Queensland has fluctuated, while in the rest of Australia it has continued to grow (Figure 2.17).

**Figure 2.17 Labour productivity, Queensland and rest of Australia**

![Graph showing labour productivity of Queensland and rest of Australia](image)

Note: Labour inputs and labour productivity measured on an hours worked basis, with no adjustment for changes in labour quality.

Source: ABS 2016a, 2016b; QPC estimates.

The longer-term increases in labour productivity in both manufacturing and other industries have been driven by a combination of increasing capital intensity and multi-factor productivity (MFP) growth. From the early 2000s, the volatility in Queensland manufacturing labour productivity has been driven mostly by variation in output rather than in hours worked.

National manufacturing MFP growth over the period 1974–75 to 2015–16 also lagged growth in the 12 market sector industries—with average annual growth of 0.9 per cent per annum compared to 1.4 per cent per annum. Since 2003–04, MFP in manufacturing fell on average by 0.3 per cent per annum, but grew in the market sector industries by 0.2 per cent per annum.

Queensland manufacturing MFP has not performed well for over a decade. While measured MFP grew strongly from 1989–90 to 2001–02, it subsequently declined to an even greater extent until 2014–15 (Figure 2.18). Over the same period, manufacturing MFP slightly improved in the rest of Australia.

---

3 The 12 market sector industries are agriculture, forestry and fishing, mining, manufacturing, electricity, gas, water and waste services, construction, retail trade, wholesale trade, transport, postal and warehousing, information, media and telecommunications, accommodation and food services, financial and insurance services and arts and recreation services.

4 MFP reflects the general efficiency with which capital and labour are used together to produce outputs.

5 The MFP estimates are experimental estimates based on the recently published experimental estimates of net capital stocks produced by the ABS.
Measured productivity performance may appear better or worse than it actually was when there are periods of particularly strong or weak investment, as there are significant lags between capital investment and future increased output. Over the period 1989–90 to 2015–16, the estimates of Queensland’s manufacturing net capital stock shows the stock increasing over threefold.

The strong increase in manufacturing capital might imply that MFP will grow strongly in the future as output expands. However, most of these capital investments were undertaken with expectations formed in a pre-GFC and resource boom environment.

The strength of the increase in Queensland MFP from 1999–2000 and subsequent degree of decline is also influenced by volatility in industry output, which coincided with the GFC around 2007–08. From 1999–2000 to 2006–07, industry output increased strongly, then declined afterwards, first contributing to, then detracting from MFP growth (Figure 2.19).

**Figure 2.18 Manufacturing MFP (experimental estimates), Queensland and rest of Australia**

Notes: Rest of Australia (ROA) excludes Tasmania and the Northern Territory, as the ABS net capital stock estimates combines manufacturing and mining in these jurisdictions. Labour inputs measured on an hours worked basis with no quality adjustment. Capital input index is an index of manufacturing net capital stocks adjusted so that the combined Queensland and ROA index growth rates equal the growth rates in the national manufacturing capital services index.

Source: ABS 2016a, 2016b; QPC estimates.

**Figure 2.19 Manufacturing MFP and component indexes, Queensland**

Source: ABS 2016j, 2016l, 2016m; QPC estimates.
2.4.2 International productivity comparisons

The level of Australian manufacturing productivity is lower than many advanced western nations.\(^6\)

In 2005, Australian manufacturing MFP and labour productivity was above the Czech Republic and Hungary and similar to Spain and Slovakia, but below all other comparative countries (Figure 2.20). Manufacturing MFP was 58 per cent of the United States level (a gap of 42 per cent).

Productivity gaps relative to the United States are higher in manufacturing than other industries. Manufacturing labour productivity was 52 per cent of the United States level. In comparison, the MFP and labour productivity gaps for the market sector were 25 and 32 per cent, respectively.

Figure 2.20 MFP levels for manufacturing, 2005

Notes: Australian productivity level set equal to 1.0. A ratio greater than 1.0 indicates that manufacturing productivity is higher than in Australia. Manufacturing excludes electrical and optical equipment.


In 2007, each manufacturing subdivision in the United States had higher MFP than in Australia, except for coke, refined petroleum products and nuclear fuels. The gap has widened for almost all manufacturing subdivisions since 1997. Some of the productivity gaps are very large, with United States MFP double Australian MFP.

The Technical Supplement provides further detail on the productivity performance of manufacturing subsectors, as well as international comparisons of productivity levels and growth rates.

2.5 Conclusion

Overall, the contraction of manufacturing in Queensland is consistent with national and global trends. Queensland manufacturing output experienced a sharp decline (by around a fifth), coinciding with the GFC, resources boom and rise in energy prices, but has stabilised over the last several years. The fall in output has not been proportionally matched by falls in labour and capital, leading to lower productivity. The impact on manufacturing employment has not been as severe.

Manufacturing exports have risen, indicating parts of Queensland manufacturing have maintained their competitiveness.

---

\(^6\) Shepherd & Prasada Rao 2002 and Dolman et al. 2007 both found that Australian manufacturing productivity was significantly below the technological frontier.
3.0
Pressures and prospects
This chapter examines the external pressures facing the manufacturing industry in Queensland and discusses some characteristics that are likely to either emerge or continue to be relevant to the future success of the sector. Supporting material for this chapter is provided in the Technical Supplement.

### Key points

1. The manufacturing sector in Queensland has been facing a range of external pressures, including: high input costs, particularly for energy and labour; strong domestic and international competition; new markets and changing consumer patterns; technological advancements; tax and regulation; and access to capital and appropriately skilled labour.

2. In particular:
   - Between 2000-01 and 2015-16, gas prices increased annually by 2.7 per cent and electricity prices by 5 per cent, on average.
   - The growth in unit labour costs in Australia between 1998 and 2015 was the second-highest among OECD countries.

3. In this environment, not all firms will continue to manufacture, but the prospects for many firms are positive. Queensland manufacturers are developing strengths by:
   - identifying and leveraging sources of advantage
   - using innovation to drive quality and efficiency
   - focusing on quality to move up the product value chain
   - providing rapid turnaround and bespoke orders
   - targeting niche markets and global value chains
   - combining manufactured goods with services to establish a local advantage.

4. There is no one standalone exemplary section of manufacturing in Queensland; rather, there are success stories across sectors and the state.
3.1 Introduction

Manufacturing firms in Queensland face strong pressures—relatively high energy and labour costs, intense domestic and international competition, changing markets and challenges accessing capital and skilled labour.

Queensland has many robust, competitive manufacturers that leverage natural resources, leading-edge technology, superior design or customisation, high levels of efficiency and/or a focus on customer service. However, not all firms have, or will, be able to successfully respond to the pressures the sector is facing.

The diverse nature of manufacturing in Queensland and the strengths that firms have developed in response to pressures mean that while it is possible to identify some of the broad opportunities emerging, there is no single pathway, or subsector, that provides a ‘blueprint’ for manufacturing success in the future.

3.2 Significant factors that affect manufacturers

The significant factors affecting manufacturing performance include input costs, levels of competition, changing markets, technological advancements, tax and regulation, and access to capital and appropriately skilled labour.

3.2.1 Input costs

Australia is a relatively high-cost place for manufacturing.

The Boston Consulting Group Cost Competitiveness Index—which develops scores based on manufacturing wages, productivity, energy costs and currency exchange rates—ranked Australia the worst-performing of the 25 economies analysed in 2014. Australia was also found to have lost ground in each of the cost competitive areas assessed since 2004:

*The resources and infrastructure boom contributed to the loss of cost competitiveness in manufacturing by driving up wages and the Australian dollar and by drawing away capital. Manufacturing wages rose by 48 per cent over the past decade, and capital inflows from commodity exports caused Australia’s currency to appreciate by 21 per cent against the U.S. dollar. At the same time, overall manufacturing labour productivity fell 1 per cent in absolute terms over the ten-year period.* (Sirkin et al 2014, p. 12)

Similarly, the Advanced Manufacturing Growth Centre estimated Australian manufacturing costs to be between 7.3 per cent and 15.1 per cent higher than their benchmark counterparts in two manufacturing sub-industries (AMGC 2017, p. 8).

As a proportion of total costs, intermediate inputs have been rising, offset by small falls in labour and capital (Figure 3.1). Among intermediate inputs, the cost share of energy inputs has risen from 4.5 per cent in 1995–96 to over 8.5 per cent in 2014–15, while the share of services has also risen.
How much the high-cost environment impacts manufacturers depends on several factors, including a firm’s exposure to particular input costs (Box 3.1) and its ability to pass on costs to buyers. Trade-exposed manufacturers are particularly vulnerable to input prices. When critical input costs such as labour or energy increase more rapidly than in competing countries, manufacturers in trade-exposed sectors bear these increased costs through reduced profit margins. Sustained increases in input costs can render businesses uncompetitive.

Notes: Labour input is based on quality-adjusted hours worked. A time series of Queensland’s manufacturing industry cost structure is not available.

Source: ABS 2016m.
Box 3.1 Manufacturing’s cost structure: How much do input costs matter?

The Queensland manufacturing industry’s cost structure as at 2006–07 was:

- labour—15 per cent of total input costs (compared to 17 per cent nationally)
- capital—12 per cent of total input costs (12 per cent nationally)
- intermediate inputs (energy, materials and services)—72 per cent of total input costs (71 per cent nationally)
- taxes on production—1 per cent of total input costs.

Disaggregated data for intermediate inputs, or recent data for Queensland, is unavailable. However, a breakdown of input costs by subsector at the national level is provided below.

Manufacturing subsector costs as a proportion of total production costs, Australia, 2014–15

![Graph showing the proportion of costs for various subsectors]

Note: Data labels for 'taxes less subsidies' are not shown. ‘Taxes less subsidies’ does not exceed 2.9 per cent of costs in any subsector. Non-ferrous primary metals taxes less subsidies are negative.


Manufacturers’ input price growth has varied over time and the impact has varied across subsectors. In aggregate:

- From 1989–90 to 2015–16, the price of inputs to manufacturing rose by 2.4 per cent per annum on average (Figure 3.2).
- Input prices rose rapidly from 1998–99 to 2007–08 at an average rate of 3.6 per cent per annum. This was followed by subdued growth averaging 1.0 per cent per annum over the period 2007–08 to 2015–16.
This suggests the impact of input price growth on manufacturers was much greater on average prior to the GFC but has slowed in recent years. Whilst this change may have had a positive impact on profit margins recently, it likely reflects lower growth in demand globally, which would adversely impact revenue.

Some subdivisions have experienced lower growth in output prices than in input prices, reducing their overall competitiveness, particularly in metals, food, textiles and furniture manufacturing.

**Energy costs**

From June 2000–01 to June 2015–16, the price of natural gas as an input to manufacturing industries increased by 2.7 per cent per annum on average. Electricity prices rose more markedly at 5.0 per cent per annum over the same period (Figure 3.3).

Stakeholders to this inquiry were concerned about the price of electricity. Two stakeholders indicated that their electricity costs have increased by over 70 per cent since 2010. CCIQ emphasised the importance of electricity for manufacturing:

> In a recent CCIQ survey, 65% of businesses cited electricity price rises as a major or critical concern. Manufacturers use a diverse range of energy sources and the ability to secure long-term supply is a key factor in their decision-making on whether to invest in, grow, or close their business operations entirely. Mostly however, the provision of reliable and cost-effective electricity supply is vital to manufacturing businesses in Queensland continuing their operations. (CCIQ sub. 6, p. 18)

Similarly, the Department of State Development (DSD) identified rising resource and energy production costs as a key challenge for Queensland’s manufacturing businesses (DSD sub. 11, p. 2).
Figure 3.3 Energy input costs in the manufacturing industry, Australia

Notes: These energy input PPIs reflect changes in manufacturing input costs for purchases from the electricity supply and gas supply industries (ANZSIC industry codes 26 and 27, respectively).

Source: ABS 2017f.

The electricity futures market expects that wholesale electricity prices will fall in Queensland on average (till at least 2020) but will remain above the historical spot price average (AEMO 2017a, AER 2017). AEMO (2016b) forecasts that the delivered wholesale price of gas in Australia will increase by 48 per cent by 2036.

Labour costs

Australia’s wages have been increasing; yet, labour productivity is not keeping pace.

As illustrated in Figure 3.4, national wages\(^9\) rose by more than 2.5 per cent per annum for all years from 1998–99 to 2015–16 with the exception of 2009–10 (2.3 per cent) and 2015–16 (2.4 per cent) (ABS 2016b, 2016l, 2016m).\(^{10}\) Compared to a set of OECD countries (plus Taiwan), Australian manufacturing experienced the second-highest rate of growth in unit labour costs\(^11\) over the period 1998 to 2008 and the third-highest rate of growth over the period 2008 to 2015 (The Conference Board n.d.).

All else being equal, wage increases that are underpinned by labour productivity increases do not erode the international competitiveness of domestic manufacturers. However, manufacturing labour productivity grew at only 1.4 per cent per annum, on average, between 1998–99 and 2015–16 (ABS 2016m, 2016l, 2016b).

---

\(^{8}\) Historical average is based on values between 1999 and 2016.

\(^{9}\) Calculated here using the Wage Price Index published by the ABS.

\(^{10}\) Wage price indexes by state and by industry are not available for Queensland.

\(^{11}\) Unit labour costs are defined as the cost of labour input required to produce one unit of output.
3.2.2 Strong domestic and international competition

Over the last three decades, the Queensland manufacturing industry has faced increasing domestic and international competition.

The appreciation of the Australian dollar from 2000 to 2013 made it difficult for Queensland exporters to compete in international markets. The depreciation of the Australian dollar in recent years has provided some relief (Figure 3.5).

Nevertheless, Queensland’s manufacturers are operating in a global environment where:

- reduced trade barriers provide customers with more choice. At the same time, remaining barriers to trade and subsidies can prevent Queensland manufacturers from accessing some international markets
- information and communication technologies help mitigate problems associated with distance, allowing activities to be more dispersed while maintaining functional supply chains
- falling transportation costs allow production to be moved to the lowest-cost regions
- the differences in costs, particularly labour, make offshoring profitable (CEDA 2014, p. 33).

The Australian manufacturing industry is relatively trade-exposed. It faces about four times as much import competition as the broader market sector, with over 40 per cent of manufactured products imported (ABS 2017c, 2017f).
Notes: The RBA’s trade-weighted indices are calculated as a weighted geometric average of a basket of currencies chosen to account for at least 90 per cent of Australia’s two-way merchandise and services trade.


The textile, leather, clothing and footwear subsector and the machinery and equipment manufacturing subsector face the greatest competition from imports (78.5 and 73.7 per cent of products consumed in Australia are imported, respectively). Metal manufacturing is the only Australian manufacturing subsector to export the majority of output (62.4 per cent) (ABS 2017k).

The global outlook for manufacturing suggests that large international manufacturers are putting renewed focus on growth (KPMG 2016, p. 3). To do this, manufacturers expect to introduce new products and services, and enter new markets. Manufacturers expect access to new markets (94 per cent) to be an important driver of their international investments (KPMG 2016, p. 10).

3.2.3 Changing markets and consumer preferences

Consumer demand is changing through:

- rising demand from Asia, due to a growing middle class, with its associated spending power (Ernst & Young 2013, p. 8)
- a global aging population is shifting demand for certain products. The average consumer is slightly older, with growth among aging populations in developed markets outpacing growth of the younger demographic in emerging markets (Benson-Armer et al. 2015, ABS 2015a)
- a growing urban consumer market increasing demand for some products (such as electric vehicles) and reducing demand for products consumed in non-urban markets.
New and emerging markets

<table>
<thead>
<tr>
<th>Rising Asian middle-class</th>
<th>Global aging population</th>
<th>Increased urbanisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some 1.8 billion people will join the global middle class by 2025.</td>
<td>The global share of people aged 60 years or over increased from 9.2 per cent in 1990 to 11.7 per cent in 2013 and will reach 21.1 per cent by 2050.</td>
<td>In 2014, approximately 54 per cent of the world’s population lived in urban areas.</td>
</tr>
<tr>
<td>By 2030 Asia will form 66 per cent of the global middle class population and 59 per cent of middle-class consumption, compared to 28 per cent and 23 per cent respectively in 2009.</td>
<td>The Australian population aged 65 years and over grew from 11.9 per cent in 1995 to 15 per cent in 2015.</td>
<td>This will increase to 66 per cent by 2050.</td>
</tr>
</tbody>
</table>


Other identifiable consumer trends include: online shopping, the sharing economy, ‘ethical’ consumerism, overemployed consumers, a shift to pre-prepared food, health consciousness and customised and bespoke products.

Given the dynamic nature of preferences, simply aligning manufacturing processes and products to these emerging patterns may not result in a firm’s success. Nor do emerging consumer patterns necessarily negate the importance of traditional manufactured goods, many of which are likely to remain a consumer staple. Many other factors—beyond the product—also contribute to the success, or otherwise, of businesses.

3.2.4 A small and relatively remote market

Queensland’s relatively small market, with a population dispersed over a large and remote land mass, can make it difficult for manufacturers to achieve economies of scale, access markets and maintain growth.

Economies of scale may become less important over time, particularly as certain markets move away from a ‘mass production, mass consumption’ model and firms trade scale for flexibility and timeliness. However, even in this environment, scale can still be important. Due to the small size of local markets, scaling production is a challenge for Queensland manufacturers (Office of the Queensland Chief Scientist 2016a, p. 5).

Firms make location decisions based on multiple factors (Box 3.2). Some of these factors that particularly affect the competitiveness of Queensland as a location for manufacturing include proximity to market, market size and stability. For example, locating close to markets may assist organisations to:

- reduce freight costs
- monitor changes in consumption patterns
- improve reliability of product delivery
- reduce the time lag of taking product to market
- understand and respond quickly to customers’ requirements
- undertake R&D and experiment with prototypes (ESCIP Consortium 2014, pp. 6–7).
Box 3.2 Factors influencing location decisions

Many studies have analysed the factors that affect location decisions.

Research shows that firms tend to base locational decisions on the rate of return they can achieve on an investment. The location decision is largely driven by economic factors based on a range of cost drivers, as well as social and political factors.

These factors include access to natural resources; energy and labour costs; transport; infrastructure; market proximity, size and growth; workforce skills and social and political stability.

In terms of government policy, the literature regularly cites corporate taxation as the strongest driver of production and investment location decisions.


3.2.5 Integration with global value chains

Global value chains present opportunities but integrating can be difficult. Networks of businesses, workers and consumers are linked in global value chains around the world. A value chain is:

*the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond. This includes activities such as research and development (R&D), design, production, marketing, distribution and support to the final consumer. The activities that comprise a value chain can be contained within a single firm or divided among different firms (Gereffi & Franeldez-Stark 2016, p. 7).*

A supply chain emphasises the manufacturing and distribution elements of activity, whereas the value chain includes other activities such as design, branding and customer service that add value but do not affect the physical transformation of the product (Frederick 2016).

The CSIRO in its Roadmap for Advanced Manufacturing identified supply chain transformation as one of five global megatrends that will substantially shift the social, economic, technological and environmental conditions that manufacturers operate in (CSIRO 2016, pp. 10–11). Transformations will see greater specialisation and collaboration in some markets, while in others technologies will enable vertical integration.

Boeing is an example of an entity that utilises global value chains to manufacture parts of its planes.

Boeing’s 787 Dreamliner sources its parts from nine countries around the world including Australia (Ro 2013). The high value of components can render shipping costs a relatively minor factor as a proportion of total costs, despite some parts being quite large and heavy.
Some Queensland manufacturers have taken advantage of fragmented production by integrating with
global value chains. However, on average, Australian manufacturers are thought to be poorly connected
to global value chains, having amongst the lowest level of backward linkages of developed countries
(AMGC 2017, p. 49).

Whilst the ideal level of forward and backward linkages\textsuperscript{12} is impossible to determine, this metric can be used
as a proxy to indicate the extent of collaboration, utilisation of economies of scale and minimising input
costs. This may not necessarily be a problem—it may be that participation in global value chains is low, but it
may also be due to geographical considerations.

Australian businesses did have a higher proportion of forward linkages. The share of domestic content in
Australian exports in 2009 (largely unchanged since 1995) was 87 per cent, well above the OECD average of
76 per cent and China’s 67 per cent (CEDA 2014, p. 62).

\subsection*{3.2.6 Technological advancements}

Technological advancements are changing the manufacturing landscape. Innovation and knowledge are
increasingly determining the competitiveness, productivity and growth of manufacturing in developed
countries (OECD 2012a, p. 30).

New technologies and innovations are combining to change how businesses manufacture. To apply
new technologies, businesses often need access to skilled and educated workers and capital. Advanced
manufacturing techniques may lower the physical capital requirements for supporting production (PC 2016a,
p. 56). Technologies like 3D printing may enable smaller-scale competitive production.

Business Insider projected that the installation of Internet of Things (IoT)\textsuperscript{13} devices in global manufacturing
will increase from 237 million in 2015 to 923 million in 2020 (Greenough 2016). More than a quarter of large
international manufacturers have already invested in robotics, 3D printing or IoT. Most large international
manufacturers are planning to invest in or are considering investing in advanced manufacturing (Figure 3.6).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.6.png}
\caption{Large international manufacturing businesses that anticipate investment in
manufacturing technologies over the next 2 years}
\end{figure}

Source: KPMG 2016, pp. 16, 22.

Queensland manufacturers and their workers may not be well-prepared for the changes taking place globally
and may lack capacity to adopt new technologies. Only 19 per cent of small and medium enterprises (SMEs)
have some form of digital strategy, and ICT literacy in many SMEs is low (DSD 2016b, p. 9).

\textsuperscript{12} Backward linkages refer to the proportion of foreign value added in exports and forward linkages refers to the proportion of domestic value added in foreign exports.

\textsuperscript{13} IoT is used to describe devices that are interconnected and communicate with each other through internet applications and technology.
3.2.7 Tax and regulation

Taxation arrangements can put Queensland manufacturers at a competitive disadvantage in relation to overseas competitors. They can also divert resources away from the sector, for example, where taxes encourage inefficient investment in alternative activities. As highlighted in Box 3.2, tax is a factor in location decisions.

Queensland manufacturers must comply with a significant amount of regulation, which increases business costs. For example, a submission to the Productivity Commission outlining the regulatory burden on the Australian red meat industry (including processors, manufacturers and retail butchers) found that as of 2008, the industry was required to comply with around 50 Queensland, Australian and international rules, regulations and guidelines, many of which were specific to Queensland (Red Meat Industry 2008, pp. 3–4). This is time-consuming and can be expensive for manufacturers.

3.2.8 Access to capital and skilled labour

Accessing capital and appropriately skilled labour can be difficult. Access to, and the cost of, capital contributes to an industry’s ability to compete.

While access to capital can be considered within the control of a firm, external factors can affect capital accessibility. Regulation, location and the tax environment can all affect the efficiency of financial markets and reduce access to capital for Queensland’s manufacturing firms.

Both access to skilled labour and the changing nature of manufacturing jobs will likely create challenges for the Queensland manufacturing industry. Some stakeholders identified that accessing skilled workers was not always easy in Queensland. Moreover, significant scope exists to improve the quality of management in Australia’s manufacturing (AMGC 2017, p. 9, AMPR Team, p. 14).

3.3 Prospects

Firms are responding to these pressures in different ways. Those that have, or can, respond and adapt have a range of opportunities, but not all firms will be able to transition. Firms have developed strengths and are continuing to do so, by:

- identifying and leveraging sources of advantage—Queensland has many competitive and comparative advantages such as land, minerals and metal ores, access to Asian markets, strong institutions and an educated workforce
- using innovation to drive quality and efficiency—adopting advanced production processes and undertaking capital deepening can reduce costs and waste while concurrently improving quality
- focusing on quality to move up the product value chain—quality is cited by international consumers as a key reason they buy Australian products
- providing rapid turnaround and bespoke orders—some customers will pay a premium to have a product that meets their specific requirements and/or can be delivered in a short period of time
- targeting niche markets and global value chains—specialising and developing unique products enables quality, reliability and efficiency
- combining manufactured goods with services—provides a greater opportunity to add value for the customer beyond products.
Manufacturers are identifying and leveraging sources of advantage

In a competitive market, manufacturers need to exploit competitive and comparative advantages (Box 3.3) to survive and prosper.

Box 3.3 What are comparative and competitive advantages?

Having a comparative advantage describes the situation where an organisation is able to produce goods and services at a lower opportunity cost than its competitors. It is the ability to produce a product most efficiently, given all the other products that could instead be produced.

A competitive advantage is an advantage over competitors gained by offering consumers greater value, either through lower prices or by providing better quality products and services that justify higher prices.

Source: Kwo 2017.

The advantages for manufacturing in Queensland are many and varied, but some identified common sources:

• an abundance of natural resources
• access to relatively low cost, highly-skilled workers
• proximity to growing export markets (such as India and China)
• infrastructure and supporting transport/logistical/telecommunication networks, including airports, ports and rail
• research capability and pre- and post-production activities (such as design, R&D, innovation, and communications)
• liveability, amenity and an increasingly diverse population with extensive links throughout the region.

Queensland’s strengths have resulted in manufacturing outputs that are largely related to food production, minerals and metals processing and the production of machinery and equipment. Queensland’s current manufacturing industries, supported by the relative competitive and comparative advantages they enjoy, are likely to continue to produce the majority of the sector’s output for the foreseeable future. Although new manufacturing opportunities will arise, it is likely that firms in existing industries will continue to be a major contributor to growth.

There are also areas where Queensland may not have a competitive advantage overall, but can still exploit specific advantages. For instance, despite having high labour costs overall, management and professional wages in the medical devices industry are 38 per cent lower in Australia than in the United States (AMGC 2017, p. 9).

The identified advantages are not exhaustive. There are manufacturers in Queensland who will remain competitive without explicitly focusing on any of these areas.

Using innovation to drive quality and efficiency

Queensland manufacturers are using technology and innovative production processes to deliver higher-quality products and value for money.

Adopting advanced production processes and undertaking capital deepening,14 including through automation, can reduce costs and waste while concurrently improving quality. Similarly, adding value through process innovation can develop new products and markets. Watkins Steel and Sunny Queen Farms are examples of Queensland manufacturers undertaking innovation to drive quality and efficiency.

14 Capital deepening is investing more in capital assets to increase the amount of capital per worker.
Case study: Watkins Steel

Watkins Steel is a Brisbane-based business that has been operating since 1968. It specialises in structural steel and metalwork fabrications with applications in construction, manufacturing and mining. The family-owned business employs over 70 staff who undertake steel detailing, fabricating, drafting, 3D scanning and design, estimating and installation services.

Watkins Steel management has adopted advanced process and production techniques, which has allowed it to innovate. It recognised that a lack of accuracy was costly, both to itself (in the need to undertake reworks) and its customers (in downtime and lost production). It subsequently developed a unique end-to-end digital workflow for measurement, fabrication and installation. By combining 3D technology with advanced robotics, it was able to largely eliminate human error in estimation, manufacture and installation. Its four-step linked process involves:

• taking a 3D laser scan of the site to ensure accuracy of measurement
• developing 2D shop drawings and undertaking 3D modelling
• automated and precise steel fabrication using robotics
• station set out for on-site installation.

Watkins Steel has also started using augmented reality (AR) within its processes, discovering application possibilities in industry design, quality assurance, site layouts, fabrication, installation and design communication.

Utilising these advanced technologies, Watkins Steel is able to achieve near 100 per cent accuracy on every job. As a result, in 2015, it decreased operational expenditure by 40 per cent, while increasing employment by 10 per cent and ultimately increased net profit by 10 per cent.

Many of Watkins Steel’s employees who were previously tradesmen, such as boilermakers, have now been trained to operate new technology. While the business remains a steel fabrication and installation company at its core, the value-added benefits afforded to customers through the application of its 3D scanning technology and modelling software has allowed the company to provide specialist design and 3D laser scanning services (Watkins Steel 2017).

Case study: Sunny Queen Australia

Sunny Queen Australia, established in 1969, is a third generation egg farming business that produces a range of egg products including omelettes, fritters, crepes, frittatas, scrambled eggs and poached eggs, as well as packaged liquid eggs.

Its products have featured in quick-service restaurants, airlines, hospitals, aged care facilities, schools, cafes, workplace catering and defence force mess halls. Sunny Queen Australia is one of the largest egg farming businesses in Australia.

Sunny Queen Australia’s innovative production processes have provided it with a competitive edge over its global peers. It has successfully expanded into offshore markets such as Hong Kong, Macau and the Middle East, and is investigating exporting to South Korea.

Its research and development and culinary teams have enabled the production of unique products that meet the needs of niche markets. For instance, the individually wrapped omelettes and scrambled egg mix results in zero waste for customers. Sunny Queen Australia is 100 per cent owned by Australian farmers (Sunny Queen Farms 2017a, 2017b; Marshall 2017).
Focusing on high quality to move up the global value chain

Product differentiation enables manufacturers to distinguish themselves from their competitors. It also allows them to meet the requirements of specific market segments. International customers have identified product quality (design and technology leadership) as one of three main reasons they buy manufactured goods from Australia (AMGC 2017, p. 9). Packer Leather is an example of a firm that has used high-quality kangaroo leather and other quality products to compete in international markets.

Case study: Packer Leather

Packer Leather was established in 1891.

To differentiate itself, Packer Leather began producing kangaroo skins, thereby carving out its own market niche. It is recognised worldwide for its locally sourced, high-performance kangaroo leathers, which provide superior strength and softness while being naturally thin. The unique properties of fibre allowed the company to establish a market niche for itself in fit-for-purpose products, including footwear, garments and gloves.

While competitors now also produce kangaroo skins, Packer Leather has maintained itself as a market leader with a reputation for quality and innovation, based on its exclusive tanning technologies that complement the natural characteristics of the leather. Packer Leather produce waterproof, abrasive resistant, breathable, fire retardant, UV reflectant, anti-microbial and identifiable leather products (Packer Leather 2017).

The business exports to 19 countries and supplies world leading sports shoe brands (Lee 2014). Domestically, Packer Leather supplies renowned brands such as Kookaburra Sport, RM Williams, Akubra, Sherrin, Rip-curl and Florsheim. Prior to shipment, its products are tested in the company’s in-house laboratory to ensure that they are fit for purpose and meet relevant international specifications. The company is committed to maintaining the environment, through its use of a renewable natural resource and by ensuring that it meets rigorous environmental standards that are subject to independent audit. It also makes use of solar power to reduce its energy consumption and recycles at least 40 per cent of the water used in production.

KFSU has developed a high-quality health food product out of sugarcane.

Case study: KFSU

KFSU, established in 2006, has developed a patented method to extract the known dietary fibre and nutrients from sugarcane. Sugarcane fibre is normally not digestible by humans. KFSU took years to refine processing technologies that would maintain the integrity of the whole-plant-cell and generate a versatile product that could easily be absorbed by the gut and combined into a wide variety of foods. Its continued research of the product revealed further health benefits and treatments of the fibre.

The business has developed two products called Phytocel and Kfibre. The products are used in baking, processed meats and health food applications and boasts being all-natural, chemical-free, non-GMO, gluten-free and allergen-free. They also contain B-group vitamins and calcium and can be added to other food products to derive low-GI, high-fibre and high-iron health benefits. The products are sold into pharmacies as a gut health treatment. The products are also able to absorb eight times their own weight in water, and their associated nutrient value gives them a major competitive advantage over the use of flour and soy as a fibre additive.

KFSU is exporting its products to many well-known distributors in Japan, the United States, China and Latin America.

KFSU is owned by approximately 70 shareholders, including sugarcane farmers. This has provided them with networking opportunities that have been critical in the development and sale of its products (KFSU 2017, DSITIA 2015).
Providing rapid turnaround and bespoke orders

For some manufacturers, their competitive advantage stems from their ability to manufacture products quickly. Some customers want to have their products in a short period of time and are willing to pay a higher price for expediency. This willingness to pay may mitigate high local production costs, and a preference for customer involvement may advantage local producers, who can more easily provide this service.

While the removal of trade barriers has seen traditionally protected industries, such as the Textiles Clothing and Footwear (TCF), contract, some firms have remained competitive. Beaulieu Pacific is an example of a Queensland manufacturer whose focus on high quality and rapid turnaround has kept it competitive in the TCF sector.

Case study: Beaulieu Pacific

Beaulieu Pacific is a manufacturer of jacquard fabrics for commercial and residential use. The company has been weaving fabrics in Brisbane since 1989. The company is a wholesaler throughout Australia and New Zealand focused on:

- high quality
- flexibility and adaptability
- exceptional customer service
- minimising environmental impacts.

A team of 45 employees including specialist weavers, technicians and three in-house designers enables the company to quickly produce and take to market new products. The company is able to turn around new products within a couple of weeks, whilst the process allows for instantaneous customer feedback and input. Large international competitors, on the other hand, can take a number of months to develop and deliver the product required.

Beaulieu Pacific is part of Belgotex International and has a working relationship with Beaulieu Fabrics in Belgium, providing its customers with direct access to the latest European design and colour trends whilst enjoying the benefits of face-to-face interactions with a local Australian manufacturer (Beaulieu Pacific 2017).

Targeting global value chains and niche markets

Firms have developed competitive advantages by targeting niche markets and leveraging green/ethical branding or the high-tech, high-quality end of global value chains. The Australian Automotive Aftermarket Association illustrates how the automotive industry is contributing to global value chains.

Case study: The Automotive Aftermarket

The Australian Automotive Aftermarket Association is an industry association representing manufacturers, distributors, wholesalers, importers and retailers of automotive parts, accessories and services. In its submission to this inquiry, it outlined how Queensland businesses are contributing to global value chains in the automotive industry.

Through collaboration, innovation, quality, flexibility and punctuality, manufacturers in Australia have earned an enviable international reputation. The industry produces suspension components, roof racks, tow bars, side steps, performance parts and other aftermarket products, which are sold both in Australia and overseas. The industry has focused on moving up the value chain, specialising in products with a technological advantage such as 4WD, high-performance and motorsport components. These are shipped and used around the globe as part of other businesses’ global value chains (AAAAA sub. 10, p. 5). This has enabled many businesses to thrive despite the recent closures of large Australian car manufacturers.
Full Circle Fibres reaches the niche market of customers who want to know the full production journey of their fabric products.

Case study: Full Circle Fibres

Full Circle Fibres sources and supplies sustainable and ethically produced fibres, yarns and fabrics. Attached to their products is a record of the full production journey so that customers can ‘create with a conscience,’ knowing exactly where their products are sourced and how. To achieve this product offering, Full Circle Fibres manages and coordinates complex supply chains to maintain this high quality and traceability. The business is responding to growing demand for integrity in fabric products (Full Circle Fibres 2017).

Combining manufactured goods with services to create a local advantage

Some manufacturers are expanding their product offering beyond the manufactured product to encompass a wide range of associated services that add value to the customer. These associated services may include customisation, maintenance, replacement, sales, insurance, financing, distribution and more.

Increasingly, manufacturers are personalising their services and products. There is a shift towards mass customisation or personalisation, rather than mass production. For instance, stores are now offering personalised packaging for products. Similarly, new technology allows for the local printing of precision parts for repair and maintenance. This allows firms to provide a broader and more comprehensive product and service offering for their customers.

The Herston Health Precinct in Brisbane is an example of such customisation. The Precinct is dedicating two floors to be converted into a hub for medical engineers to collaborate, use 3D printers and undertake tissue engineering (Halverson 2017). This location places the facility close to patients who will likely require these services. Surgical Engineering Queensland is a firm offering personalised product development and product service support for its customers.

Case study: Customised disability aids

Surgical Engineering Qld has been designing and manufacturing wheelchairs in Australia for over 35 years. The company makes everything from day wheelchairs to top-of-the-range racers and handcycles. All chairs are custom-made and fitted to individual specifications and preferences (Surgical Engineering 2017).

3.3.1 Conclusion

This chapter explores factors which place pressures on the competitiveness of the manufacturing industry and individual manufacturers in Queensland. These factors include high input costs; strong global competition; geographical constraints, new markets and changing consumer patterns; technological advancements; tax and regulation; and access to capital and appropriately skilled labour.

Manufacturers are responding to these pressures in different ways—some, but not all, will embrace new opportunities. Many Queensland manufacturers are developing strengths through identifying and leveraging sources of advantage, producing unique, high-quality products, providing value from money through efficiency, and bundling manufactured goods with services.

There are many successful manufacturers across Queensland, with some operating in the most unexpected areas of manufacturing. However, there was not one standalone exemplary segment of manufacturing in Queensland—competitive manufacturers were identified in many different sub-industries. Competition has driven these manufacturers to identify and build their competitive strengths.

The next chapter analyses the role of government in manufacturing.
4.0

Government policies and programs
Government policies and programs influence outcomes in Queensland’s manufacturing sectors—shaping the general business environment and influencing firms’ and workers’ decisions.

This chapter provides an overview of the existing policies and programs that manufacturing businesses might use, have access to, or would otherwise be impacted by, and discusses what role the government can play in the manufacturing sector.

**Key points**

1. Manufacturers are affected by a broad range of government policies and programs across all levels of government. These policies are often not specifically directed at the manufacturing sector.
   - Like all businesses, manufacturers are influenced by framework policies that shape the overall business operating environment and the economy more broadly.
   - More targeted policies include grants or subsidies; trade barriers; industry facilitation and support programs; programs to bolster research, increase collaboration and accelerate commercialisation; and education and skills development programs.

2. It is difficult to assess whether existing policies and programs are effective or efficient.
   - Many policies and programs are new (limited or no performance information is therefore available).
   - Specific challenges may arise when programs are dealing with complex and dynamic processes, which can have lags between implementation and outcome.
   - More generally, a lack of information on policy failures lends itself to a lack of balanced reviews on the effectiveness of policy programs.

3. The Queensland Government can influence the Queensland manufacturing sector’s future growth.

4. Getting the fundamental policy and program settings right is the best way to help all businesses and workers (including those in the manufacturing sector) to achieve their potential.

5. Direct intervention should be limited to policy problems that require a government response (that is, where the market clearly fails to produce the best outcome) and where a government response will improve outcomes (where benefits outweigh the costs).

6. The Queensland Government should be particularly cautious when attempting to develop new ‘strategic’ industries or sustain industries in decline. There is no convincing link between targeted government aid for a particular industry and the performance of that industry—and history details many costly failures.

7. Best-practice policy design, implementation and review will help focus Queensland Government efforts.
4.1 A brief history of manufacturing policy

Following federation in 1901, to support local industry the Australian Government adopted an array of trade protection policies, in the form of tariffs, quotas and subsidies. State governments supported trade barriers with regulatory restrictions on competition, and subsidised services and infrastructure.

By the 1970s and 1980s, there was growing evidence that trade barriers were making a significant contribution to Australia’s economic malaise—declining per capita incomes, higher prices and poor productivity. There was a recognition that:

- as a small open economy, Australia is a price-taker for many goods and services, so must enable markets to work to ensure the most efficient allocation of resources
- government funding of social programs depended on having an efficient and productive economy (Banks 2005, p. 17).

What followed was a progressive opening of the Australian economy, with the effective rate of assistance for manufacturing falling from approximately 35 per cent in the early 1970s to around 4 per cent in 2014–15 (Figure 4.1).

**Figure 4.1 Effective rates of assistance to manufacturing and agriculture, 1970–71 to 2014–15**

Note: a Refers to selected agriculture activities up to and including the year 2000–01. From 2001–02, estimates refer to division A of the Australian and New Zealand Industrial Classification which covers agriculture, forestry, fishing and hunting activities.


The opening of the Australian economy, and a range of other economic reforms, saw a significant rise in Australia’s per capita GDP ranking (Figure 4.2).

The lowering of trade barriers has, however, precipitated an increase in other forms of intervention such as budgetary assistance through subsidies and tax concessions (including to support innovation), as well as government purchasing preferences and regional adjustment initiatives. Emerging influences seen domestically and abroad have put a renewed emphasis on reinvigorating manufacturing, including some calls for the return of measures that support, maintain or develop capabilities in key sectors even where otherwise the sector would not be competitive.

---

15 The effective rate of assistance measures the net combined assistance to a particular industry (including budgetary outlays, tax concessions and tariffs) in proportion to that industry’s unassisted net output (value added). It provides an indication of the extent to which assistance to an industry enables it to attract and hold economic resources relative to other sectors (PC 2016b, p. 26).
4.2 Current policy landscape

Policies and programs that impact manufacturing are delivered by all levels of government and include:

- framework policies that shape the overall business operating environment and the economy more broadly
- more-closely-targeted assistance, including grants, subsidies, and concessions.

In 2014–15, 15.5 per cent of manufacturing businesses in Australia received some type of government financial assistance. With the exception of ongoing funding, a larger share of manufacturing businesses reported receiving government financial assistance than the share of businesses generally (ABS 2016c). That said, it is likely that overall figures mask large variations between different manufacturing subsectors.

Australian Government policies and programs

In 2014–15, Australian manufacturers received an estimated $7 billion in net assistance (PC 2016b, p. vii), largely due to tariff protection, but also through industry programs and policies (Box 4.1). It is not possible to disaggregate how much assistance is provided to Queensland manufacturing businesses through these programs.

R&D tax incentive

The research and development (R&D) tax incentive aims to encourage R&D activity that would not otherwise occur and to incentivise small companies to engage in R&D (Australian Government 2015). It allows eligible companies to receive a refundable tax offset for R&D activities. This offset can be as much as 43.5 per cent when aggregated turnover is less than $20 million.

Trade agreements

The Australian Government has enabled manufacturers to access new markets by negotiating trade agreements. Since 2010, the Australian Government has signed free trade agreements with China, Japan, Korea and Malaysia, as well as the ASEAN–Australia–New Zealand free trade agreement. The Australian Trade and Investment Commission provides resources to navigate these agreements online, and grants are available to assist with entering new export markets.

The Australian Government assists industry through an array of government programs, regulatory instruments and policies. Key policies and programs relevant to manufacturing include:

- **import tariffs**—raise the price of imported products allowing competing domestic firms to charge higher prices including for food, beverages and tobacco ($1.3 billion), fabricated metal products ($1.3 billion), petroleum, coal, chemical and rubber products ($0.7 billion)
- **tax concessions** ($393 million)—including the R&D tax offset that reimburses some of the costs of R&D to organisations through a tax offset
- **Growth Fund** ($101 million)—a partnership between government and industry to support employees, businesses and regions affected by the closure of Australia’s car manufacturing industry, including assisting automotive supply chain firms to add new products and customers and drive new non-automotive business activities
- **Advanced Manufacturing Fund** ($101.5 million)—to promote research and capital development for high-technology manufacturing businesses
- **Industry Growth Centres**—including establishing the Advanced Manufacturing Growth Centre (located in Victoria) to link manufacturers with global companies; identify future job and skills needs; develop an innovation pipeline; and identify regulatory reforms
- **Innovative Manufacturing Cooperative Research Centre** ($40 million)—to develop and support ‘manufacturing innovation’ in Australia
- **numerous business grants available to manufacturing and free trade agreements.**


**Export Market Development Grants**

Export Market Development Grants (EMDGs) encourage small and medium-sized Australian businesses to develop export markets by reimbursing up to 50 per cent of eligible export promotion expenses. Each eligible applicant can receive the grant up to eight times (QCA 2015a).

**The Industry Innovation and Competitiveness Agenda**

The Industry Innovation and Competitiveness Agenda has six key initiatives designed to promote industry innovation and competitiveness, including:

- encouraging employee share ownership
- reforming the vocational education and training (VET) sector
- promoting science, technology and mathematics skills in schools
- accepting international standards and risk assessments for certain product approvals
- enhancing the 457 and investor visa programs16
- establishing Industry Growth Centres (Box 4.2) (DIIS 2014, p.vii).

**Procurement policy**

The Australian Government’s procurement rules require that all suppliers be treated equitably (based on their commercial, legal, technical and financial abilities) and not be discriminated against due to their size, degree of foreign affiliation or ownership, location or the origin of their goods and services (DoF 2017b, p. 13). The Australian Government does, however, seek to assist entities in identifying procurement opportunities. The Department of Defence’s Australian Industry Capability Program, for example, helps Australian companies identify opportunities in supplying Australian Defence Force projects (Department of Defence 2017).

16 In April 2017, the Australian Government announced that the 457 visa will be abolished and replaced with a new Temporary Skill Shortage visa in March 2018 (see Chapter 6).
Box 4.2 Industry Growth Centres

The Industry Growth Centres are designed to help industries transition into ‘smart, high value and export focused industries’. The Australian Government has allocated $250 million in funding over four years (2016–17 to 2019–20) to this initiative. It has established six growth centres around the following industry sector priorities:

<table>
<thead>
<tr>
<th>Advanced Manufacturing</th>
<th>Cyber Security</th>
<th>Food and Agribusiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Technologies and Pharmaceuticals</td>
<td>Mining Equipment, Technology Services</td>
<td>Oil, Gas and Energy Resources</td>
</tr>
</tbody>
</table>

The growth centres are not-for-profit organisations—led by a board of industry experts—which have been tasked to:

- identify regulations that are unnecessary, or overly burdensome, for the key growth sectors and impede their ability to grow, and suggest possible reforms
- improve engagement between research and industry, and within industry, to achieve stronger coordination and collaboration of research and stronger commercialisation outcomes in the key growth sectors
- improve the capability of the key growth sectors to engage with international markets and access global supply chains
- identify ways to improve the management and workforce skills of key growth sectors.

Each centre has been tasked to set a long-term strategy for its sector in a Sector Competitiveness Plan, which outlines how to lift capability, boost productivity and skills, create jobs, reduce regulation and engage with international opportunities.


Queensland Government policies and programs

The Queensland Government is seeking to ‘create jobs and a diverse economy’ through policies and programs that foster entrepreneurship and innovation; promote business investment and exports; deliver and facilitate productive infrastructure; grow human capital; optimise the use of land and natural resources; and lead an innovative, active and responsive public sector (Queensland Treasury 2017b, p. 8). Within this framework, the government is committed to growing manufacturing as a critical driver of innovation and productivity in the Queensland economy (DSD 2016a, p. 1).

Queensland manufacturing businesses and workers have access to a broad set of Queensland Government policies and programs (Figure 4.3) to support small business, encourage innovation and improve education and training outcomes. These include:

- the $420 million Advance Queensland initiative—aims to reinvigorate science and innovation to create the knowledge-based jobs, increase collaboration between research bodies and industry to translate ideas and research into commercial outcomes, and boost Queensland’s entrepreneurial culture (see chapter 6)
- the Queensland Trade and Investment Strategy 2017-22—seeks to position Queensland as an innovative and dynamic trading economy by: building on Queensland’s existing strengths and further diversifying the economy; building export capabilities and fostering export opportunities; attracting job-creating investment (see chapter 10)
- funding under the Annual VET Investment Plan—contributes to the cost of vocational education and training (see chapter 6)
- policies and programs designed to support employment and regional growth—such as the $177.5 million Back to Work Regional Employment package as well as elements of the $240 million Skilling Queenslanders for Work program (Queensland Treasury 2017b, p. 15).
The Queensland Government also provides significant assistance to manufacturers through tax concessions that are available to all Queensland businesses.\(^{17}\) The Queensland Competition Authority (QCA) estimated that from 2013–14 to 2017–18 the manufacturing sector would receive $946 million of payroll tax concessions, including $167 million for wages for apprentices and trainees (QCA 2015a, pp. 52, 56).

**Figure 4.3 Selected Queensland Government initiatives relevant to manufacturers**

<table>
<thead>
<tr>
<th>Advance Queensland</th>
<th>Industry Accelerator Program</th>
<th>Knowledge Transfer Partnerships Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Platform Technology Program</td>
<td>Innovation Partnerships Program</td>
</tr>
<tr>
<td></td>
<td>Ignite Ideas Fund</td>
<td>Commercialisation Partnership Program</td>
</tr>
<tr>
<td></td>
<td>Business Development Fund</td>
<td>Advance Queensland Industry Attraction Fund</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advancing Small Business Queensland Strategy 2016-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring for Growth Program</td>
</tr>
<tr>
<td>Accelerate Small Business Grants Program</td>
</tr>
<tr>
<td>Small Business Digital Grants Program</td>
</tr>
<tr>
<td>Small Business Entrepreneur Grants Program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Queensland Trade and Investment Strategy 2017-2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing future leaders</td>
</tr>
<tr>
<td>Improving the client experience</td>
</tr>
<tr>
<td>Supporting businesses</td>
</tr>
<tr>
<td>Strengthening regional businesses and economies</td>
</tr>
<tr>
<td>Expanding international presence</td>
</tr>
<tr>
<td>Promoting Queensland globally</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advancing Education: An Action Plan for Education in Queensland</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Schools of the future STEM Strategy</td>
</tr>
<tr>
<td>#codingcounts: A plan for coding and robotics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual VET Investment Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate 3 Guarantee</td>
</tr>
<tr>
<td>User Choice Program</td>
</tr>
<tr>
<td>Higher Levels Skills Program</td>
</tr>
<tr>
<td>Vocational Education and Training in Schools</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jobs and Regional Growth Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made in Queensland</td>
</tr>
<tr>
<td>Jobs and Regional Growth Fund</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skilling Queenslanders for Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back to Work</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Queensland Charter for Local Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powering Queensland Plan</td>
</tr>
<tr>
<td>Cover cost of Solar Bonus Scheme</td>
</tr>
<tr>
<td>Return Swanbank E to service</td>
</tr>
<tr>
<td>Investigate restructure of government owned gencos</td>
</tr>
<tr>
<td>Deliver the Powering North Queensland Plan</td>
</tr>
<tr>
<td>50 per cent renewable energy target by 2030</td>
</tr>
<tr>
<td>Facilitate next wave of diversified renewable energy</td>
</tr>
<tr>
<td>Improve large scale renewable project facilitation</td>
</tr>
<tr>
<td>Establish Queensland Energy Security Taskforce</td>
</tr>
<tr>
<td>Implement Queensland Gas Action Plan</td>
</tr>
<tr>
<td>Seek integrated national climate and energy policies</td>
</tr>
</tbody>
</table>

The uptake of Queensland Government programs by manufacturing businesses or workers is not available—neither is information on whether there are any particular benefits that might accrue to the manufacturing sector.

Several agencies provided information to the Commission that suggest a positive contribution by their programs. For example:

- the Mentoring for Growth Program and the (new) Accelerate Small Business Grants Program, which both have a focus on increasing capabilities in small businesses through access to high quality expertise and advice, can be particularly relevant for manufacturers (DTESB 2017a)\(^{18}\)
- in 2015–16, the VET Investment Plan provided $33.2 million for manufacturing-related apprenticeships and traineeships under the User Choice Program and $14 million for manufacturing-related Certificate

---

\(^{17}\) These reduce the amount of tax that a business is liable to pay.

\(^{18}\) The Commission was advised that around 40 per cent of businesses that register for Mentoring for Growth are manufacturing businesses and that is expected that between 15 per cent and 40 per cent of applications for Accelerate Small Business Grants Program are likely to be from manufacturing businesses (DTESB 2017a).
Level III and higher level qualifications under the Certificate 3 Guarantee and Higher Levels Skills Program (DET 2017a)\textsuperscript{19}

- 23 of the 29 projects currently being managed through the Advance Queensland Industry Attraction Fund are related to manufacturing (DSD 2017a)
- manufacturing firms have accessed Advance Queensland Initiatives, including for projects seeking to:
  - translate incremental sheet forming to market (under the Innovation Partnerships Program)
  - use battery storage to extend product range and develop new markets in the energy industry (under the Knowledge Transfer Partnerships program)
  - develop low-cost wireless sensors to monitor mining and sugar industry equipment (under the Knowledge Transfer Partnerships program) (DSITI 2017).

The Queensland Government also provides support and advice to firms, including manufacturers, looking to invest in, establish or expand operations in Queensland (Figure 4.4). This is provided by Trade and Investment Queensland (with a focus on interstate and international investors) and the Department of State Development (DSD) (DSD sub. 11, p. 9; TIQ n.d.).

Figure 4.4 Examples of support services provided by DSD

DSD support is provided to projects that:

- will make a significant contribution to the Queensland economy
- require multiple approvals and active facilitation across governments and stakeholders
- are complex or sensitive
- respond to a recognised regional need (DSD sub. 11, pp. 9–10).

Under these arrangements, case managers address issues that may inhibit a project’s establishment or expansion; ensure a coordinated approach; and provide a diverse suite of skills and experience to assist clients (DSD sub. 11, p. 10).

DSD also delivers workshops about the Queensland Government procurement process to support local businesses to maximise their chances of winning government work (DSD sub. 11, p. 7). In addition, the Queensland Charter for Local Content supports agencies in embedding ‘local content’ principles within their procurement practices and procedures (DSD 2016c, p. 2).

A focus on manufacturing — targeted programs

The Queensland Government provides targeted programs and initiatives that are directly relevant to Queensland’s manufacturers. This can include packaging investment assistance and facilitation for specific firms or projects (including through offering financial support and grants, land and payroll tax concessions as well as assistance in finding suitable land for the project concerned). For example, the Queensland Government has been working closely with the two companies shortlisted by the Federal Government for its Land 400 contract,\textsuperscript{20} to secure Queensland as the location to build and maintain armoured vehicles (Lynham 2017e, Palaczszuk and Lynham 2017).

Advance Queensland 10-year roadmaps and action plans

DSD is working with industry to develop a series of 10-year industry roadmaps and action plans as part of the Advance Queensland program. The roadmaps and actions plans seek to articulate a vision for, and shape the ongoing growth of, identified emerging and priority sectors (DSD 2017b).

\textsuperscript{19} The year to date expenditures (as at December 2016) are $12.7 million for the User Choice Program and $10.3 million for Certificate 3 Guarantee and Higher Levels Skills Program (DET 2017a).

\textsuperscript{20} Rheinmetall and BAE Systems.
To date, roadmaps and action plans have been developed for biofutures and for advanced manufacturing (Box 4.3), with implementation expected to continue over for the next three years (between 2016 and 2019).

A key element of the Government’s Biofutures 10-Year Roadmap and Action Plan is the Biofutures Acceleration Program, which aims to attract and support development of commercial-scale biorefinery projects in the state. Through this program, the Government announced it would provide financial assistance to fast-track development and construction of facilities in Mackay (Pitt and Lynham 2017), Dalby (Lynham 2017f) and Yarwun (Palaczszuk and Bailey 2017). The program was also used to support US biotechnology company Amyris’s recent decision to develop a biorefinery in regional Queensland (Palaczszuk 2017).

Roadmaps for aerospace, biomedical and life sciences, defence and mining engineering technology services are also being developed (DSD 2017b).

Box 4.3 10-Year Advanced Manufacturing Roadmap and Action Plan
The 10-Year Advanced Manufacturing Roadmap and Action Plan outlines ‘a path for the growth of advanced manufacturing, fostering the continued transition of existing manufacturers into world-class advanced manufacturers and creating high paid, sustainable jobs for Queenslanders’.

The focus is on supporting advanced manufacturers to expand their businesses and assisting traditional manufacturers to adopt advanced manufacturing approaches.

The plan identifies key areas of competitive strength and opportunity for advanced manufacturing in: aerospace; automotive and transport; biomedical and life sciences; defence; food and beverage processing; industrial biotechnology and bioproducts; mining equipment, technology and services; precision agriculture; and renewable energy.

It provides $7.6 million over three years (2016-17 to 2018-19) based around three strategies.

<table>
<thead>
<tr>
<th>Increase productivity and international competitiveness</th>
<th>Target the adoption/adaption of innovative technologies and processes</th>
<th>Promotion and marketing (domestic and international)</th>
</tr>
</thead>
</table>

It includes:

- $1.5 million program of workshops on robotics and digital business capability
- $0.55 million for hacker/maker spaces to connect manufacturers with ideas and innovations
- $0.7 million for workshops to encourage manufacturers to use design and engineering analysis software, new materials and advanced manufacturing techniques
- $0.9 million to improve manufacturers’ energy efficiency and produce stronger environmental outcomes
- $0.25 million to get more young people into manufacturing careers.


Industry and Manufacturing Advisory Group (IMAG)
IMAG was established to help position Queensland manufacturing businesses to maximise domestic and international opportunities, including through the development and implementation on the 10-Year Advanced Manufacturing Roadmap and Action Plan (DSD 2015).

Made in Queensland (MIQ)
Made in Queensland (MIQ) provides $20 million in grant funding across two years to support small and medium-sized enterprises manufacturers in Queensland to become more internationally competitive and adopt innovative processes and technologies (DSD 2017a; 2017c).
The program requires manufacturing businesses to measure their business performance against international best practice and provide an action plan across a broad range of business capability areas to improve their international competitiveness (Figure 4.5).

**Figure 4.5 Made in Queensland program business capability areas**

An MIQ grant will reimburse up to 50 per cent of the cost of implementing business capability improvements.

Grants will range from $50,000 to $2.5 million (in matched funding on a dollar-for-dollar basis) with a maximum of four grants, to a total of $2.5 million for an individual business.

The project must focus on boosting productivity and international competitiveness, leading to improved commercial outcomes and contributing to the creation of high-skilled jobs.

Each grant will be under the supervision of a case manager who will monitor the business throughout the length of the project. Businesses must also provide an assessment of the results of the grant against the improvements identified in the benchmark report.

The MIQ program was announced as part of the 2016–17 Mid-Year Fiscal and Economic Review under the Jobs and Regional Growth package (Queensland Treasury 2016c). By May 2017, more than 160 Queensland manufacturing firms had completed the first stage of the program, with more than 20 being assessed for grants (Lynham 2017a).

**Local government policies and programs**

Local governments also run a number of programs available to manufacturers. These include:

- providing grants and incentives for firms seeking to start, expand or locate the businesses in particular local government areas
- investment attraction teams and business specialists to assist with starting a new business, expansion, relocating, seeking training, discussing plans, connecting with resources, networking, identifying local business growth opportunities, and complying with legislation
- establishing startup hubs as co-working spaces for new businesses
- ‘buy local’ policies—where local councils identify and seek quotes from local business suppliers
- trade mission events.

Variations of these programs are running in larger cities as well as some regional areas. Some of these policies overlap with the Australian and Queensland government policies.

**4.3 What is the role for government?**

This inquiry has been asked to consider policy options to improve the productivity and competitiveness of the manufacturing sector in Queensland.22

Stakeholders to this inquiry generally saw a role for government in facilitating the ongoing growth of the manufacturing sector.

Most said governments should focus on the general business operating environment and leave the market and competitive forces to shape the development of the industry. A key priority was removing ‘burdensome

---

21 Subject to requirements under the Local Government Act 2009 and Local Government Regulations 2012 for councils to adhere to Sound Contracting Principles for the discharge of public money.

22 The question of whether, when and how governments should become involved in the manufacturing sector has been debated at length. See, for example, Pack and Saggi (2006).
regulatory requirements that can unnecessarily constrain business decisions and thereby hinder growth and investment. Stakeholders also highlighted the importance of comprehensive tax reform, delivering reliable infrastructure and transport networks and having access to affordable and reliable energy supply, given the importance of each of these factors to many Queensland manufacturing businesses.

Others, however, supported a more active government role in the sector, particularly in the areas of innovation, training and skills, and supporting businesses, workers and communities less able to adapt and reposition themselves in a changing market.

A first step in considering these issues is to recognise that manufacturing firms, workers and consumers—rather than government—drive the success of the sector, and acknowledge the important role competition plays in driving productivity growth in markets. Competitive pressures generally increase productivity by ensuring resources are allocated to their highest value use (allocative efficiency); goods and services are produced at least cost (productive efficiency); and innovation and investment occurs in a timely way to meet changes in consumer tastes and in productive opportunities (dynamic efficiency).

The Queensland Government is also constrained by a number of practical matters:

- Many of the key challenges facing manufacturing (identified in Chapter 3) cannot be directly influenced by the Queensland Government.
- For policy-relevant areas, the problem may be best addressed at a national level (Box 4.4).

Within this context, the fundamental role for government is to put in place a robust system of laws, policies and institutions to enable markets to work efficiently (including secure property rights, rule of law and core public services). For the Queensland Government, this means setting state policies that allow businesses, including manufacturers, to capitalise on existing strengths and opportunities. It also means working with the Australian Government and other states and territories to influence national reforms, and working with local governments to address local agendas.

### Box 4.4 Whose responsibility? Assigning functions between levels of government

In principle, the appropriate level of government for a particular function should reflect:

- Sovereignty—as far as practicable, each level of government should be sovereign in its own sphere, and activities should be allocated to one level of government only.
- Subsidiarity—as far as practicable, policy and service delivery should be devolved to the level of government closest to the ultimate clients, to allow programs to be tailored to meet community needs.
- Fiscal equivalency—those who benefit and those who bear the cost of a policy should coincide within a geographic boundary to avoid the over-or under-provision of programs.

While there might be no single ‘best’ model for assigning functions between governments, it is likely that policy oversight for the Australian Government will be appropriate where:

- there are significant interjurisdictional spillovers associated with the provision of a good or service at the sub-national level (for example, interstate transport systems)
- there are readily identifiable areas of shared or common interest or sizeable economies of scale and scope arising from central provision or organisation (for example, defence, and social welfare support)
- a diversity in rules or regulations is likely to give rise to high transaction costs with insufficient offsetting benefits (for example, regulation of companies, transport, the financial sector and trading provisions covering weights and measures)
- there is scope for mobility of capital and people across jurisdictions to undermine the fiscal strength of the sub-national level of government (for example, as arises with the income, capital gains and corporate tax bases or with welfare entitlements).

Beyond this, there can be an ‘in-principle’ case for governments intervening in markets to protect against (or correct) market failures. For manufacturing, these failures primarily relate to:

- addressing knowledge spillovers—where firms are unable to capture privately the full returns from their own R&D, reducing incentives for the industry to undertake a socially optimal level of R&D
- overcoming information failures in the market—for example when consumers have insufficient information to make optimal consumption decisions (for example, food safety).

Governments may become involved to address ‘systems failures’ that are a result of the complex interactions between institutions, enterprises and people. For example, the networks of firms, universities, research institutes and governments (and the people within them) support the flows of technology and information that are key to the innovative process (Chapter 5). Governments also provide assistance to facilitate community adjustment and recovery in response to structural change, often on the grounds of equity or fairness.

Even where there is an in-principle case to intervene, governments should demonstrate that their intervention is likely to do more good than harm. Government intervention is, in itself, not without costs and may create distortions that introduce new inefficiencies or have unintended impacts. Moreover, markets may, without intervention, move to a desirable solution over time, especially when they are experiencing fundamental change that provides a powerful stimulus (and opportunity) for firms to seek out new opportunities and improve business practices.

Other reasons put forward in favour of intervening in the manufacturing sector are weak. For example:

- Supporting regional economies and regional development by providing specific incentives for firms to locate operations in particular regions—this is unlikely to lead to a net increase in output but rather simply shift economic activity between regions (often shifting resources away from more highly valued uses) with the benefits to a region often only existing until another region offers a bigger enticement.
- Supporting ‘infant industries’ that could become become viable over time—the evidence of the effectiveness of this strategy is, at best, mixed, in part because it relies on governments having a better long-term vision of the viability, or otherwise, of the industry after it matures than industry and consumers.
- Maintaining a ‘critical mass’ of manufacturing firms due to its significant direct and indirect contributions—there is no evidence that economies with a certain level of manufacturing have a higher standard of living than those without it.
- Creating ‘clusters’ of interconnected firms and institutions in particular precincts—this is more likely to be a success when being part of the cluster is consistent with firm needs, not when governments attempt to artificially create them.
- Mitigating the ‘high costs’ of doing business and the impacts of assistance provided in other countries, or other government regulatory/policy distortions.

The long history of missteps and (sometimes costly) failures from attempting to develop new ‘strategic’ industries or sustain industries in decline (Box 4.5) suggests that the Queensland Government should be particularly cautious when considering whether to establish these types of programs. In modern economies with global supply chains, businesses are mobile—those that require incentives and subsidies (not their comparative and competitive advantage) to invest or stay, will come to rely on those subsidies, and move on when they are reduced or withdrawn.

When government seeks to ‘pick winners’, this implicitly puts those group(s) not selected at a disadvantage. This is a particular concern when:

- it diverts resources away from higher value uses—ultimately imposing costs on consumers
- it distorts firms’ incentives and operational decisions—encouraging firms to focus their efforts on taking advantage of the assistance provided, potentially foreclosing market developments (through emerging technologies or new business models) that may turn out to be superior
- it unnecessarily delays otherwise beneficial structural change—by artificially protecting the position of existing firms (and workers)

---

23 Or in some cases ‘save losers’ to the extent that policies seek to protect industries or firms that would otherwise decline.
• the process for developing policy:
  - is not transparent—with the risk that the beneficiaries reflect the vested interests of those firms best equipped to lobby government (but with little basis for support)
  - lacks accountability—where the people deciding the ‘winners’ do not experience the effects of making errors
  - fails to take account of the ‘bigger picture’—either because it is focused on more obvious, shorter-term gains or because it is intrinsically aligned with particular sectors.

Box 4.5 Caution required—promoting winners, protecting losers, or something else?

Governments often attempt to target specific industries or attract investment to increase employment and generate economic growth. However, empirical evidence and reported outcomes do not suggest any convincing link between governments targeting a particular industry and the performance of that industry.

History details many costly failures. For example, in Queensland in 2001:

• The Queensland and Australian governments offered assistance to the Australian Magnesium Corporation to establish the world’s largest magnesium smelter near Rockhampton. Both governments foresaw large and beneficial impacts for employment (of up to 7,000 jobs) and investment ($4.5 billion). However, the project was not viable and work ceased in June 2003, with the Australian Government required to fulfil its loan guarantee of $90 million, and the Queensland Government losing $70 million to the project.

• The Queensland Government provided incentives to Berri Fruit Juice to relocate some of its manufacturing operations to Queensland. The company had previously received similar incentives from the South Australian Government to locate some operations there. Berri closed its South Australian manufacturing operations in 2010 and its Queensland plant in 2014, transferring production to New South Wales.

The Australian Government supported the Australian automobile manufacturing industry for more than a century. About $30 billion (2011–12 dollars) in net combined assistance to the industry between 1997 and 2012 failed to produce a sustainable manufacturing plant.

Internationally:

• In the late 1950s, the Japanese Government decided to subsidise petroleum and petrochemicals industries, while at the same time hindering Sony’s transistor technology venture because it was ‘unpromising’.

• In the United States, the Obama administration had several high-profile failures from funding alternative energy companies, with total losses as of November 2014 estimated at US$2.2 billion.

Many countries have tried to establish a semiconductor industry. The McKinsey Global Institute identified countries that have attempted, but failed, to create a sustainable industry since the 1980s. These include Singapore (US$5–16 billion in subsidies), China (US$6–17 billion), Japan (US$19–54 billion), Germany (US$2–7 billion) and Malaysia (US$1–3 billion).

Sources: QCA 2015a; Dinian 2015; The Economist 2010.

Policies that target specific industries or firms are more likely to ‘succeed’ when they are in line with areas of competitive strength. However, there is a risk that this assistance is essentially paying for activity that would have occurred anyway.24 In that case, the key question is why government intervention was required in the first place, and if it is provided, how it will generate significant additional benefits. This can be difficult to determine because it is hard to know what might have occurred in the absence of intervention.

24 Which in effect is simply transferring taxpayers’ resources to increase the private profitability of particular firms.
A well-designed and robust policy framework (Box 4.6) is essential when trade-offs are required, to help focus Queensland Government efforts.

**Box 4.6 Good policy design principles for manufacturing**

Good outcomes are more likely where policy is developed under a well-designed and robust framework that:

- identifies there is a sound basis for government action—where there is a genuine policy problem of sufficient size and scope that government can address
- considers all feasible options for achieving policy objectives—and identifies the option that is most likely to:
  - target the problem effectively—inducing socially valuable change that would not otherwise have occurred
  - provide the right incentives and avoid unintended consequences—with a focus on limiting rentseeking behaviour, limiting adverse interactions with other policies and facilitating (rather than impeding) otherwise beneficial structural change
  - limit compliance burdens and be administratively efficient for government—avoiding duplication and inconsistency with other programs and policies
  - maximise the net benefit to the Queensland community—having regard to all of the expected benefits and costs (economic, social, compliance and administrative)
- provides for periodic evaluation to assess and identify opportunities for improvement and foster policy learning
- is transparent—with any funding or assistance provided, as well as the evidence base that underpins the government’s decision to provide it, made publicly available.

4.3.1 Some preliminary findings

Queensland manufacturers have access to a broad range of government policies and programs, across all levels of government. These policies and programs are generally not directed only at the manufacturing sector, but can nevertheless influence manufacturers’ business decisions and performance. More recently, governments (state, national and overseas) have looked to ‘revive’ manufacturing, through policies designed to support and develop their manufacturing sectors.

Whether these programs and initiatives are effective—and whether they are the best option—will depend, among other things, on how they have been developed, designed and implemented. On this, DSD said the current Queensland government strategies, policies and programs have been:

...appropriately developed, targeted and marketed in consultation with industry and other relevant stakeholders. ... this is being driven by the Advance Queensland initiative, which comprises a comprehensive suite of programs based on international evidence of best practice and collaboration between entrepreneurs, industry, universities and government. (sub. II, p. 9)

It is difficult to assess the effectiveness of the Queensland Government’s current policy settings for manufacturing. Many of these programs are new and there is limited or no information available on their performance. When assessments have been undertaken, they often consider overall, not manufacturing-specific, outcomes. There are specific challenges to assessment when programs are dealing with complex processes, which can have lags between implementation and outcome, and which are part of a broader national (and sometimes international) policy framework.

There is some evidence of potential benefits for Queensland manufacturers. For example, participants in the Mentoring for Growth program have consistently reported improvements in employment, turnover and gross profits of businesses involved in the program in excess of what would be expected from businesses in general (DTESB 2017a).

---

25. This makes some sense when the programs are not directed only at the manufacturing sector or are not expected to have a particular or discriminatory impact on manufacturing firms or workers, beyond that expected more broadly.
However, the Commission was also told as part of its consultation that some manufacturers:

- tend to avoid government programs or initiatives, given uncertainty around the nature and scope of assistance on offer
- are unaware of relevant government programs or initiatives available to them
- find it difficult to select programs to suit their needs, given the large number of programs available, and the duplication and inconsistencies (including across various levels of government).

Compliance and administration costs tend to be higher when there are many small programs. Moreover, to the extent that some of these programs do not have clearly defined policy objectives or include a plan to review effectiveness, they may not provide government with good value for money.

In addition, poor policy design and implementation can give rise to its own costs and problems, which need to be taken into account.  

4.3.2 The way forward

While firms and workers will drive productivity and performance outcomes in Queensland manufacturing, the Queensland Government also plays a role through policies that shape the general business environment and influence firms’ and workers’ decisions.

The Queensland Government should focus its efforts on broad-based policy reform—minimising impediments to efficiency and competitiveness; ensuring the effective and efficient performance of government programs and procurement; and appropriately managing any adverse transitional impacts of adjustment.

Economy-wide policies, rather than sector-specific measures, are likely to deliver sustainable industries not dependant on handouts. Economy-wide policies raise Queensland’s overall capability and provide the greatest opportunity for dynamic and innovative firms, including manufacturers, to prosper. Broad-based reform also reduces the risk of perverse outcomes often associated with sector-specific measures.

Good policy outcomes are also more likely where policy is designed using sound principles.

The Queensland Government should be particularly cautious in attempting to promote the growth (or prevent the decline) of particular industries or firms. What may be good for a particular part of the economy may not be good for other parts, or the community more broadly. Where trade-offs exist, a careful consideration of all of the expected benefits and costs is required. This can be technically demanding (requiring information about all benefits and costs) and politically challenging (particularly where there are calls to directly support certain firms or sectors).

The remainder of this report sets out a reform plan to best support a competitive and productive manufacturing sector in Queensland.

---

26 In the extreme, a program that in-principle could have yielded significant benefits may instead result in net social costs.
Draft recommendation 1

The Queensland Government should adopt an action plan for the manufacturing sector, centred on broad-based policy reform rather than on firm- or manufacturing-specific assistance. The plan should address three key action areas:

- address cost pressures
- increase productivity
- improve government programs.

Policies and programs underpinning the plan should be designed and managed for performance: target market and government failures; avoid funding activity that will occur anyway; minimise compliance costs for industry and government; establish accountability, and properly measure, review and publicly report outcomes.

Draft Recommendations 2–10 set out the detailed policy reforms to support the action plan.
5.0 Innovation
In a global market, innovation is an important source of competitiveness and productivity improvement for Queensland manufacturers. This chapter investigates barriers to innovation, innovation policy and options for reforming Queensland Government programs.

Key points

1. Innovation is a key driver of productivity and also of economic welfare. Australia ranks towards the middle among developed countries in terms of innovation.

2. Manufacturing is a relatively innovative and R&D-intensive industry. The industry’s business expenditure on R&D as a proportion of GSP in Queensland (0.17 per cent) was lower than in other states and about half of that of Australia (0.31 per cent).

3. 60 per cent of innovation-active manufacturers experience barriers to innovation. These include access to finance, skilled people, time costs, government regulations, standards and costs of development.

   • Manufacturing businesses do not appear to face additional barriers to financing than other businesses.
   
   • Entrepreneurship in Queensland manufacturing appears to be healthy. However, there may be some broader barriers in terms of culture and entrepreneurial skills.
   
   • The standard of management capabilities in Australian manufacturing appears to be below that of global leaders. An improvement in management quality may improve innovation and productivity in the manufacturing industry.
   
   • There appears to be little collaboration between Queensland manufacturers and universities. The reasons for this include experiential, cultural and information differences, poor incentives for universities to collaborate and the capability of businesses.

4. The Queensland Government has a suite of innovation programs. Most programs have been implemented only recently so it is too early to evaluate their effectiveness. However, there is scope to rationalise and redesign programs to do fewer things, but to be better.
5.1 What is innovation?

Innovation has been defined in many ways. Innovation occurs when businesses and people produce, disseminate and apply knowledge. The OECD defines innovation as:

...the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. (2005b, p. 46)

Innovation is not just the creation of new ideas but also their application. The minimum requirement for an innovation is the process, product or method is new to the firm rather than the world. Once innovations are discovered the knowledge is transferred, finding applications in other processes, services and products.

Innovation is a term that applies to a broad range of activities. It applies equally to technological and non-technological changes that improve products, services or the functioning of businesses. The OECD defines four main types of innovation: product, process, marketing and organisation innovation (see Box 5.1).

Box 5.1 Main types of innovation

**Product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness, or other functional characteristics.

**Process innovation** is a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment or software.

**Marketing innovation** is a new marketing method involving significant changes in product design or packaging, product placement, product promotion, or pricing.

**Organisational innovation** is a new organisational method in the business’ business practices, workplace organisation, or external relations.


Analysis for the OECD (2015b, p. 7) suggests innovation thrives in an environment characterised by a:

- skilled workforce
- sound business environment
- strong and efficient system for knowledge creation and diffusion
- set of policies encouraging innovation and entrepreneurship
- strong focus on governance and implementation.

5.2 Why is innovation important?

Innovation is a key driver of productivity, competitiveness and economic output. It results in better products and services, customer benefits, greater efficiency for businesses and can solve social and environmental problems. Baumol (2002, p. 13) highlights the importance of innovation to the economy:

*It can be argued that virtually all the economic growth that has occurred since the eighteenth century is ultimately attributable to innovation.*

How effectively investment in skills, R&D and creative activity are transformed into knowledge and then into innovations is critical to business productivity:

*The generation and application of technological and organisational knowledge (innovation) are the main drivers of firm-level productivity growth.* (Gordon et al. 2015, p. 3)

For businesses, the fundamental role of innovation is to improve profitability—it is a means to an end, rather than the end in itself (BCA 2014, p. 5, Rassenfosse et al. 2011, p. 12). In response to challenges, businesses innovate to solve problems, improve productivity or create new products and services to differentiate and add value.

Innovation is challenging to measure and there is no single indicator of performance. Reports on innovation generally provide a wide range of indirect indicators such as productivity, investment in R&D, patents, number of reported innovations and levels of education. There is only limited data on many innovation indicators for Queensland, and so Australian statistics are often used as a proxy. On some indicators Queensland and Australia lag leading nations.

5.2.1 Relative performance

Relative to other high income countries, Australia’s innovation performance is around the average (Cornell University et al. 2017, pp. xviii–xix).

Using a combination of indicators, the Global Innovation Index 2017 of 127 nations ranked Australia:

- 23rd for innovation (7th in the Asian region) (Table 5.1)
- 12th in innovation inputs but 30th in innovation outputs
- 76th for innovation efficiency, indicating that while the nation invests a lot of inputs into its innovation system, the outputs are relatively low.

The 2017 Bloomberg Innovation Index ranked Australia similarly—18th out of 78 nations.

**Table 5.1 International innovation rankings**

<table>
<thead>
<tr>
<th>Country</th>
<th>Global Innovation Index 2017 (score)</th>
<th>Bloomberg Innovation Index 2017 (score)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>1 (67.7)</td>
<td>4 (83.6)</td>
</tr>
<tr>
<td>Sweden</td>
<td>2 (63.8)</td>
<td>2 (84)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3 (63.4)</td>
<td>15 (75.2)</td>
</tr>
<tr>
<td>United States</td>
<td>4 (61.4)</td>
<td>9 (81.4)</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>5 (60.9)</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>6 (58.7)</td>
<td>8 (81.9)</td>
</tr>
<tr>
<td>Singapore</td>
<td>7 (58.7)</td>
<td>6 (83.2)</td>
</tr>
<tr>
<td>Finland</td>
<td>8 (58.5)</td>
<td>5 (83.3)</td>
</tr>
<tr>
<td>Germany</td>
<td>9 (58.4)</td>
<td>3 (83.9)</td>
</tr>
<tr>
<td>Ireland</td>
<td>10 (58.1)</td>
<td>16 (74.9)</td>
</tr>
<tr>
<td>South Korea</td>
<td>11 (57.7)</td>
<td>1 (89.0)</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>12 (56.4)</td>
<td>34 (59.2)</td>
</tr>
<tr>
<td>Iceland</td>
<td>13 (55.8)</td>
<td>25 (65.3)</td>
</tr>
<tr>
<td>Japan</td>
<td>14 (54.7)</td>
<td>7 (82.6)</td>
</tr>
<tr>
<td>France</td>
<td>15 (54.2)</td>
<td>11 (81)</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>16 (53.9)</td>
<td>35 (57.5)</td>
</tr>
<tr>
<td>Israel</td>
<td>17 (53.9)</td>
<td>10 (81.2)</td>
</tr>
<tr>
<td>Canada</td>
<td>18 (53.7)</td>
<td>20 (71.6)</td>
</tr>
<tr>
<td>Norway</td>
<td>19 (53.1)</td>
<td>14 (76.9)</td>
</tr>
<tr>
<td>Austria</td>
<td>20 (53.1)</td>
<td>12 (80.5)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>21 (52.9)</td>
<td>19 (71.6)</td>
</tr>
<tr>
<td>China</td>
<td>22 (52.5)</td>
<td>21 (68.9)</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td>23 (51.8)</td>
<td>18 (73.3)</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>24 (51)</td>
<td>28 (62.7)</td>
</tr>
<tr>
<td>Estonia</td>
<td>25 (50.9)</td>
<td>33 (59.8)</td>
</tr>
</tbody>
</table>

Manufacturing is one of Queensland’s most innovative industries. The University of Queensland 2013–14 Business School Innovation Survey estimated 77 per cent of Queensland manufacturers innovate (DSD sub. 11, p. 3). The same survey also found innovation in Queensland businesses had increased relative to previous years and Queensland businesses were more likely to innovate than those in other states (Verreyne & Steen 2014, pp. 8–9).

The majority (54 per cent) of Australian manufacturing businesses identify themselves as engaging in some sort of innovation activity, more than all businesses (45 per cent) (ABS 2016g). Only health, social assistance and wholesale trade businesses say they are more likely to undertake innovation activity. Manufacturing businesses are more likely to introduce a new or significantly improved product or service (28.5 per cent) than all businesses (19.3 per cent).

Across all four types of innovation, manufacturing businesses are more likely to innovate than other businesses (Table 5.2). New products and services introduced by manufacturing businesses are more than twice as likely to be new to the world as those introduced by other businesses. However, organisational and marketing innovations introduced by manufacturers show a low degree of novelty.

Table 5.2 Proportion of Australian businesses that introduced any innovation, by type and the degree of novelty of the innovation, 2014–15 (%)

<table>
<thead>
<tr>
<th>Type of innovation</th>
<th>Type of business</th>
<th>Proportion of businesses that introduced any innovation (%)</th>
<th>Degree of novelty of the innovation (%)</th>
<th>New to the world</th>
<th>New to Australia</th>
<th>New to the industry</th>
<th>New to the business only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products or services</td>
<td>Manufacturing</td>
<td>28.5</td>
<td></td>
<td>20.1</td>
<td>19.7</td>
<td>13.9</td>
<td>57.5</td>
</tr>
<tr>
<td></td>
<td>All businesses</td>
<td>19.3</td>
<td></td>
<td>8.4</td>
<td>7.4</td>
<td>12.9</td>
<td>74.5</td>
</tr>
<tr>
<td>Operational processes</td>
<td>Manufacturing</td>
<td>27.6</td>
<td></td>
<td>3.4</td>
<td>1.0</td>
<td>9.8</td>
<td>86.5</td>
</tr>
<tr>
<td></td>
<td>All businesses</td>
<td>15.6</td>
<td></td>
<td>2.5</td>
<td>3.9</td>
<td>9.4</td>
<td>85.8</td>
</tr>
<tr>
<td>Organisational processes</td>
<td>Manufacturing</td>
<td>23.8</td>
<td></td>
<td>0.1</td>
<td>0.5</td>
<td>4.3</td>
<td>95.6</td>
</tr>
<tr>
<td></td>
<td>All businesses</td>
<td>17.4</td>
<td></td>
<td>2.2</td>
<td>3.1</td>
<td>5.9</td>
<td>90.5</td>
</tr>
<tr>
<td>Marketing methods</td>
<td>Manufacturing</td>
<td>19.6</td>
<td></td>
<td>0.1</td>
<td>0.1</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td></td>
<td>All businesses</td>
<td>16.5</td>
<td></td>
<td>1.2</td>
<td>1.8</td>
<td>5.9</td>
<td>92.2</td>
</tr>
</tbody>
</table>

Source: ABS 2016g

Submissions to the inquiry and consultation conducted by the Commission revealed many Queensland manufacturers are innovating (see for example Cook Medical in Box 5.2).

Box 5.2 Case study: Cook Medical

Cook Medical Australia manufactures some of the world’s most advanced endovascular grafts for the treatment of aortic aneurysms, and is one of the few companies that custom-makes these products to fit individual patient anatomies. The company is also recognised as a leader in reproductive health, developing and manufacturing products used in the IVF process.

In Australia, Cook Medical has over 500 employees including 50 research engineers and laboratory staff committed to creating innovative healthcare treatments, and an Asia-Pacific New Technologies Team (ANTT) dedicated to finding medical technologies to address some of the key challenges facing healthcare systems. The ANTT interacts with inventors, universities, research institutes, startup companies, and design contractors to evaluate ideas and new technologies that have potential for commercialisation.

Source: Cook Medical sub. 12; CCIQ sub. 6.
5.2.2 Research and development

R&D plays a crucial role in creating knowledge, developing technology and ultimately industry competitiveness. Some studies conclude R&D explains the majority of innovation and productivity growth. CCIQ (sub. 6, p. 7) suggested that the contribution of innovation to business productivity is undeniable and that ‘one of the key ways to encourage innovative practices at the SME level is to invest in R&D’.

Queensland expenditure on R&D as a proportion of GSP—about 1.6 per cent—is less than Australia’s (2.1 per cent) and is also below the OECD+ average (1.9 per cent). Queensland and Australia invest heavily in creating knowledge through basic research, but lag behind in commercialisation. Figure 5.1 shows higher education expenditure on R&D (HERD) as a proportion of GDP in Queensland and Australia is above the OECD+ average. However, business expenditure on R&D (BERD) as a proportion of GDP is below the OECD+ average.

Australia performs well in terms of creating academic knowledge, commensurate with a large investment. For example, Australia ranked 8th of 36 OECD+ nations in terms of academic publishing (Innovation and Science Australia 2016, p. xiii).

The number of researchers per 1000 workers in Australia (8.6) is similar to the OECD+ average (7.7) (OECD 2015c), but the proportion of researchers working in businesses is relatively low.

**Figure 5.1 Business expenditure on R&D (BERD) and higher education expenditure on R&D (HERD) as a proportion of GDP, 2013**

Note: Queensland expenditure data refers to 2013–14. OECD countries expenditure mostly refers to 2013 data, however, some data refer to 2011 and 2012, including Australia (2011).

Source: ABS 2015b, 2016e, 2016h; OECD 2015c; QPC calculations.

Manufacturing is one of the most R&D-intensive industries globally. Queensland has lower manufacturing BERD as a proportion of GSP (0.17 per cent) than all but two OECD countries—about half of Australia’s proportion and one-fifth of the OECD+ average (Figure 5.2).
Queensland manufacturers spent $532 million on R&D in 2013-14. Queensland spends relatively less on manufacturing R&D than other states, despite the industry making a similar contribution to GSP. This may partly reflect the nature of Queensland manufacturing, which is relatively more focused on processing primary production.

In Australian manufacturing almost two thirds (64 per cent) of R&D activity occurs inside large businesses (200 or more employees). Globally, original, frontier innovation is highly concentrated across a small number of large corporations:

*In 2012, the 2000 leading R&D corporations and their network of 500 000 affiliates accounted for more than 90% of global business R&D and 66% of patent families filed at the largest five intellectual property offices worldwide. Within the top-2000, 250 multinationals accounted for 70% of R&D expenditure, 70% of patents, almost 80% of ICT-related patents, and 44% of trademarks filings. Most of their headquarters (55%) and affiliates (40%) were based in the United States and Japan. (OECD 2015c, p. 16)*

Figure 5.3 shows that while Queensland’s BERD is relatively low, it has substantially increased. In 2013-14, Queensland businesses spent about $2.7 billion on R&D, about 11 times more than it did a decade earlier. As a proportion of GSP, BERD has increased almost three-fold between 1993–94 and 2013–14, from about 0.3 per cent to almost 0.9 per cent.
Innovation is difficult to measure. Most indicators are partial and often reflect inputs rather than the quality and impact of innovations.

Multi-factor productivity (MFP) is often used as proxy for the contribution of innovation to economic growth and, if measured well, it might be the most reasonable measure of innovation. However, it can be difficult to separate innovation from other impacts, such as capital over-investment and measurement errors. As detailed in chapter 2, Queensland MFP has declined since 2003–04, but this appears to reflect fluctuating output and capacity underutilisation, rather than a lack of innovation.

**Draft finding 5.1**

Queensland invests a greater proportion of its output on higher education R&D than most other developed countries, but business still contributes the majority of R&D. While manufacturing is a relatively R&D-intensive industry globally, Queensland invests a relatively low amount in manufacturing R&D.

**5.3 Barriers to innovation**

Most manufacturers are attempting to innovate, but success depends on their capacity to innovate as well as overcome external barriers. The capacity of businesses to absorb and generate new innovations depends on:

- scale and access to resources
- access to finance
- access to knowledge
- the relevance of innovation to the firm’s business strategy
- entrepreneurial leadership
- management capability and structure
- workers’ skills, including science and research skills
- the extent to which the full value of the innovation can be captured by the firm
- government regulations and standards.

60 per cent of innovation-active28 Australian manufacturing businesses reported barriers to innovation. Manufacturers were slightly more likely to face barriers to innovation than other businesses (Figure 5.4).

---

28 Innovation-active businesses are those that had undertaken any innovative activity during the reference period, including the introduction of any type of innovation; and/or the development or introduction either still in progress or abandoned.
Australian manufacturing businesses reported the greatest barriers to innovation as a lack of access to additional funds and a lack of skilled people.

**Figure 5.4 Barriers to innovation for Australian businesses, 2014–15**

<table>
<thead>
<tr>
<th>Barrier to Innovation</th>
<th>Innovation active businesses</th>
<th>Non-innovation active manufacturing</th>
<th>Innovation active manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of access to additional funds</td>
<td>52</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Lack of skilled people</td>
<td>38</td>
<td>55</td>
<td>61</td>
</tr>
<tr>
<td>Cost of development or introduction/implementation</td>
<td>22</td>
<td>41</td>
<td>35</td>
</tr>
<tr>
<td>Uncertain demand for new goods or services</td>
<td>27</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>Government regulations and compliance</td>
<td>20</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Adherence to standards</td>
<td>15</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>Lack of access to knowledge or technology</td>
<td>10</td>
<td>62</td>
<td>56</td>
</tr>
</tbody>
</table>

Source: ABS 2016g.

Queensland manufacturing businesses tend to be smaller than those in other leading manufacturing nations (OECD 2016). This may reflect a smaller market or comparative advantages in niche products, but it may also be an impediment to innovation. As shown in Table 5.3 large manufacturing businesses were more likely to be engaged in innovation activity (79 per cent) than medium businesses (71 per cent) or small businesses (about 51 per cent). Medium businesses reported that they were more likely to face barriers to innovation than small businesses.

Larger organisations have access to more resources as well as a greater diversity of resources, which can be redeployed to support the implementation of innovation (ABS & PC 2011, p. 2; Rogers 2003). Lack of scale may impede some businesses from having sufficient capabilities—such as financing, management and skills—to undertake innovation. It may also result in SMEs making imperfect choices due to a lack of knowledge and the costs of gathering, assessing and processing information (Potts and Morrison 2009, p. 10-11).

While existing businesses tend to be relatively more productive (Nguyen & Hansell 2014, p. 8,14), new entrants can provide fresh innovative ideas. Young firms may possess a comparative advantage in their capacity to commercialise more radical innovations (OECD 2015b, p. 5).

**Table 5.3 Proportion of manufacturing businesses innovating and experiencing a barrier to innovation, by firm size, Australia, 2014–15**

<table>
<thead>
<tr>
<th>Firm Size</th>
<th>Proportion of businesses innovating (%)</th>
<th>Proportion of businesses experiencing barriers to innovation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All businesses</td>
<td>Innovation-active businesses</td>
</tr>
<tr>
<td>Small (0–4 persons)</td>
<td>51.4</td>
<td>42.3</td>
</tr>
<tr>
<td>Small (5–19 persons)</td>
<td>51.7</td>
<td>45.6</td>
</tr>
<tr>
<td>Medium (20–199 persons)</td>
<td>71.0</td>
<td>55.5</td>
</tr>
<tr>
<td>Large (200 or more persons)</td>
<td>78.7</td>
<td>36.8</td>
</tr>
<tr>
<td>Total</td>
<td>54.1</td>
<td>45.0</td>
</tr>
</tbody>
</table>

Source: ABS 2016g.

Innovation depends on access to knowledge and ideas or on the ability to create new ideas. As illustrated in Figure 5.5, internal sources are the most common origin of ideas and information for innovation in manufacturing firms (78 per cent of manufacturers). Upstream and downstream sources within the value
chain and competitors are also important sources of ideas. Less than 1 per cent of manufacturing businesses consider governments and universities a source of ideas for innovation.

Figure 5.5 Sources of ideas or information for innovation, Australia, 2014–15

<table>
<thead>
<tr>
<th>Industry associations</th>
<th>Professional conferences, seminars, meetings or trade shows</th>
<th>Websites, journals, research papers or publications</th>
<th>Government agencies</th>
<th>Universities or other higher education institutions</th>
<th>Consultants</th>
<th>Competitors and other businesses from the same industry</th>
<th>Suppliers</th>
<th>Clients, customers or buyers</th>
<th>Within this business or corporate group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of businesses %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: ABS 2016g.

5.3.1 Access to finance

A lack of access to finance is a commonly cited barrier to innovation. ABS data suggests it is the biggest constraint on innovation for Australian manufacturing businesses. This constraint is more likely to impact small businesses (around 25 per cent) and medium businesses (19 per cent) than large businesses (10 per cent) (ABS 2016g).

Manufacturers in Queensland told the Commission that access to finance impacted on their ability to undertake innovation (QPC Innovation Roundtable; CCIQ sub. 6, p. 7).

Innovation can be resource-intensive and risky. To undertake it, businesses need access to funds, for activities such as investing in advanced manufacturing technologies and R&D.

Only about 19 per cent of Australian manufacturing businesses sought debt or equity financing in 2014–15 (ABS 2016i). The majority of these businesses (91 per cent) sought debt financing and about a quarter (24 per cent) sought equity financing. Most manufacturing businesses seeking debt financing obtained it (88 per cent), but just more than half of the manufacturing businesses seeking equity financing obtained it (52 per cent).

Factors that may impact manufacturers’ access to finance include:

- Queensland has a relatively small venture capital and private equity market compared with leading nations. Queensland accounts for only 9.3 per cent of the Australian venture capital market and 7.5 per cent of the Australian private equity market (Australian Private Equity & Venture Capital Association Limited 2016, p. 22).
- the greater physical capital requirements of manufacturers might delay returns on investment and deter some financiers (QPC Innovation Roundtable). Research suggests Australians have a relatively high preference towards short term returns over long term returns (Wang et al. 2011, p. 17).
- capital markets may not function perfectly in the presence of information asymmetry and risk and uncertainty (Freel 2000, p. 61). Financiers may lack the information to understand business innovation, and discriminate between businesses with a high probability of success and those with a low probability of success.

Withers et al. (2015, p. 121) argued:

_The most fundamental problem here arises because potential borrowers are not able to indicate their ‘quality’ to banks. This problem of information asymmetry identified by Nobel laureate George Akerlof is a major cause for market collapse and lost opportunities._
However, manufacturing businesses were more likely to seek financing and more likely to obtain both debt and equity financing than other businesses (ABS 2016i). The Australian financial system generally performs well compared to its international peers. A study by The World Bank ranked Australia 5th out of 190 nations for ease of getting credit (World Bank 2016b).

The Productivity Commission found that there are no market failures impeding capital allocation to innovative firms:

Similar to conventional businesses, [failure to access finance] could be due to an array of reasons — for example, the business plan may be inadequate or unviable, or investors may view the risks to be too great — and of itself is not evidence that there are widespread market failures.

On balance, there is not sufficient evidence to suggest that there are widespread, systemic problems around new businesses accessing finance in Australia. Nevertheless, there are opportunities to address regulations around crowd-sourced equity and employee share schemes with a view to giving more (and potentially lower cost) finance options to new businesses. (PC 2015b, p. 136)

Moreover, even if market failures exist, there is no evidence that governments would be able to solve such imperfections through superior information. Financial intermediaries have incentives and superior knowledge to solve such failures, by developing innovative models to provide capital to risky investments (Lacker 1994). Where governments intervene by providing loans or grants, without solving the underlying information problem, they may fund the same projects and largely crowd out private investment (QCA 2015a, p. 247).

Draft finding 5.2

Manufacturing businesses do not appear to face additional barriers to financing than other businesses.

5.3.2 Entrepreneurship

Stakeholders to this inquiry identified entrepreneurship and management as key internal factors in firm innovation and productivity (DSD sub. 11, p. 6; CCIQ sub. 6, pp. 7–8; QPC Innovation Roundtable; Australian Sugar Milling Council sub. 5, p. 5).

Entrepreneurship is an important factor in innovation, bridging the gap between invention and commercialisation. An entrepreneur can be defined as a person with the vision to see an innovation and the ability to bring it to market.

In contrast to relatively modest performances in innovation and competitive indexes, Australia performs quite well in entrepreneurship. The Global Entrepreneurship Index ranked Australia 7th globally (Global Entrepreneurship and Development Institute 2017, p. 24). Australia exhibits relatively high rates of business ownership and business formation, and generally positive attitudes to starting businesses (Innovation and Science Australia 2016, p. 77).

Analysis from the Office of the Chief Economist (2015a, p. 43) found that Australia:

...has one of the highest proportions of start-ups and young firms among small businesses in the OECD. As is the case in many other advanced economies, we show that start-ups and young businesses contribute disproportionately to job creation in Australia. However, it is only a relatively small percentage of very high growth businesses that make up the bulk of this contribution.

There is evidence of increasing and healthy entrepreneurship within Queensland. The state’s Chief Entrepreneur said Queensland now had the second highest number of start-ups in Australia, with 19 per cent of the nation’s total (Norris 2017).

Queensland manufacturing exhibited lower entry and exit rates than other businesses, but still higher than most other OECD manufacturing industries29 (ABS 2017b; OECD 2016, pp. 76–80). This suggests barriers.

---

29 OECD compare business entry and exit using an industry classification that also includes mining.
to entry and exit are not particularly high in Queensland manufacturing. Innovation and Science Australia suggested business formation is not a problem:

*Compared to other countries however, Australians are good at starting businesses but not good at growing them.* (Innovation and Science Australia 2016, p. 77)

Even though Queensland appears to perform relatively well in terms of some entrepreneurship measures, entrepreneurial skills and culture or attitudes have been suggested as potential barriers.

There is mixed evidence on how skillful Australian entrepreneurs are (PC 2015b, p. 270; Australian Venture Capital Association Ltd 2012, p. 31). StartupAus (2015, p. 41) suggested Australia is a long way behind other parts of the world and that entrepreneurial skills should be taught in their own right. A review of skills by the Office of the Chief Scientist suggested innovation and entrepreneurship should be integrated into the school curriculum (2014, p. 18).

Entrepreneurship courses are becoming more common and most universities (over 95 per cent) now offer them. However, Spike Innovation (2015, p. 18) found that most universities lacked an entrepreneurial culture and that academics teaching have limited experience of actual entrepreneurship. Some universities are attempting to educate in new ways. For example, the University of Queensland has established an Idea Hub to connect student entrepreneurs with mentors and to provide workshops and experiences (Enoch 2017a). See Box 5.3 below.

### Box 5.3: The UQ Idea Hub

The UQ Idea Hub is practical, hands-on program, delivered over a six week period, providing aspiring student entrepreneurs with the skills and knowledge needed to conceive a startup.

During the program, students form project teams and meet weekly to attend workshops on technology choices, prototyping, market validation and business modelling. Sessions are designed to help progress projects to a prototype stage, ready for market testing and evaluation.

The program is designed to:

- create a cycle of innovation through interdisciplinary ideation, team formation and project work
- create a format for engaging with alumni and industry
- attract future students with a strong desire to excel in education and entrepreneurship
- contribution to the creation of high growth, globally focused, new Australian ventures
- inspire students to be the next generation of successful Australian business owners and international startup founders.

On-going access is provided to a dedicated co-working space on the St Lucia campus, where teams can meet and work with guest entrepreneurs, academics and members of the UQ’s student entrepreneur club IdeaNetwork.

*Source: University of Queensland 2017*

There are concerns about Australia’s cultural attitudes towards entrepreneurship (PC 2015b, p. 268). Table 5.4 shows that Australians were relatively fearful of failure and had less positive perceptions of entrepreneurship as a career. However, Australians are more likely than other nationalities to perceive themselves as being capable of starting a business and considered that starting a business is a good opportunity.
Table 5.4 Perception or attitude of Australians aged 18–64, 2011

<table>
<thead>
<tr>
<th>Perception or attitude</th>
<th>Proportion (%)</th>
<th>Average global proportion (%)</th>
<th>Australia’s ranking globally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived opportunities</td>
<td>48</td>
<td>35</td>
<td>6 out of 31</td>
</tr>
<tr>
<td>Perceived capabilities</td>
<td>47</td>
<td>43</td>
<td>10 out of 31</td>
</tr>
<tr>
<td>Fear of failure</td>
<td>43</td>
<td>36</td>
<td>27 out of 31</td>
</tr>
<tr>
<td>Entrepreneurship as a good career option</td>
<td>54</td>
<td>61</td>
<td>21 out of 29</td>
</tr>
<tr>
<td>High status to successful entrepreneurs</td>
<td>68</td>
<td>71</td>
<td>19 out of 29</td>
</tr>
<tr>
<td>Media attention for entrepreneurship</td>
<td>70</td>
<td>57</td>
<td>4 out of 29</td>
</tr>
</tbody>
</table>

Source: OECD 2012b.

Draft finding 5.3

Entrepreneurship in Queensland manufacturing appears to be healthy. However, there are some broader potential barriers related to culture and entrepreneurial skills.

5.3.3 Management practices

Differences in management skills and capabilities play a key role in firm productivity and innovation:

...workplaces with more capable leaders are more innovative—regarding both incremental and radical innovation performance. It also confirms the importance of innovation for business performance. (Gahan et al. 2016, p. 7)

The Cutler Review (2008, p. 33) of the Australian innovation system identified a range of strategic and leadership competencies that enable innovative businesses:

• the ability to respond to changes in the market environment
• clearly communicating strategic intent and articulating the need for innovation
• nurturing innovative capacity and creativity throughout the organisation
• crystallising the value that innovation can deliver and being open to alternative business models
• being open to learning from failure
• thinking and acting from a global perspective.

A study benchmarking Australian manufacturing against 15 other countries on 18 management capabilities, found Australian manufacturing managers performed around the global average, but lagged global leaders. The areas of greatest skills deficiency were in people management, especially rewarding and retaining top performers and installing a talent mindset. Australian managers were also found to be relatively further behind in setting goals and time horizons (AMPR Team 2009, pp. 14–22).

Better management capability in Australian manufacturing is positively associated with:

• the education attainment of management and employees, and organisational size
• more diffuse and multinational ownership (Agarwal et al. 2014, pp. 6497–6511).

Internationally, the level of product market competition has also been positively associated with superior management practices, by providing comparison opportunities, reducing economic rents and removing poor practices over time (Bloom and Van Reenen 2007).

Poor management performance is linked to low educational attainment. In general, Australian manufacturing managers have been found to have a relatively low level of tertiary qualifications (Green et al. 2012, p. 45).

Studies have identified deficiencies in management practices in some manufacturing businesses are limiting innovation (Cutler 2008, p. 6; Samson 2011, p. 2; Agarwal et al. 2014, pp. 6497-6498). This suggests
that if management could be improved across the manufacturing industry, sector-wide productivity and competitiveness would increase.

Given the link between management skills and productivity and innovation, some studies advocate for government support to improve management skills (Green et al. 2012, p. 47; Bloom et al. 2007, p. 10). A collaborative report between the London School of Economics and McKinsey & Company found:

*Governments can play their part in encouraging the take-up of good management behaviour. Doing so may be the single most cost-effective way of improving the performance of their economies. Strong competition and flexible labour markets both lead directly to improved management performance … Relentless improvement in educational standards is also essential.* (Bloom et al. 2007, p. 10)

There is some evidence that improvements in management can be achieved as a result of industry action and practical evidence based recommendations. The Industry Skills Council found:

*The 28 Karpin Report recommendations [delivered in 1995] have proven over time to be robust and strongly related to organisational success. Market forces, rather than concerted action by Government, ensured that many of the recommendations found their way into practice within organisations and educational settings.* (Samson 2011, p. 5)

While studies suggest management practices could be improved, there is the risk that what is considered better practice may turn out to be a fad or not add value (Agarwal et al. 2014, p. 6498; Abrahamson and Fairchild 1999). There is also the risk that managers will not have the time or not perceive sufficient value to invest their energy into a management education program.

As with entrepreneurship, governments may not be well placed to understand management deficiencies. Businesses and their managers are in many cases better placed than government bureaucracies to understand and address these deficiencies.

That said, there is a place for mentorship and education from experienced management practitioners. The success and proliferation of university business schools and other private courses suggest there is a demand for such services. There are also a range of free online tools through platforms such as Edx and Coursera, covering topics such as business fundamentals, supply chains, people management and leadership, from internationally recognised universities such as Harvard, MIT, Stanford, Duke University, University of Queensland and University of London (Edx 2017; Coursera n.d.).

Queensland already has some industry bodies that support better management and leadership. For example, the Queensland Leaders Organisation supports business leaders through a range of strategies to provide knowledge and networks (Queensland Leaders n.d.).

The Queensland Government offers a range of workshops to help managers, especially understanding government grants, procurement, taxes and regulation. TAFE Queensland also offers a range of courses to develop business fundamentals, marketing and entrepreneurial skills (TAFE Queensland n.d.). There may be gaps in the services offered, particularly for medium-sized manufacturers and for leaders wanting to improve how they manage people.

**Draft finding 5.4**

The standard of management capabilities in Australian manufacturing appears to be below that of global leaders. An improvement in management quality could improve innovation and productivity in the manufacturing industry.
seeking further views

Management capabilities in Australian manufacturing appear to be below global leaders. The Commission is seeking further views about the role of management training and education in manufacturing businesses.

• What stops businesses and workers from investing in management education and training?
• Are the current programs delivered by TAFE Queensland, universities and private providers sufficiently available to, designed for and targeted at Queensland manufacturers and are there any gaps?
• If there is a role for improved management training and education, who would be best placed to deliver it to Queensland manufacturing businesses?
• If there is a role for improved management training and education, what capabilities should be focused on and what format should courses be presented in, to ensure they meet users’ needs?

5.3.4 Commercialisation of university R&D and collaboration

Consultation suggested that business-to-university and business-to-business collaboration are important for Queensland manufacturing innovation (QPC Innovation Roundtable; CCIQ sub. 6, p. 8; AAAA sub. 10, pp. 4–5; AMWU sub. 9, pp. 6–8; TCF sub. 2, p. 3):

A business’s ability to collaborate is critical to accessing the skills and knowledge required to be competitive. Collaboration gives businesses access to new ideas, better information, and improved capabilities beyond that if a business operated in isolation. Businesses that collaborate perform better when compared with businesses that do not innovate or collaborate, with a significant majority of businesses reporting increases in productivity when collaborating with industry partners, academic institutions, or governments. (CCIQ sub. 6, p. 8)

Several reviews of innovation and manufacturing in Australia have pointed to the importance of networks and collaboration in increasing businesses’ capacity to innovate (VCEC 2011, p. 131; Cutler 2008, p. 32). Australian businesses and universities do not collaborate as much as their foreign peers, and this may impede knowledge transfer (PC 2016d, p. 475).

Australian universities produce high quality research. The PC (2016d, p. 478) found:

Most analysis of Australia’s science system finds that Australia’s publicly-funded research organisations have generally high productivity as measured by their academic outputs.

Without collaboration between businesses and researchers, Queensland manufacturing may lack sufficient access to R&D. Universities are likely to hold a large amount of intellectual property (IP) that has commercial potential but has not been commercialised (QPC Innovation Roundtable).

Manufacturers tend to source their ideas and information for innovation from within their own business, their supply chain or competitors, to a greater extent than other businesses. As mentioned above, less than 1 per cent of manufacturing businesses source ideas from universities or government. This is even lower than the proportion of all businesses who use these sources at 3 per cent. Around 2010, Australia appeared to have the least collaboration between businesses and universities and public research institutions of 33 OECD countries. While the data is somewhat dated and new policies have been introduced since 2010, recent ABS surveys suggest this type of collaboration remains low (ABS 2016 g).

Large firms were about one-tenth as likely to collaborate as their global peers and SMEs were about one-third as likely (Figure 5.6). The lower collaboration for both SMEs and large businesses suggests the scale of Australian businesses is only a partial explanation.
Figure 5.6 Businesses collaborating on innovation with higher education or public research institutions, by firm size, 2008–10

Note: For Australia, data refers to 2010–11 and includes product-, process-, marketing- and organisational-innovative firms (including ongoing or abandoned innovation activities). Recorded year and measurement of business size vary across nations. For example, South African data refer to 2005–07 and firms with 20 or more employees, with a minimum turnover between ZAR 3 million and ZAR 6 million, depending on the industry. Some caution should therefore be used in the interpretation. However these differences are unlikely to impact the data for large firms.

Source: OECD 2013a.

In Queensland, the rate of collaboration on publications between academic and corporate researchers was lower than the Australian rate and world average (Office of the Queensland Chief Scientist 2016b, p. 57).

Some key factors driving this outcome are:

- Many businesses say they lack the time or skills needed to collaborate with research institutions (Innovation and Science Australia 2016, p. 84).
- Funding approaches for universities may provide excessive incentives to publish journal articles, but provide limited incentive for commercialising research or collaborating with businesses (QPC Innovation Roundtable; PWC 2015, p. 12). Some cultural elements within universities, including risk aversion, may impede innovation (Spike Innovation 2015, p. 18).
- Australia has a relatively high number of PhDs, but relatively few are employed by businesses. There is a lack of mobility between public and private research (PC 2015b, p. 276).
- The scale of businesses impedes business–university connectedness (PWC 2015, p. 8). There are 43 accredited universities in Australia, while there are over 16,000 businesses in the Queensland manufacturing sector alone, most of them small businesses. It may be difficult for both parties to communicate and collaborate their efforts effectively.
- The results of R&D are often very uncertain. This uncertainty combined with financing, skills and time difficulties may deter some businesses from collaboration. Manufacturers may also lack information on the potential opportunities and benefits and the type of research and intellectual property that are available at universities.
- The research priorities of the private sector and public research institutions may not be well aligned. For example, in 2010 businesses spent 52 per cent of R&D on engineering and 28 per cent on ICT, while universities only spent 9 per cent and 4 per cent, respectively (PWC 2015, p. 8).
• Some universities may be too protective of their IP (PWC 2015, p. 12). It has also been suggested the technology transfer offices within universities may not function as well as they could (Mazzarol 2016; PC 2016d, p. 471). Some individual researchers may overvalue their intellectual property and as a result price themselves out of the market (PC 2016d, p. 475).

In 2015, the Australian Government announced policy measures to address the lack of connectivity between research and industry in Australia (Macfarlane 2015b; DIIS n.d.). Since then initiatives introduced include:

• establishing science and research priorities that align areas of national research excellence with industry strengths
• examining the operation of the R&D tax incentive to place more emphasis on collaboration
• ensuring rules for competitive grants appropriately recognise industry-relevant expertise or research
• developing a National Collaborative Research Infrastructure Strategy
• implementing a strategy to provide business with greater online access to research
• developing an IP Toolkit, with model contracts and case studies
• requiring universities (from 2017) to list their patents generated from publicly funded research on a central information platform
• initiating a Productivity Commission Inquiry into intellectual property.

In its 2017-18 budget, the Australian Government increased Cooperative Research Centres (CRC) program funding (see Box 5.4) to support larger scale advanced manufacturing research projects (Sinodinos 2017).

Universities are also aware of the lack of connectivity with industry and are instituting initiatives to encourage research commercialisation. Queensland universities have established incubators to help commercialise student and staff research and build industry links, including the University of Queensland’s UniQuest, Queensland University of Technology’s BlueBox and James Cook University.
Box 5.4: Cooperative Research Centres

The Cooperative Research Centres (CRC) program was introduced by the Australian Government in 1990 to bridge the gap between research and industry. The program supports industry user-driven research through the formation of collaborative partnerships, between businesses, industry associations, governments and research organisations.

Over 200 CRCs have been formed over the history of the program, across a wide range of specialist fields. Of the 31 CRCs current members of the CRC Association, three are based in Queensland (CRC Optimising Resource Extraction; CRC for Living with Autism; and Wound Management Innovation CRC).

There are a number of CRCs which primarily focus on manufacturing applications, including: Innovative Manufacturing CRC (IMCRC); Excellence Australia (with an automotive focus); CRC for Polymers and Rail Manufacturing CRC.

The IMCRC is a relatively new collaboration that aims to improve the competitiveness, productivity and sustainability of Australian manufacturing firms, by driving digital and business model transformation and increasing the use of enabling technologies. The IMCRC is funded to run from 2016 to 2022, and has up to $40 million in available Australian Government money, to be matched with industry funding. The Centre funds projects that:

- demonstrate clear benefits
- demonstrate collaborate, including with SMEs
- improve access to global supply chains
- have a commercialisation and an intellectual property utilisation plan
- require high quality research with research organisations and utilize PhD students.

Several reviews have found evidence of CRCs providing benefits to industry. For example, the CRC for Advanced Composite Structures enabled Hawker de Havilland to propose designs for the Boeing 787 that reduced labour and materials costs and aircraft weight. As a result of the innovation Hawker de Havilland won $4 billion of contracts over 25 years with Boeing to manufacture aircraft parts in Australia.

Source: Miles 2015; The Allen Consulting Group 2012; IMRC 2017a; 2017b; Cooperative Research Centres Association 2016

Internationally, centres to connect research and business are often used to increase commercialisation and collaboration. The United Kingdom introduced Catapult Centres to improve collaboration between industries and universities, amongst other objectives.

The Australian Government has introduced Industry Growth Centres (including one in advanced manufacturing) modelled on the UK approach. It will take time to establish to what extent these Australian Government initiatives have been successful.

While the Australian Government has jurisdiction over the university sector, state governments still have a role in minimising any state-based barriers to research and commercialisation.

Draft finding 5.5

There appears to be little collaboration between Queensland manufacturers and universities. Reasons may include experiential, cultural and information differences, poor incentives for universities to collaborate and capability in businesses.
5.3.5 Business networks

Collaboration within business networks can spread the cost of innovation, achieve economies of scale and reduce duplication. The Australian Department of Industry, Tourism and Resources found that, while controlling for other firm characteristics, collaboration was associated with a statistically significant increase in new-to-the-world innovations (Rassenfosse et al. 2011, p. 18).

However, Australian business-to-business collaboration appears limited. Only about 16 per cent of innovation-active manufacturers collaborate with another organisation (ABS 2016g). This is similar to other industries, where about 15 per cent collaborate. More than half of collaborators do so through joint marketing or distribution, followed by joint R&D and joint production.

Large innovation-active manufacturers appear to be much better at collaboration. Almost half of them (47 per cent) collaborate, in comparison with the far smaller percentage of small and medium businesses that collaborate (12–19 per cent). Large manufacturers are the most likely to collaborate on R&D—five times more likely than all businesses.

Figure 5.7 illustrates that Australian businesses are poorly connected in global value chains. Australia’s large businesses ranked 24th out of 27 OECD+ countries and its SMEs 19th for international collaboration in 2010-12.

Figure 5.7 Proportion of innovation active firms that collaborate with international partners, 2010–12

Reasons for relatively low collaboration may include geographical isolation and a lack of scale and cross-cultural skills. Cultural attitudes to business may also play a role (QPC Innovation Roundtable).

The AAAA (sub. 10, p. 5) suggested collaboration is:

…the key to developing new products and expanding into new markets and this can rarely be achieved by a stand-alone commercial entity. Governments and industry associations working together are the best method of bringing clusters of manufacturers together to pursue opportunities.
Clusters are geographic concentrations of linked businesses and institutions in a particular industry, such as the aerospace industry in north Brisbane and the marine industry on the Gold Coast. These industries generally do not conform to traditional industry classifications and sometimes go unrecognised (Porter 1998).

Clusters enable specialisation, economies of scale, improved coordination, and comparison, the sharing of infrastructure, agglomeration and innovation. As Porter (1998) said:

Clusters promote both competition and cooperation. Rivals compete intensely to win and retain customers. Without vigorous competition a cluster will fail. Yet there is also cooperation, much of it vertical involving companies in related industries and local institutions. ...

A cluster allows each member to benefit as if it had greater scale or as if it had joined with others without sacrificing its flexibility.

As detailed earlier, internationally many governments are trying to improve business collaboration and networking, through initiatives such as the United Kingdom’s Catapult Centres. The Australian Government has formed Industry Growth Centres to, amongst other things, improve engagement within industry.

Innovative industries and businesses have an innate tendency towards clustering (Rothwell et al. 2016, p. 35). New businesses often proliferate in existing clusters rather than in isolation, because a dense customer base makes opportunities more apparent and lowers risks, and an existing supply of inputs can be utilised. Reviews suggest that more than half of attempts to artificially create manufacturing clusters fail, and as few as 10 per cent are significantly successful (Johnston 2003, p. 25). However, governments can assist promoting networks and collaboration through the right framework conditions, land use planning and zoning and information dissemination.

**Draft finding 5.6**

Australian manufacturers do not collaborate as much as their international peers. Greater collaboration between Queensland manufacturers would likely provide knowledge spillovers and improve innovation. Limited information is available on networks and clusters within the Queensland industry.

**5.3.6 Skills**

Stakeholders mentioned a lack of skills as one of the key barriers to manufacturing innovation (AMWU sub. 9, p. 6; QPC Innovation Roundtable; CCIQ sub. 6, pp. 7–8). The importance of skills in the innovation process was highlighted in Cook Medical’s submission:

But the true asset to Queensland’s economic future is the skill base retained within the manufacturing industry. It is these skills that drive innovation and support the commercialisation of those ideas, which in turn create new opportunities for growth (sub. 12, p. 3).

Innovation occurs through people working smarter rather than harder. An educated and skilled workforce is vital to generating the ideas for and implementing successful innovation. Because innovation can apply to all aspects of the manufacturing value chain, and can occur through process and organisational change as well as technological adoption, the skills needed are wide-ranging.

Innovation-active manufacturers use a wider range of skills and are more likely to face skill shortages for most skill types than other businesses (ABS 2016i). Trades are the largest area of technical skill shortages for innovation-active manufacturing businesses, rather than STEM skills. Tertiary skills, particularly in engineering and marketing, are relatively more commonly utilised by, and the subject of skills shortages for, innovation-active manufacturers than other manufacturers.

Australia has a relatively highly educated labour force. On some metrics, such as literacy and proportion of population with a tertiary degree, expenditure on primary and secondary education Australia performs relatively well internationally (Office of the Chief Economist 2016, p. 102). However, an OECD study of 22 countries ranked Australia as having the 7th largest skills mismatch in 2011–12 (McGowan & Andrews 2015,
As manufacturing evolves, including adoption of advanced technologies and techniques, the skills required by manufacturers to compete and innovate will change. The demand and supply of well-matched skills are of vital importance to the absorptive capacity of manufacturers seeking to innovate.

Skills are discussed in more detail in Chapter 6.

### 5.3.7 Regulation

Regulation and compliance costs are commonly cited barriers to innovation. Consultation and submissions highlighted the importance of regulation to innovation (Cook Medical sub. 12, p. 4; CCIQ, sub. 6, p. 6; Australian Sugar Milling Council sub. 5, p. 5). Packer Leather (sub. 13, p. 2) said:

*Over-regulation by all levels of government suffocates imitative and diminishes risk-taking.*

When processes or technologies, rather than outcomes, are regulated, the potential options to solve a problem and do something new and innovate diminishes. Larger and incumbent firms tend to better understand regulation and have business models tailored to existing regulation, than smaller and newer firms. Innovation can often solve the information and safety problems that regulations were originally created to address.

Regulation also provides barriers to entrepreneurship by increasing the complexity or the financial capital requirements (for example licence costs) of market entry (Office of the Chief Economist 2016, p. 73).

Gruen (2007, pp. 10–11) provides the example of keyless cars, where regulation may have impeded manufacturing innovation. In response to high car theft in the late 1980s, Australian vehicle and component manufacturers were world leaders in, and exporters of, car security technology (including digital technology). Gruen says that Australian Design Rule 25 (which mandated mechanical door and steering locks), was an important impediment—though not the only—to Australian manufacturers developing keyless cars and components.

Innovation and Science Australia found some regulations could be improved to enable greater innovation. These regulations include intellectual property arrangements, labour market regulation, industrial chemicals regulation, planning and zoning requirements and clinical trial regulation (Innovation and Science Australia 2016, p. 73).

Chapter 8 goes into more detail about regulation and the manufacturing sector.

### Seeking further views

The Commission is seeking further information on innovation.

Are there state-based impediments to businesses and universities collaborating to commercialise R&D that could be reformed or removed? Do current Queensland and Australian government policies effectively target barriers?

Are there specific ways that the government can facilitate networks, hubs and clustering? Are there any state-based impediments to businesses forming effective networks and clustering? Are there any other state-based barriers to innovation?

### 5.4 Innovation policy

Innovation policy has emerged as an amalgam of industry policy and knowledge and science policy. Since the 1980s governments have changed the emphasis of industry policy towards improving a nation or state’s innovation performance (QCA 2015a, p. 12). Innovation support accounted for 38 per cent of Australian Government industry assistance in 2012–13 (PC 2014b, p. 38).

Submissions have highlighted the importance of a good policy environment to firm innovation. CCIQ (sub. 6, p. 7) noted that:
Embracing industry 4.0 will require the right policy settings to enable manufacturing businesses to focus on innovation, invest in research and commercialisation, educate and train highly skilled workforce and encourage collaboration and the adoption of new technologies.

5.4.1 The roles of government and business in innovation

Ultimately, businesses and the people within them will drive manufacturing innovation. Businesses have strong incentives to innovate. Where they succeed, innovation can be highly profitable and personally rewarding. However, a lack of innovation can render businesses uncompetitive, at substantial personal cost to those who own and work for them.

Competition and profit motive are the dominant drivers of manufacturing innovation (ABS 2016g, ABS & PC 2011, pp. 1–2). In competitive markets, innovative businesses out-compete other businesses by achieving higher rates of growth in employment, profits and survival (Office of the Chief Economist 2016, p. 23).

There is a direct role for government in innovation, where it provides services, such as health and defence, including investing in R&D. Beyond this, the role of government is not to promote individual innovation, but to set framework conditions to allow innovation to occur (Carlsson 2015, p. 227).

The Queensland Government broadly influences manufacturing innovation through policies including taxation, education, training, energy, regulation, grants, subsidies and concessions. While some policies support innovation, other policies may impede it, often unintentionally.

5.4.2 Australian programs

The Australian Government has more substantial levers to deliberately or accidentally influence innovation than state governments. It has jurisdiction over universities and company taxes and is charged with regulating important parts of the market, including the financial system, corporations and competition laws.

Programs are numerous and fragmented. The Cutler Review (2008, p. 156) found investment in research and innovation was spread across 11 portfolios. In 2016 a new independent board, Innovation and Science Australia was established to provide more focused whole-of-government advice on science, research and innovation.

The Australian Government has over 100 innovation policies focusing on creating knowledge, transferring knowledge and applying knowledge. The majority of funding is directed towards private and public sector R&D (Innovation and Science Australia 2016, p. 30). Programs to improve knowledge transfer are a smaller proportion of funding, around 16 per cent.

In 2016–17, the Australian Government expected to spend around $10.3 billion on innovation-related policies (Innovation and Science Australia 2016, p. 21). This equated to about 2.3 per cent of Australian Government expenditure (Australian Government 2016, p. 114). The largest government program to assist innovation was the R&D Tax Incentive, budgeted at $3.1 billion. In comparison, state and territory governments were projected to spend around $1.1 billion in 2016–17 (Innovation and Science Australia 2016, p. 23).

Many of the businesses said during consultation they found the R&D Tax Incentive to be the most useful innovation policy available in Australia.

5.4.3 Queensland programs

The Queensland Government has a range of similarly fragmented innovation policies, programs and activities. They are generally targeted at businesses broadly, rather than manufacturing businesses exclusively.

At least 25 programs are aimed at increasing innovation or entrepreneurship. These programs are run by the Department of Science, Information Technology and Innovation (DSITI) the Department of State Development (DSD), the Department of Tourism, Events and Small Business (DTESB) and Queensland Treasury. In addition, these departments also undertake other activities aimed at stimulating innovation, such as industry roadmaps.
The Queensland Government’s primary innovation policy is the Advance Queensland initiative. The initiative aims to build new industries, broaden traditional ones and create new jobs. The 2017–18 state budget includes initiatives to boost the Advance Queensland investment to $420 million over the next four years (Queensland Treasury 2017b, p. 24). An additional $15 million has been budgeted to implement industry roadmaps and action plans over the same timeframe.

Advance Queensland focuses on maintaining research strengths, encouraging entrepreneurship and start-ups, connecting research with industry, inspiring future generations, growing regions and unlocking businesses’ potential to innovate (DSITI 2017). Programs include a range of mechanisms, such as grants, co-investment with venture capitalists and workshops. Most programs appear targeted towards small business, though some target medium business. The extent they are utilised by manufacturers is uncertain.

Advance Queensland innovation programs most likely to be used by manufacturers include:

- **Ignite Ideas Fund**—assists SMEs to commercialise new or improved products, processes or services through grants of up to $250,000 (Box 5.5)
- **Knowledge Transfer Partnerships**—helps SMEs to employ graduates to work on strategic innovation projects to improve collaboration and knowledge transfer. Grants of up to $50,000 are available for each project
- **Innovation Partnerships**—supports research organisations to undertake collaborative research projects with end-users that address industry needs, through grants of up to $1.5 million
- **Commercialisation Partnership**—provides access to Chinese incubators to access facilities and funding
- **Industry Accelerators**—pairs established businesses with industry accelerators to help commercialise ideas
- **Platform Technology**—provides funding for collaborative R&D towards development and use of enabling technologies, such as unmanned aerial vehicles (Queensland Government 2017a)
- **Small Business Innovation Research**—supports innovators to develop their ideas, by providing funding of up to $500,000 for feasibility and proof of concept (DSITI 2017).

**Box 5.5 Ignite Ideas Fund**

The Ignite Ideas Fund, part of the Queensland Government’s Advance Queensland initiative, supports startups and small to medium Queensland businesses commercialise market-ready innovative ideas that will help them grow and compete in a global market, and create new jobs.

It requires applicants to contribute partial matched funding, depending on the size of their business. First tier grants provide up to $100,000 per project, and fund 60 to 100 per cent of project costs. Second tier grants provide between $100,000 and $250,000 per project, to fund up to 50 per cent of project costs.

The first two rounds of Ignite Ideas grants awarded $16.5 million in grants to 119 successful applicants. Recipients included:

- **Brisbane Materials**—to commercialise a new light-emitting diode (LED) manufacturing materials to increase efficiency, by producing more light, using less energy and lasting longer.
- **Magnatica Limited**—to develop commercial manufacturing for innovative Magnetic Resonance Imaging (MRI) sub-systems used in pre-clinical and clinical MRI system applications.

Funding for the Ignite Ideas Fund was increased by $10 million in the 2017–18 state budget.


---

30 Incubators provide assistance to entrepreneurs and their new businesses in the form of office services, mentoring, management and business advice, networking and sometimes financing. If successful, the business grows in size and moves out of the incubator into the surrounding economy and is replaced by a new infant business. Accelerators provide similar services to incubators but focus on providing them once a business is beyond the very early start-up stage.
Advance Queensland offers the Business Development Fund, which aims to stimulate the venture capital industry and early stage businesses. The fund of up to $40 million co-invests equity funding with angel and venture capital investors. Projects funded to date include Brisbane-based legaltech company Lawcadia, which has received $500,000 to expand its legal procurement business. (Pitt 2017)

Funding from Advance Queensland has also been used to develop the Queensland Startup Precinct (Box 5.6).

**Box 5.6: The Queensland Startup Precinct**

The Queensland Startup Precinct is the state’s largest startup hub. It was founded in March 2017 with a $6 million State Government investment. The Precinct is housed in the repurposed TC Beirne building in the Fortitude Valley, and brings together Queensland entrepreneurs, startups, incubators and mentors in one central location.

The hub provides entrepreneurs with co-working spaces and access to support networks and mentors, allowing them to grow and develop. It also offers events and meeting spaces, an investor and venture capital presence, access to professional services such as legal and accounting, and assistance for international entrepreneurs setting in Queensland.

With digital and physical links to innovation centres and accelerators located elsewhere in the Queensland, the hub facilitates collaboration and innovation across the state.

Foundation tenants include River City Labs, CSIRO’s Data 61, eHealth Queensland, Softbank Technologies from Japan, the Open Data Institute of Queensland, One Ventures, R&R Strategic, CyberLabs, ClipChamp, Find-Me, Airway Medical Innovations, Myriad and the Office of the Queensland Chief Entrepreneur.

Most of the startups using the Precinct innovate using technology to deliver new or better services. However, a major Japanese drone manufacturer, Terra Drone, has also based its regional office there.

*Source: Queensland Government 2017e; River City Labs 2015; Trad 2017.*

Through most stages of the early business or innovation process, government support is available from either the Australian Government or the Queensland Government, or from both (Figure 5.8). The Queensland Chief Scientist Office (2016, p. 67) notes there is some overlap between Advance Queensland and Australian Government programs. This is no accident—the programs share similar policy goals in creating the right environment for success.
5.4.4 There is scope to improve policy design

The main policy rationales for government intervention (see chapter 4) in innovation are market and systems failures (knowledge spillovers, information and coordination problems). These provide a necessary but not sufficient rationale for government intervention. A sufficient case for intervention depends on establishing that the intervention is likely to provide net social or economic benefit.

It is too early to evaluate the success of most Advance Queensland programs. DSITI has indicated monitoring is ongoing and it will evaluate the effectiveness of innovation programs using best international practices (DSITI 2017). In their communications with the Commission, DSD and DTESB identified objectives and monitoring and evaluation processes for some of their programs.

However, based on the policy design principles outlined in Chapter 4, there is scope to improve the current suite of programs.

Some programs lack evidence of strong policy rationale. Few programs have specific or measurable objectives for the community to judge their success. This may be because little of the supporting evidence for the programs is publicly released, rather than because of an absence of policy logic. Some programs appear to favour activities with a limited link to innovation (Box 5.7).
Box 5.7: Advance Queensland—targeting innovation?

Sport Science Challenge—the objective is to enhance the competitiveness of our elite athletes and teams, including those preparing for the 2018 Commonwealth Games or the 2020 Olympic Games, and to promote healthy and active lifestyles. The fund has $300,000 and it is not clear what failures impede a socially optimal level of innovation in Australian sport.

Women’s Academic Fund—the objective was to support more women in STEM with funding for female researchers within Queensland-based universities and other publicly-funded research organisations. Between August 2015 and 30 June 2017, more than $1.53 million was invested through the fund to directly support more than 150 women researchers to help them continue research while on maternity leave, or to help advance their careers by raising the profile of their research through presenting at national or international conferences. There is no established failure that the policy addresses. In 2011, women represented almost half (49.4 per cent) of university lecturer and tutor roles. The guidelines do not restrict the academic’s field of study to a STEM discipline, as the objective might suggest. (Applications to this Fund are now closed, and the program is now in its evaluation stage.)


For many programs, there is limited (publicly available) evidence to suggest they will induce additional activity. For example, much government assistance to start-ups31 through measures such as incubators, accelerators, grants and tax concessions is based on the notion that high-growth businesses may generate positive network spillovers, agglomeration economies and virtuous cycles of entrepreneurship (PC 2015b, p. 253). A disproportionate amount of net employment and economic growth comes from a relatively small number of firms (Office of the Chief Economist 2015a, p. 51). It is not clear that these programs can distinguish between what is a small business and what is a high-growth startup.

Many manufacturers indicated they are unaware of, or avoid programs. Many firms participating in this inquiry indicated they tend to avoid government programs based on a view they would not be useful, or the compliance costs of navigating, applying and complying with the program are too high compared with the expected benefits. Some firms were either not aware of the available programs or found it too difficult to find one that suited their needs.

There is a large number of programs and no public performance information. There may be a case for multiple programs to enable policy experimentation, particularly in complex areas such as innovation where barriers are diverse and it is difficult to know what will work. Yet, the large number of programs available reduces effectiveness, increases overlap and duplication (both within state programs and with Australian and local government programs) and impedes performance measurement. It may also undermine the process of eliminating ineffective policies, scaling effective policies and continuous improvement.

Large numbers of relatively small programs are also likely to be less cost-effective, requiring a high proportion of funds to administer them. The greater the proportion of the funding spent on administration, the smaller the amount that businesses and researchers actually receive.

As the Queensland Competition Authority observed in relation to industry assistance:

Some assistance measures have very high delivery costs. While the cost of administering industry assistance measures averaged around 10 per cent for those budget-funded programs that record program administration costs, for a handful of programs, administration costs account for 50 per cent of total program cost, meaning for every dollar of assistance, a dollar is spent administering the program. For a small number of programs, the cost of establishing and administering the program was higher than the amount of assistance provided. (2015a, p. 59)

The OECD recommended the consolidation of innovation programs and a more integrated whole-of-government approach, to increase innovation absorption and development and boost productivity (OECD 2017b, pp. 2–3). Evaluation and monitoring of innovation policies is important to allow ineffective programs to be discontinued or effective programs to be scaled up. Some innovation programs have been found

31 Start-ups are a very small proportion of new businesses that are highly entrepreneurial and innovative and have high growth potential (PC 2015b, p. 251).
to provide benefits—for example, reviews of the Cooperative Research Centres found them to be highly effective in linking researchers and businesses and estimated a 3:1 return on investment (Miles 2015, p. 6). However, in general, innovation programs are not well-monitored and evaluated.

A comprehensive evaluation of New Zealand innovation programs concluded that:

*The direct economic and financial returns from most individual government programs aimed at supporting innovative research or business investments have been generally low. Although there have been some exceptions—i.e. specific projects which went on to significant commercial investment—these have been far fewer in number and scale than initially envisaged. (New Zealand Ministry of Economic Development 2011, pp. 3—4)*

Innovation and Science Australia found:

*Whilst there are evaluations showing the success of several such programmes, there is a need for improved data in this area (innovation) to ensure the efficiency and effectiveness of all Australian Government interventions. (2016, p.xii)*

Evaluation is not a compliance exercise—it is integral to the policy development process. The Office of the Chief Economist explained the rationale for evaluating their department’s programs as:

*We gain an understanding of what works and what doesn’t work and why, what is being done well and what is not, what should be pursued and what should not. This knowledge can improve the design and implementation of effective interventions. (2015b, p. 2)*

Fewer programs, based on robust design that focuses on outcomes, measures benefits and is accompanied by transparent evaluation to demonstrate ‘what works’, are more likely to:

- establish a clear government plan for industry, which is understood by firms, workers and the community
- make it easier for manufacturing firms to access and participate, increasing the chance that the best firms can access programs, rather than firms that have the time and resources to navigate the system
- better achieve the government’s objectives and be able to demonstrate success (or if not successful, demonstrate how to improve programs or identify if resources would be better deployed elsewhere).

**Draft recommendation 9**

The Queensland Government should consolidate its more than 25 innovation and entrepreneurial programs to target three key areas—increase beneficial knowledge spillovers; improve information access; and address coordination problems.

For each remaining program, the government should:

- establish measurable objectives aimed at inducing additional activity
- measure and monitor the program for performance from commencement
- evaluate programs within three years and publicly report the outcomes, including administration costs and if the program achieved its objectives (effectiveness) and the benefits exceeded the costs (efficiency).
6.0 Skills and training
This chapter considers how workforce skills and training can influence the productivity and competitiveness of Queensland manufacturing. It identifies skill challenges and discusses how government can address these issues as part of broader reform to the education and training sector.

Key points

1. A skilled workforce is an important driver of growth and innovation for Queensland manufacturing.

2. New and emerging technologies are placing new demands on workers and businesses—changing tasks and activities and the associated skillsets required. This provides opportunities for some, but can also pose significant risks for others.
   - For manufacturing businesses, the challenge is to attract and retain workers with skillsets to meet changing needs.
   - For manufacturing workers, the challenge is to acquire new skills and quickly adapt, in an environment of uncertainty over which new technologies will develop next.
   - For government, the challenge is to put in place sufficiently flexible policies and programs to accommodate a range of possible future needs.

3. Some manufacturers find it difficult to attract, retain or replace skilled workers, particularly in regional areas or niche markets, in part reflecting:
   - the perception there is ‘no future’ in manufacturing
   - ongoing concerns with the level of basic skills (literacy, numeracy, problem solving)
   - differences in the capability and capacity of workers ‘beyond the production line’ (STEM skills, leadership, management, entrepreneurship)
   - an apparent disconnect between government, training providers and industry needs, particularly in relation to ‘job readiness’ as well as in identifying and providing for future skills needs.

4. Many of these issues are not unique to manufacturing. They reflect challenges facing the Queensland economy as it shifts to more knowledge-intensive industries and services.

5. A robust and flexible vocational education and training (VET) sector plays a key role in delivering an appropriately skilled manufacturing workforce.

6. Reform of the VET system to better serve students, business and the wider community (including ensuring VET funding is efficient) will benefit Queensland manufacturers and workers, as well as the broader economy.
6.1 Introduction

Manufacturing businesses require workers with different bundles of skills to pursue different product-market strategies. In some cases, highly skilled staff with knowledge of specific disciplines are required to undertake highly technical and specific tasks. Businesses also need ‘capable’ workers with a base set of skills and the flexibility, creativity and ability to try new things.

A skilled manufacturing workforce is an important driver of innovation and growth within firms, and across the sector.

The OECD emphasises the importance of:

... a skilled workforce that can generate new ideas and technologies, bring them to the market, and adapt to technological changes across society. Skilled people generate knowledge that can be used to create and implement innovations, and skills are also crucial to help absorb new innovations throughout economy and society (OECD 2015a, p. 47).

Stakeholders said Queensland manufacturing required a skilled workforce to succeed—and that firm and industry outcomes would suffer unless existing skills gaps were addressed (Box 6.1).

Box 6.1 Stakeholder views about the skills in Queensland manufacturing

Stakeholders said a diverse range of disciplines and levels of skill would enable Queensland manufacturers to succeed, noting:

Higher skill levels and genuine interaction across disciplines and specialisations will be a necessary precondition to Queensland securing a competitive advantage in global markets and capitalising on the opportunities of the future. (CCIQ sub.6, p. 8)

The key skills required for participation in global manufacturing supply chains includes: strong communication skills; the ability to collaborate effectively; knowledge of international practices and quality standards; and the ability to produce high-quality products. (DSD sub.11, p. 4)

But the true asset to Queensland's economic future is the skill base retained within the manufacturing industry. It is these skills that drive innovation and support the commercialisation of those ideas, which in turn create new opportunities for growth. (Cook Medical Australia sub. 12, p. 3)

Many of the required skills will be highly transferable and important to other industries including mining, construction and the services industries (AMWU sub.9, p. 2).

Stakeholders said firm and industry outcomes would suffer unless existing skills gaps were addressed, noting:

One of the key barriers to manufacturing innovation is a lack of skilled people. ... industry and government should focus on building a stronger skills base which will increase productivity and competitiveness ... (AMWU sub. 9, p. 6)

Stakeholders were generally concerned manufacturing skills would be lost and not replaced if the industry failed to grow. They said the decline in manufacturing:

...is severely impacting the skills and knowledge base, which is critical to achieving the successful commercialisation of innovative new products. ... the skills necessary to pursue innovation-led advanced manufacturing opportunities are largely nurtured within wider manufacturing, making the two inextricably linked ... (Cook Medical sub.12, p. 5)
These effects could be felt by manufacturing workers and businesses, as well as firms in other industries and the broader economy:

Many people initially trained in manufacturing move to other industries. Where will the engineers, technicians, welders, maintenance fitters and machinists come from to install and maintain our telecommunications, power stations, water plants, transport and defence systems? (Green & Roos 2012, p. 49)

Specific concerns identified in this inquiry have been:

• new and emerging technologies that provide opportunities for the industry, but nevertheless place new demands on workers (see section 6.2)
• difficulties in finding (or replacing) and retaining skilled staff, particularly in regional areas or niche markets (see section 6.3)
• gaps in desired workplace skills that limit opportunities for firms and workers (see section 6.4)
• an apparent disconnect between government, training providers and industry needs, particularly in relation to ‘job readiness’ as well as in identifying and providing for future skills needs (see section 6.5)
• difficulties and costs of engaging with the skills sector (see section 6.5).

These issues are not new—and are not unique to manufacturing. Reflecting this, governments have put in place a program of broader reform to improve skills and training outcomes for firms and workers, including those involved in manufacturing (see sections 6.6 and 6.7).

6.2 New and emerging technologies—changing workforce needs

During the consultation process, the Commission was advised new and emerging technologies were shaping the Queensland manufacturing industry—but uptake by business and industry is highly context dependent (see Chapter 3).

While many businesses have automated routine or repetitive tasks, some have also fundamentally changed their processes and business models:

• by using smart robotics, advanced machinery and control systems, and additive manufacturing for complex tasks. This includes using 3D scanning and modelling, robotic processing and on-site installation for metal fabricators to improve accuracy and reduce human error, resulting in fewer delays and cost overruns.
• by using new technologies and advanced materials to improve products and processes. This includes printing patterns onto fabric rather than having colour fabric woven in and using modern design techniques and rapid prototyping (3D printing) to respond to consumers in much shorter timeframes.

New businesses are also emerging to take advantage of new technologies.

These developments place new demands on workers—changing the tasks and activities undertaken in many manufacturing firms, and the associated skill sets needed. The impacts in workplaces and on workers are well documented:

Recent decades have witnessed waves of obsolescence of skills as a result of wholesale replacements of technologies and their associated infrastructures. (Jones & Grimshaw 2012, p. 6)

Technology will change the way we work and the work we do; destroying existing jobs, creating new ones, transforming industries and internationalising labour at unprecedented levels. ... People most likely to prosper in tomorrow’s workforce will be protean—able to change, adapt to unfamiliar work, deploy versatile skills and learn new trades continuously as part of their working lives. (Williamson et al. 2015a, pp. 8, 19)
It is expected that the increasing automation of processes will reduce the labour intensity of manufacturing, significantly lowering the number of low-skilled roles:

*Employment is likely to decrease in the manufacturing sector because productivity improvements generally exceed growth in demand, and rapid digitisation means firms require fewer workers even as they become more service oriented.* (CEDA 2014, p. 33)

*Autonomous machines and additive manufacturing are reducing the labour intensity of manufacturing, significantly lowering the number of low-skilled roles.* (CSIRO 2016, p. 53)

The Australian Department of Employment (DoE) found the proportion of manufacturing workers employed as labourers, machinery operators and drivers across Australia has fallen from 40 per cent to 31 per cent during the past 20 years. This suggests opportunities for lower skilled workers have declined (DoE 2015a, p. 9).

Many manufacturers have redesigned and streamlined production lines while increasingly automating processes. Although some remaining job roles will require less technically skilled workers these trends and innovations generally demand more skilled workers (Deloitte Development LLC and The Manufacturing Institute 2015, p. 6). Capabilities more difficult to automate such as the ‘deeply human’ characteristics of ethics, creativity and intuition will be more important and highly valued (CSIRO 2016, p. 53).

These effects are not expected to diminish over time:

*One certainty about the economy and employment in the years ahead is they will continue to be shaped and affected by new and evolving technology ... While the impact of technology on the workplace to date has been significant, it is likely to be dwarfed by new technologies that are emerging.* (CEDA 2015, p. 39)

Stakeholders agreed that new and emerging technologies are likely to increase the demand for workers who are capable of driving change and innovation (CCIQ sub. 6, p. 8; QPC Innovation Roundtable; TCF Roundtable). This includes people with high levels of technical proficiency (engineering, production, technology) as well as entrepreneurship, design and creativity skills. While trade skills will remain important to the sector, they are more likely to come in the form of skilled trade roles as opposed to lower skilled work as was the case in traditional manufacturing (CCIQ sub. 6, p. 8; TCF Connect sub. 2, p. 2; QPC Innovation Roundtable; TCF Roundtable).

There are particular concerns for workers with low or obsolete skills, or who are unable to readily acquire new skills. These workers will be increasingly exposed to unemployment or underemployment. The AMWU said:

...asking a boilermaker to put on a lab coat tomorrow is an unrealistic proposition. (sub. 9, p. 3)

As it is difficult to predict major technological changes very far in advance, the ability to acquire new skills and adapt quickly is necessary.

*Occupational obsolescence can be mitigated by ensuring that vocational training targets tomorrow’s jobs rather than yesterday’s, and by training people to be adaptable.* (Williamson et al. 2015b, p. 20)

*Lifelong learning is an essential part of both reacting to and fostering innovation. Learning and replenishing skills is necessary to respond to economic and technological change.* (OECD 2015a, p. 57)

Queensland’s changing manufacturing sector requires skills across a broad range of disciplines and at a variety of levels. For manufacturing businesses, the challenge is attracting and retaining workers with the skillsets to meet changing needs. For manufacturing workers, the challenge is in lifting basic skills and/or reskilling or upskilling to take on new tasks. Skilled workers need to find a balance between ‘generic’ or ‘adaptable’ skills and specialist scientific and technical skills, especially when there is uncertainty over what technologies will come ‘online’ and whether or not the new skills will fit with these developments.

For government, this means putting policies and programs in place that are flexible enough to accommodate a range of possible future states.
Draft finding 6.1

New and emerging technologies place new demands on workers, changing the tasks and activities undertaken in manufacturing, and the associated skill sets required. Increasing automation creates risks for workers with low or obsolete skills, or those workers unable to readily acquire new skills. The capabilities that are more difficult to automate will become more important and highly valued.

6.3 Difficulties in attracting and retaining skilled workers

Across Australia, 18 per cent of all manufacturing businesses identified the lack of skilled persons within the business and/or within the labour market as a barrier to general business activities or performance. This increases to 24 per cent for innovation-active manufacturing businesses (ABS 2016d).

Stakeholders said that although Queensland manufacturing offers opportunities for a wide variety of workers with a diverse range of skills, some businesses had difficulties in finding (or replacing) and retaining skilled manufacturing workers. This seemed to be a particular challenge for businesses that:

- require (sometimes new) specialised skills for niche products (Packer Leather sub. 13, p. 3; TCF Connect sub. 2, p. 2; TCF Roundtable; MSA 2015a, p. 22)
- have a greater share of older workers (who are heading towards retirement) and are:
  - struggling to attract younger workers and so rely on older workers to remain fully active and engaged in the workplace (TCF Connect sub. 2, p. 2; TCF Roundtable)
  - seeking to move to more advanced manufacturing practices that require workers to develop different skillsets (DSD sub.11, p. 5).

The AMWU highlighted the importance of prioritising reskilling and skills upgrades for existing tradespeople to transition them into new forms of manufacturing (AMWU sub. 9, p. 4). This is unlikely to be a short-term activity:

> Taking middle-aged workers, who are frequently lower skilled, out of their familiar environment and putting them in a classroom with the expectation they will immediately learn new skills is unrealistic. (CEDA 2015, p. 30)

The relatively low levels of apprentice and trainee enrolments and completions are also expected to have a negative impact. TCF Connect said that training for new sewing machine mechanics was an immediate requirement. It noted:

> There are only a few sewing machine technicians and (they) have an average age of over 60 years. (sub. 2, p. 2)

These challenges can be a particular concern in regional areas, where firms can often have difficulty recruiting labour with the appropriate foundation skills and there are more limited opportunities for training and development (MSA 2015b, p. 14).

The general decline in manufacturing activity (and reduced demand for workers with related skills from the mining sector) has meant competition can be strong for available vacancies for some jobs. In 2015, the DoE found there were 23 applicants for each engineering trade vacancy on average in Queensland (of which 5.2 applicants were suitable), the highest recorded levels for the past eight years (DoE 2015b, p. 2). However, shortages still exist for some particular occupations or in some regional areas (Table 6.1).

Where particular skills are in demand, market forces will ‘bid up’ what a firm needs to do to attract and retain high quality workers. This could mean offering: higher wages, more attractive working conditions, or more interesting longer-term development or career opportunities. Importantly, potential manufacturing workers will consider each of these factors in the context of other opportunities that might be available to them, now and in the future, including in other sectors requiring similar skills.

---

33 Engineering trades workers construct, repair and maintain vehicles and aircraft structures and systems, and cut, shape, cast, join and finish metal, metal parts, subassemblies and precision instruments. At the last census, manufacturing was the largest employing industry of people in these occupations (44 per cent) (DoE 2015b).
**Table 6.1 Department of Employment labour market ranking of selected occupations relevant to manufacturing in Queensland**, 2016

<table>
<thead>
<tr>
<th>Status</th>
<th>Applicants per vacancy</th>
<th>Suitable applicants per vacancy</th>
<th>Metro</th>
<th>Regional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheetmetal trades</td>
<td>R</td>
<td>13.1</td>
<td>2.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Structural steel and welding trades</td>
<td>NS</td>
<td>15.6</td>
<td>1.9</td>
<td>3.50</td>
</tr>
<tr>
<td>Metal fitters and machinists</td>
<td>R</td>
<td>40.6</td>
<td>6.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Mechanical engineers</td>
<td>NS</td>
<td>139.4</td>
<td>190</td>
<td>63.5</td>
</tr>
<tr>
<td>Butcher or smallgoods maker</td>
<td>S</td>
<td>8</td>
<td>1.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Cabinetmaker</td>
<td>S</td>
<td>10.3</td>
<td>0.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

---

**Notes:**

- a In Queensland, the manufacturing industry is a key employer of engineering trades workers (particularly sheet metal trades and structural steel and welding). Metal fitters and machinists, butchers, cabinetmakers and mechanical engineers are employed across a number of industries, including manufacturing. 
- b NS—No shortage; S—Skill shortage (employers are unable to fill or have considerable difficulty filling vacancies, or significant specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and in reasonably accessible locations); R—Regional shortage.

**Sources:** DoE 2016b, 2016c, 2016d, 2016e, 2016f, 2016g, 2016h, 2015a.
A perception problem

The prospect of a stable career can be a powerful factor in attracting people to the manufacturing workforce and continuing to develop relevant skills and knowledge. Some stakeholders were concerned that workers were deterred from the manufacturing sector by the view that it had no future. The CCIQ said:

The consequences of this negative public perception include successful manufacturers encountering roadblocks when seeking to attract and retain talent ... Queensland needs to build a renewed perception of its manufacturing industry, from one of steep declines and a bleak future, to that of a rejuvenated and active industry full of opportunity and promise. (sub. 6, p. 20)

The Queensland Government’s Advanced Manufacturing Action Plan and Roadmap also highlighted the challenges around existing perceptions and understanding of the industry, noting:

Communities’ perception that the manufacturing (and by extension advanced manufacturing) sector is in decline is devaluing the importance of manufacturing to the economy and thereby reducing the industry’s ability to attract new businesses and apprentices into the sector. (DSD 2016a, p. 23)

Similar concerns have been raised at the national level. In its 2014 study into Australia’s manufacturing workforce, the (former) Australian Workforce and Productivity Agency said:

Public perceptions of manufacturing do not bear a close relationship to the contemporary emergence of creative, high-skilled and interdisciplinary manufacturing jobs. These perceptions are impacting the sector’s ability to attract skilled workers. (AWPA 2014, p. 25)

CEDA said despite some ‘good news stories’, the media focus on closures, job losses, cutbacks, uncertainty and vulnerability paints a bleak picture. This influences young students contemplating their future study and career pathway; skilled workers looking for career development; and those already working in the sector and contemplating their future (CEDA 2014, p. 87).

The MSA (2015a, p. 9) said the overwhelming negativity is taking its toll:

Rather than an atmosphere of collaboration and innovation that are today’s business aspirations, it fosters a mindset of limitation and an aversion to risk. Without a more inspiring vision, manufacturing is at risk of becoming a self-fulfilling prophesy ... Certainly manufacturing finds itself in a vicious circle in need of a circuit breaker.

This has an adverse impact on the potential desirability of manufacturing as a career:

While most Australians appear to believe it would be a good thing if more Australians worked in manufacturing, there doesn’t appear to be a strong desire among Australians for their own children to work in factory jobs. (Eslake in Wade 2017)

Reflecting this negativity, the Wallis Public Perceptions of Manufacturing Survey found only 29 per cent of Australians would recommend manufacturing as a career for young people, identifying as key disadvantages: low job security; repetitive and boring tasks; potentially dirty and unsafe work environments (Wallis Consulting Group 2013, pp. 2, 27).

Draft finding 6.2

The community’s perceptions and understanding of Queensland manufacturing have an effect on the industry’s ability to attract and retain manufacturing workers (with desired skills and talents).
6.4 Workplace skills

Like many businesses, manufacturers look for workers with the skills, knowledge and training to perform existing tasks—as well as the ability to acquire new skills to respond and adapt successfully to new circumstances and working environments.

There are many ways individuals can develop skills for the workplace (Figure 6.1).

Figure 6.1 Improving workplace skills

Some options are accredited and lead to a formal qualification (through vocational education and training (VET) or higher education). Non accredited training options such as short courses, vendor programs and open online courses also increase skills.

The Commission was told of the importance of on-the-job training for many manufacturing firms. This includes traineeships for workers new to the industry, additional training on firm-specific tasks and processes and upskilling and cross-skilling existing workers for new processes and roles.

There are also development opportunities through mentoring and coaching.

Basic workplace skills

Basic workplace skills such as numeracy, literacy and problem-solving are important in all workplaces. They are crucial when processes become increasingly complex and higher level technical competencies are needed. In these cases, basic skills extend beyond the entry-level skills required to obtain employment and enter the workforce.

There are ongoing concerns with the level of basic skills in the manufacturing workforce. Information from the 2012 Programme for the International Assessment of Adult Competencies (PIAAC) shows the levels of numeracy, literacy and problem-solving skills in manufacturing in Australia are lower on average than in most other sectors (Table 6.2). More than half of manufacturing workers recorded low levels of proficiency for literacy and numeracy, and problem solving, and could be regarded as not meeting a ‘functional level’ to participate effectively at work or benefit fully from training. Technicians and trade workers, machinery operators and labourers generally had lower than average levels of proficiency numeracy, literacy and problem solving skills than all employed persons (Table 6.2).

---

35 Proficiency is ranked on a 1-5 scale. Workers with lower level proficiencies can locate a single piece of specific information, using basic vocabulary and sometimes the meanings of sentences and paragraphs (Level 1 and below) or make matches between the text and information requiring paraphrasing or low-level inferences (Level 2) (OECD 2013b, p. 2).

36 Proficiency is ranked on a 1-5 scale. Workers with lower level proficiencies can carry out simple processes such as counting, sorting, performing basic arithmetic (Level 1 and below), sometimes taking two or more steps (Level 2) (OECD 2013b, p. 2).

37 These workers can use widely available and familiar technology applications, such as e-mail software or a web browser and generally use only one function to meet one explicit criterion without any categorical or inferential reasoning, or transforming of information (OECD 2013b, p. 2).
Table 6.2 Proportion of workers with low levels of proficiency in literacy, numeracy and problem solving, Australia, 2012 (per cent)

<table>
<thead>
<tr>
<th>Proportion of workers</th>
<th>Literacy a</th>
<th>Numeracy a</th>
<th>Problem solving in a technology rich world b</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>51.2</td>
<td>59.1</td>
<td>77.5</td>
</tr>
<tr>
<td>By Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technicians and trades workers</td>
<td>47.7</td>
<td>54.4</td>
<td>75.0</td>
</tr>
<tr>
<td>Machinery operators and drivers</td>
<td>57.9</td>
<td>66.6</td>
<td>84.9</td>
</tr>
<tr>
<td>Labourers</td>
<td>62.3</td>
<td>68.3</td>
<td>85.3</td>
</tr>
<tr>
<td>All employed persons</td>
<td>38.3</td>
<td>48.4</td>
<td>65.8</td>
</tr>
</tbody>
</table>

a A low level of proficiency (literacy or numeracy) refers to a proficiency score of 2 or below (out of 5). b A low level of proficiency (problem solving) refers to a proficiency score of 1 or below (out of 3) as well as people who did not have the skills to undertake the assessment or opted out of the assessment. c Occupations that are relevant to manufacturing, but will also include workers who do not work in manufacturing.

Source: ABS 2013.

To the extent these results reflect Queensland outcomes, this means a large number of:

- Queensland manufacturing workers are potentially missing out on the individual and wider benefits of having the necessary literacy, numeracy and problem solving skills—and may therefore have limited opportunities to reskill or upskill for new (potentially higher level) roles.
- Queensland manufacturers (and other businesses) are potentially missing out on the benefits of having a workforce with higher level literacy, numeracy and problem-solving skills—and therefore day-to-day activities are adversely affected (through poor completion of workplace documents, reworking, ineffective work teams and wasted materials) and firms have limited capacity to innovate, adapt and respond to new technologies, systems or work processes.

This is a particular concern for those manufacturers seeking to become high-skill, advanced manufacturing businesses with a focus on new technology, customer orientation and product innovation (MSA 2015c, pp. 7–10).

Other workplace skills

Queensland manufacturing is evolving to include activities beyond those performed on traditional production lines. This can include complex research, development and design work as well as value-adding post-production opportunities, through service and support.

STEM skills

Stakeholders said science, technology, engineering and mathematics (STEM) skills are essential for manufacturing firms seeking to move to more advanced technologies and skill-based technological manufacturing processes (CCIQ sub. 6, p. 8; Cook Medical sub. 12, p. 5). The Australian Chief Scientist said STEM skills:

...are the lifeblood of emerging knowledge-based industries—such as biotechnology, information and communications technology (ICT) and advanced manufacturing—and provide competitive advantage to established industries—such as agriculture, resources and healthcare. ... An education in STEM also fosters a range of generic and quantitative skills and ways of thinking that enable individuals to see and grasp opportunities. These capabilities—including deep knowledge of a subject, creativity, problem solving, critical thinking and communication skills—are relevant to an increasingly wide range of occupations. They will be part of the foundation of adaptive and nimble workplaces of the future. (Office of the Chief Scientist 2014, p. 7)
DSD identified the low uptake (and capability and capacity) in STEM subjects at school as a key challenge to Queensland manufacturing businesses (DSD sub. 11, p. 2).

Over the past decade, there has been a fall in the number of students enrolling in STEM subjects at high school (and at university) (Office of the Queensland Chief Scientist 2017). Moreover, recent Programme for International Student Assessment (PISA) results show Queensland average scores for mathematical and scientific literacy are below the Australian average and are significantly lower than the ACT (the top rating Australian jurisdiction) and Singapore (the top rating country). Queensland’s score for mathematical literacy was also less than the OECD average (Table 6.3).

Table 6.3 PISA reading, mathematical and scientific literacy results

<table>
<thead>
<tr>
<th>Country</th>
<th>Reading literacy</th>
<th>Mathematical literacy</th>
<th>Scientific literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>516</td>
<td>505</td>
<td>527</td>
</tr>
<tr>
<td>Queensland</td>
<td>500</td>
<td>486</td>
<td>507</td>
</tr>
<tr>
<td>Australia</td>
<td>503</td>
<td>494</td>
<td>510</td>
</tr>
<tr>
<td>OECD average</td>
<td>493</td>
<td>490</td>
<td>493</td>
</tr>
<tr>
<td>Singapore</td>
<td>535</td>
<td>564</td>
<td>556</td>
</tr>
</tbody>
</table>

*The ACT was the highest performing Australian jurisdiction for reading, mathematical and scientific literacy in 2015. Singapore was the highest performing country for reading, mathematical and scientific literacy in 2015.


Leadership, management and entrepreneurship

Stakeholders suggested developing leadership and management skills is a key priority, noting there can be significant differences in the capabilities and capacity of Queensland manufacturers.

The Advanced Manufacturing Growth Centre said while there is a large and talented cohort of managers in Australian manufacturing, there are fewer high-performing managers (and a larger tail of low-performing manufacturing companies) than in other successful countries (AMGC 2017, pp. 29, 69). The CSIRO suggested this reflects the ‘family-owned’ nature of many manufacturing businesses, where those in leadership positions are less likely to have had sufficient external experience to learn novel or more sophisticated approaches to business planning and staff management (CSIRO 2016, p. 20).

MSA noted 80 per cent of its 2015 EScan survey respondents thought developing management skills was a high priority. It said:

Manufacturers often don’t have management skills and managers are brought in who don’t have manufacturing skills; indicating that current development pathways are not being used to properly prepare employees to move up the ranks. There is also a big gap in the development of supervisors and in the executive leadership training area. (MSA 2015a, pp. 16-17)

Similarly, entrepreneurs are essential to firm survival and growth in changing markets, faced with challenging conditions. Entrepreneurs innovate, take risks, find new opportunities and develop new goods and services. They drive the birth, expansion, contraction and death of firms (and sectors).

There are general concerns about Australia’s attitude to entrepreneurship and its reputation as a risk-averse culture, and about mixed international evidence as to how Australia performs in terms of entrepreneurial skills and capacity (see Chapter 5).
Draft finding 6.3

Some Queensland manufacturers are concerned with the existing levels of workplace skills in the manufacturing workforce, including:

- levels of basic skills—literacy, numeracy and problem-solving
- interest and ability in STEM subjects
- leadership, management and entrepreneurship.

Efforts to improve workplace skills will benefit workers and firms, including those manufacturing businesses looking to move to more advanced processes with more highly skilled workers.

6.5 Education, skills and training

The qualifications profile of Australian manufacturing workers varies considerably (Figure 6.2).

Many Australian manufacturing workers do not hold any formal post-school qualifications.

The majority of manufacturing workers who have attained a non-school qualification hold a Certificate level qualification, reflecting the importance of trade skills to manufacturing.

While some manufacturing workers also hold higher-level qualifications, manufacturing employs fewer university graduates than other industries.

Some subsectors of the industry have a well-educated (and highly skilled) workforce, particularly those moving into innovative and advanced manufacturing practices. For example, more than 85 per cent of staff at Patheon’s pharmaceutical manufacturing and development facility have tertiary qualifications (DSD 2016a, p. 19).

During consultation, the Commission was told that it is likely that more people with post-school qualifications and skills will be required to provide the technical and leadership capabilities to drive further sector transformation.

Meeting worker, firm and industry needs

A well-functioning education and training system will ensure a suitably trained workforce can meet the needs of the manufacturing industry, particularly given the sector’s diversity. CCIQ said the relationship between the manufacturing industry and the education and training system will be critical, and recommended promoting:

...increased collaboration between industry and education providers to ensure training delivered and competencies achieved by graduates successfully meet the needs of the industry now and into the future. (CCIQ sub.6, p. 9)
Some manufacturing businesses suggested there is a disconnect between skills outcomes and industry needs, with many newly qualified workers (across all qualification levels) often not ‘job ready’, particularly for the more innovative parts of the manufacturing sector. The Australian Sugar Milling Council (sub. 5, p. 6) noted the key challenges in developing capabilities in regional areas, as well as changing social and learning expectations.

These concerns have been reported elsewhere. For example, in its 2015 labour market ratings, the Australian DoE noted Queensland employers were concerned about the quality of engineering trades training in Australia, with apprentices not receiving sufficient exposure to all facets of the trade (DoE 2015b, p. 5). Some employers were also concerned that newly trained applicants lacked soft skills (communication, team work) and resilience to challenging situations in the workplace (DoE 2016h).

The (former) Australian Workforce and Productivity Agency said that Australian manufacturing’s engagement with the higher education sector is ‘underdeveloped’ and its employment of tertiary graduates lags behind that of other countries with developed manufacturing sectors. Broader concerns have also been raised about current completion rates for apprentices and about encouraging university graduates into manufacturing (AWPA 2014, p. 26).

**Vocational education and training**

VET plays an important role in skilling, upskilling and cross-skilling the manufacturing workforce.

Some stakeholders were concerned VET course offerings did not meet worker, firm and industry needs—with recent graduates often not ‘job ready’. This reflected, in part, a concern over the quality of courses provided by some training providers, especially the heavy reliance on book-based or online content to deliver what would usually be considered to be very hands-on, practical skill sets. In addition, some stakeholders found technically proficient graduates often lacked desirable workplace skills, including problem-solving, thinking creatively or collaborating effectively with others.

The National Council for Vocational Education Research (NCVER) student outcomes survey reported student outcomes for Queensland VET graduates in engineering and related technologies have fallen since 2013, in some cases quite considerably (Table 6.4). In 2016, Queensland graduates’ satisfaction with the courses undertaken and the impact of training on their employment prospects were generally lower than the Australian average.

**Table 6.4 NCVER National Student Outcomes Survey, VET graduate outcomes, engineering and related technologies, 2012–2016, per cent**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed after training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>80.7</td>
<td>86.6</td>
<td>87.9</td>
<td>81.4</td>
<td>79.8</td>
</tr>
<tr>
<td>Australia</td>
<td>83.9</td>
<td>84.3</td>
<td>83.7</td>
<td>83.2</td>
<td>83.2</td>
</tr>
<tr>
<td>Fully or partly achieved main reason for undertaking training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>88.1</td>
<td>88.9</td>
<td>88.7</td>
<td>78.9</td>
<td>77.6</td>
</tr>
<tr>
<td>Australia</td>
<td>85.9</td>
<td>86.4</td>
<td>83.6</td>
<td>81.2</td>
<td>82.0</td>
</tr>
<tr>
<td>Satisfied with training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>87.8</td>
<td>87.8</td>
<td>88.2</td>
<td>85.8</td>
<td>85.3</td>
</tr>
<tr>
<td>Australia</td>
<td>90.4</td>
<td>87.3</td>
<td>87.7</td>
<td>84.6</td>
<td>85.1</td>
</tr>
<tr>
<td>At least one job-related benefit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>81.0</td>
<td>82.6</td>
<td>81.1</td>
<td>79.8</td>
<td>64.0</td>
</tr>
<tr>
<td>Australia</td>
<td>81.2</td>
<td>79.3</td>
<td>75.7</td>
<td>77.8</td>
<td>67.1</td>
</tr>
<tr>
<td>Training highly/somewhat relevant to job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>80.7</td>
<td>89.0</td>
<td>85.5</td>
<td>84.4</td>
<td>75.2</td>
</tr>
<tr>
<td>Australia</td>
<td>84.8</td>
<td>84.8</td>
<td>82.7</td>
<td>83.0</td>
<td>79.1</td>
</tr>
</tbody>
</table>

Source: NCVER 2016.
Over that time, the proportion of manufacturing employers (Australia-wide) using the VET system to meet their training requirements fell slightly (from 61 per cent to 57.3 per cent) (NCVER 2015, p. 10).

Of these, the proportion of manufacturing employers who were satisfied that vocational qualifications provided employees with the skills they required for the job fell (from 78 per cent to 64.4 per cent) and is now less than overall industry outcomes. In contrast, the proportion of manufacturing employers who were satisfied that apprentices and trainees are obtaining the skills they require from training grew considerably (from 68.5 per cent to 82.8 per cent) to now be marginally higher than overall industry outcomes (NCVER 2015, p. 13). Overall, the key reasons given for employer dissatisfaction (across all industries), were:

- training was of a poor quality or low standard
- the relevant skills were not taught
- there was not enough focus on practical skills
- training is too general and not specific enough (NCVER 2015, p. 14).

These issues were also raised in the consultation process.

This suggests more can be done to ensure courses better meet firm and industry needs. Stakeholders made a number of recommendations, including:

- Promote increased collaboration between industry and education providers (CCIQ sub. 6, p. 9; QPC Innovation Roundtable, TCF Roundtable).
- Review training needs to focus on new technologies to produce work-ready graduates (TCF Connect sub. 2, p. 2).
- Provide businesses with greater flexibility to bring in training expertise from ‘outside traditional education facilities’ by providing training funds directly to business (Packer Leather sub. 13, p. 3).
- Provide support for apprenticeships to make them more attractive and financially viable options for young people (AMWU sub. 9, p. 7).
- Provide additional support for apprentices living away from home and for regional employers to take on apprentices (ASMC sub. 5, p. 6).

Managing niche industries and thin markets

The expected growth of niche industries (chapter 3) creates additional challenges for the VET system, where the lack of a critical mass of people seeking training means courses get wound back or are no longer offered.

The Commission has been told that some manufacturing businesses cannot source training to meet their workforce needs for specific skills (Packer Leather sub.13, p. 3; TCF Connect sub. 2, p. 2; TCF Roundtable) or in particular (mostly regional) areas. However, there is limited publicly available information about the nature, prevalence and consequences of this unmet demand.

Thin markets are inherently difficult for training providers to service. In some cases, low (and sometimes volatile) student numbers make courses financially unviable. The costs of delivering programs can also increase in regional and remote areas or where the student population has significant additional learning needs.

Improving options to better deal with training for niche markets is likely to become increasingly important as the nature of the manufacturing sector changes.

Draft finding 6.4

Some manufacturers are concerned the skills and qualifications profile of the manufacturing workforce is not aligned with occupational and employment needs now and in the future. This is a particular concern for VET, given the important role it plays in skilling, upskilling and cross skilling the manufacturing workforce.

---

40 Where the actual or potential number of learners is too small, relative to the cost of delivery, to sustain efficient provision.
6.6 What is being done to improve education and skills outcomes?

Government policies and programs across all levels of government deal with education, training and skills matters relevant to manufacturing. In Queensland, the Department of Education and Training (DET) delivers services relating to:

- school education—supporting students to develop fundamental knowledge, skills and qualities needed and providing a pathway to further education
- training and skills—supporting training and skills outcomes, including through the VET Investment Plan, the Skilling Queenslanders for Work Program and through accredited and non-accredited adult community education programs.

The Australian Government also has a role supporting education (policies, funding and programs) and through the governance, regulation and support of the national VET system.

VET

VET has a direct effect on manufacturing in Queensland. It provides practical and technical skills and knowledge to allow new workers to join the workforce and for existing workers to upskill or cross skill. This can include strengthening foundation skills in the workplace through language, literacy or numeracy training.

VET in Queensland is part of a national system (Figure 6.3).

Figure 6.3 VET in Australia—a shared responsibility

Source: DET 2017c, p. 5.
In 2012, the Australian, State and Territory Governments committed to a National Partnership Agreement on Skills Reform, and set out goals and structures of intergovernmental VET funding and reform over five years (2012–17).

In 2017, the Australian Government announced the Agreement would be replaced by the Skilling Australians Fund. States will need to bid for project funding with proposals that align with priorities and criteria set by the Australian Government.

In Queensland, the draft strategy Advancing skills for the future: a strategy for vocational education and training in Queensland has been released for public comment. This proposes priority actions to strengthen Queensland’s VET sector based around:

- industry and innovation through ongoing strategic collaboration between industry, employers and government to support new industries and business practices and advance the growth of priority industries
- a quality VET system—that underpins economic growth and meets the needs of industry, employers and students.
- access and participation—where all Queenslanders have access to skilling pathways that enhance employability and social wellbeing (DET 2017c, p. 8).

VET funding

The Queensland Government’s Annual VET Investment Plan provides $810.7 million for VET in 2016–17, a 32 per cent increase in spending since 2014–15 (DET 2016a, p. 4). Key programs under the plan that are relevant to the manufacturing industry are the User Choice Program, the Certificate 3 Guarantee and Higher Level Skills program. In the first six months of 2016–17, these programs provided $23 million funding for training for manufacturing activities (Table 6.5).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>User Choice ($m)</td>
<td>45.3</td>
<td>38.1</td>
<td>33.2</td>
<td>12.7</td>
</tr>
<tr>
<td>… provides a public funding contribution towards the cost of training and assessment for apprentices and trainees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate 3 Guarantee and Higher Level Skills ($m)⁵</td>
<td>0.3</td>
<td>3.8</td>
<td>14.0</td>
<td>10.3</td>
</tr>
<tr>
<td>… provides eligible individuals with a government subsided training place for a certificate III qualification or for certificate IV and above qualifications (higher level).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VET Revenue General</td>
<td>5.6</td>
<td>2.5</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>VET in Schools (VETiS)¹</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>… provides education and training for students while they are at secondary school that focuses on delivering skills and knowledge required for specific industries.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a Year to date, as at December 2016. b The chief intent of VET Revenue General was to purchase training from public providers to address government skilling priorities. Over 2013–14 and 2014–15 VET Revenue General was replaced with other funding programs, including Certificate 3 Guarantee and Higher Level Skills. c VETiS activity funded by the VET budget will be managed through the Certificate 3 Guarantee.

Source: DET 2017a, 2016a.

The Queensland Government provides annual grants to TAFE Queensland to support its operation (DET 2016a, p. 13). It also provides incentives to employers to take on apprentices and trainees under the Skilling Queenslanders for Work program (DET 2017b). This includes $4.25 million for local councils across Queensland.
Queensland to create 340 new traineeships (under First Start) and $3 million for businesses who employ new trainees or apprentices in south east Queensland (under Work Start) (DET 2017d, 2017e). There is also a 50 per cent payroll tax rebate for Queensland businesses seeking to employ apprentices and trainees, subject to eligibility thresholds (Queensland Government 2017f).

In the 2017-18 Budget, the Queensland Government provided $10 million over two years for a Regional Skills Adjustment Strategy to support unemployed individuals develop employability skills for jobs in demand, jobs pathway planning and provide pathways to training at TAFE Queensland (Queensland Treasury 2017b, p. 25). It also provided $9 million over four years through the Regional Skills Investment Strategy to better target training on local opportunities available in regional areas (Queensland Government 2017c, p. 11).

**VET quality**

VET quality is a shared responsibility across governments, industry and the consumer market.

At the national level, the Australian Industry and Skills Committee (AISC) is responsible for ensuring national training packages are meeting the needs of industry. AISC prioritises the review and development of training packages in accordance with the National Schedule. It draws on advice provided by various industry reference committees (IRCs), including manufacturing sector IRCs, to identify the skills needed by employers and develop occupational skills standards and training packages (AISC 2017a, 2017b).

The Australian Skills Quality Authority (ASQA) regulates Australia’s training providers, courses and qualifications to ensure nationally approved quality standards are met. It also undertakes strategic reviews of training quality in areas where system risks have been identified (ASQA 2015a, 2015b).

At the state level, the Queensland Government regulates apprenticeships and traineeships under the Further Education and Training Act 2014. The Queensland VET Quality Framework details requirements for VET program design; supplier entry requirements; information and support; market performance and oversight; and compliance (DET 2017f). There is also a Queensland Training Ombudsman: an independent office that provides support to resolve training issues or complaints in relation to the VET system (Queensland Training Ombudsman 2017).

**Influencing the nature and types of training offered**

The Queensland Government influences the nature and types of training offered and undertaken by providing subsidies for particular qualifications.

The level of subsidy provided for various qualifications is published through:

- the User Choice Price List—for training delivered to apprentices and trainees
- the Queensland Training Subsidies List—for training delivered to general students under the Certificate 3 Guarantee and Higher Level Skills programs.

The amount of subsidy the Queensland Government provides varies across qualifications, reflecting:

- the indicative course value—calculated as the funded hours for the qualification multiplied by a ‘course rate’ that considers the complexity of the training delivered and other costs such as teacher or trainer costs, overheads and extra ordinary materials
- the ‘relative priority’ of the industry or qualification for government investment—with highest priority being given to qualifications that support identified skills demand and long-term workforce planning priorities or are assessed as highly effective in generating outcomes for graduates (DET 2016h).

In some cases, qualifications are managed under special arrangements, with additional restrictions applying to students (for example, requiring the student to be an existing worker in the industry or hold a particular qualification). Special restrictions can also apply to training organisations, such as where only pre-qualified suppliers specifically authorised by the department can deliver publicly-funded training for those qualifications.

The Commission understands funding is reviewed by the department each year. In addition, industry can submit evidence to the department at any time to seek funding of new qualifications under the training lists.
or request a change to the government priority of currently funded qualification(s). The pricing model may be adjusted, on an ad hoc basis, to price thin markets at higher rates than otherwise to attract and retain a supplier in that qualification.

**Draft finding 6.5**

A robust and flexible VET sector is required to meet worker, firm and industry needs, including the need to deal efficiently with niche trades. VET is a shared responsibility across all governments. The Queensland Government influences outcomes through its funding arrangements, apprenticeship and traineeship regulation, and through public providers.

**Schools**

The Queensland Government’s *Advancing education: an action plan for education in Queensland* includes strategies to help prepare young people to lift education outcomes (DET 2016d). Strategies relevant to manufacturing include enhancing students’ capacity to learn, general literacy and numeracy and engaging young Queenslanders in STEM subjects (see Box 6.2).

### Box 6.2 Engaging students in STEM subjects

The Queensland Government’s *Schools of the future STEM strategy* seeks to encourage students to study science, technology, engineering and mathematics—including robotics and coding.

<table>
<thead>
<tr>
<th>Building teacher capability</th>
<th>Students engage in STEM learning</th>
<th>Excellence in STEM learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional learning for teachers in STEM</td>
<td>Entrepreneurs of Tomorrow program</td>
<td>Targeted initiatives to lift student performance in STEM</td>
</tr>
<tr>
<td>Regionally-based STEM champions</td>
<td>STEM programs for girls</td>
<td>Implementing the Australian Curriculum: Digital Technologies</td>
</tr>
<tr>
<td>Access to specialist STEM teachers</td>
<td>STEM programs for Aboriginal and Torres Strait Islanders</td>
<td>STEM-specific curriculum resources</td>
</tr>
<tr>
<td>Step into STEM Teaching Scholarships</td>
<td>STEM Hub and Coding Academy</td>
<td>STEM virtual academies</td>
</tr>
</tbody>
</table>

The Queensland Government’s *Schools of the future #codingcounts* program supports students’ digital literacy and coding skills, while nurturing young innovators and creating young entrepreneurs.

*Source: DET 2016d, 2016f, 2016g.*

Some schools also provide students with real-world experience and information about manufacturing in Queensland through:

- trade training centres—facilities that support VET-approved training courses, including in aeroskills and aeronautics, marine technology and food processing
- the Manufacturing and Engineering Gateway to Industry Schools Program—where secondary schools partner with local manufacturing and engineering firms to provide students and teachers with a better understanding of the nature of work and the skill sets required (DET 2016e).

The AMWU (sub. 9, p. 7) said expanding the Manufacturing and Engineering Gateway to Industry Schools Program and integrating it into more schools (particularly in rural and regional areas) would be a useful way to guide young people into required skills fields as early as possible, and would help to create a lasting skills base for the future.
The Commission understands a new operating framework is being developed for the Manufacturing and Engineering Gateway to Industry Schools Program to identify clear objectives and related measurable outputs and outcomes in order to enhance the program’s governance.

**Draft finding 6.6**

Schools influence the size of the potential manufacturing workforce and its capacity and capability through influencing learning outcomes, in particular in STEM subjects, and by exposing students to manufacturing as a potential career option.

**Skilled migrants**

A 2014 independent review into *Integrity in the Subclass 457 Programme* reported that, on average, more than 3500 subclass 457 visas were granted each year for workers going into Australian manufacturing between 2005 and 2014 (Azarias et al. 2014, p. 34).

Queensland manufacturers said they would like to hire local workers, but the lack of relevant skills or interest in manufacturing jobs, particularly in some Queensland regions and industries, stop them from doing so. On that basis, migrant workers have become an important part of some textiles and clothing, meat processing and high-skill biomedical workforces and are expected to remain an important source of skilled labour in the future. Migrant workers include:

- international students and graduates with working rights
- temporary arrivals with working rights
- permanent arrivals—including those under the point-tested skilled migration program including those nominated under the Queensland State Migration Plan.

Migration issues are largely dealt with by the Australian Government through the Department of Immigration and Border Protection. The Ministerial Advisory Council on Skilled Migration (MACSM) provides advice on Australia’s temporary and permanent skilled migration programs. This includes:

- the size and composition of Australia’s temporary and permanent migration programs
- the composition of the various Occupations Lists
- existing skills shortages that cannot be met from the domestic labour force and domestic training and education programs
- policies to ensure that Australian workers are afforded priority in the labour market
- the role of state and territory governments in skilled and business migration (DoF 2017a).

In April 2017, the Australian Government announced that it would replace the existing Temporary Work (Skilled) visa (subclass 457 visa) with a new Temporary Skill Shortage visa that includes:

- more targeted occupation lists
- mandatory labour market testing with limited exemptions
- a new non-discriminatory workforce test
- mandatory criminal history checks
- a market salary rate assessment
- a work experience requirement (DIBP 2017b).

The Queensland Government can also influence outcomes through its State Migration Plan. The plan provides for the government to identify and sponsor points-tested applicants to fill local skills shortages in

---

43 Annual information reported by sponsor industry (self-identified). There were 2013 subclass 457 visas granted between 1 July 2013 and 31 May 2014 (Azarias et al. 2014, p. 34).

44 Known previously as General Skilled Migration. To be eligible for a points tested skilled migration visa, prospective migrants must meet the minimum number of ‘points’, based on age, English language ability, employment experience, qualifications completed in Australia and other educational qualifications, and other bonus factors such as regional Australian study (DIBP 2014).

45 Visa subclass 190 is for skilled workers who wish to permanently live and work in Queensland. Visa subclass 489 is a provisional visa that allows nominated skilled workers to work and live in regional Queensland (excluding the Greater Brisbane Area and the Gold Coast) for four years, and is a pathway to permanent residency (BSMQ 2016).

46 As part of the Australian Government’s reforms, a new Short-term Skilled Occupations List and Medium and Long-term Strategic Skills List applies from 19 April 2017, for further review in 1 July 2017 (DIBP 2017a).
Queensland. The occupations identified in 2016–17 that are relevant to manufacturing include: aeronautical, biomedical, mechatronics or production site engineers; medical laboratory scientists; sheet metal trades workers; welders (first class); metal machinists (first class); plastics technicians; and cabinet markers.

In April 2017, applications for Queensland Skilled Visa Nominations were temporarily suspended, with a new Queensland Skills Occupation List to be released in the new financial year (BSMQ 2017). It will be important for the Queensland Government to maintain its awareness of manufacturing skill needs over time when developing the occupational list.

**Draft finding 6.7**

Skilled migration programs are important for the scope and size of the manufacturing workforce.

**6.7 What more could be done?**

There is an opportunity to address concerns about the limited availability of workers with the required skills and knowledge to match manufacturing firms’ needs.

In practice, addressing these issues is a shared task. Manufacturing workers and firms (and their associations) have a direct interest in addressing skills needs to improve their prospects and the performance of their business and industry. Government shapes the broader institutional framework and regulatory and policy environment.

**Better access to information**

Perceptions can have a significant impact on industry performance and outcomes. They influence what entrepreneurs and financiers invest in, where management and skilled talent apply themselves, what skills students and apprentices learn and what jobs unskilled people consider. Improving access to accurate and balanced information about Queensland’s manufacturing sector will go some way to helping workers to better engage with the sector and understand the opportunities that might exist (Figure 6.4).

**Figure 6.4 Potential benefits from better access to accurate and balanced information**

<table>
<thead>
<tr>
<th>Correct unfounded perceptions</th>
<th>Provide better information</th>
<th>Reduce search costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Current opportunities</td>
<td>• What to expect on the job</td>
<td>• Making contacts</td>
</tr>
<tr>
<td>• Future prospects</td>
<td>• Skills required</td>
<td>• Relationships and networks</td>
</tr>
</tbody>
</table>


Queensland manufacturers have a key responsibility for enhancing their own reputation, which will, in turn, promote the broader strengths of the sector and the opportunities available in the industry.

However, manufacturing businesses may undertake less than efficient amounts of sector-wide, reputation-building activities because they are unable to capture a sufficient level of benefits individually. For example, activities that could improve perceptions about a particular type of manufacturing also benefit other related types of manufacturing, and ultimately the sector more broadly.

Accordingly, CSIRO (2016, p. 62) concluded the manufacturing ‘ecosystem’ (which includes industry bodies and government) can play a key role in changing perceptions of manufacturing.

This is already occurring in some parts of the sector. For example, in 2016 the Australian Advanced Manufacturing Council (AAMC) partnered with the Ai Group to produce a video and social media campaign to spread awareness about the advanced manufacturing industry and encourage students to enter it (AAMC & Ai Group 2016). The AAMC also showcases Australian advanced manufacturing companies on its website—providing case studies of successful manufacturing businesses, including Queensland businesses (AAMC 2016).
The government may complement industry initiatives, where it is clear a government response will improve outcomes. DSD provides information and advice about the manufacturing sector on its website. In addition, the Queensland Government’s Advanced Manufacturing 10-year Action Plan and Roadmap includes a promotion and marketing strategy, focusing on Queensland’s advanced manufacturing technologies and expertise as well as future career opportunities in advanced manufacturing (DSD 2016a). As a new program, it is too early to tell if, or how, the program is effective. Future review will be required to ensure future activity is directed where it has the largest effect.

Better education and skills outcomes
Better education and training outcomes will lift the capabilities and productivity of Queensland’s manufacturing workforce.

VET reform
Jobs Queensland (JQ) has been established to provide strategic industry advice to the Queensland Government to support a strong and productive VET sector (see Box 6.3). The JQ work program—and its advice to government to reform the VET sector to enable it to better meet worker, firm and industry needs—is likely to be particularly relevant for Queensland manufacturing. VET provides important training and skills development for many manufacturing workers.

The scope for VET reform extends beyond its impact on the manufacturing sector. However, a number of issues relevant to manufacturing would be usefully considered as part of broader reform efforts.

Box 6.3 Jobs Queensland

The Queensland Government established Jobs Queensland (JQ) as an independent statutory entity under the Jobs Queensland Act 2015 to provide strategic industry advice to government on skills demand and future workforce planning, including:

• the skills that will be needed for particular industries and regional areas
• future workforce development and planning
• the apprenticeship and traineeship system in Queensland.

It has developed a research program that seeks to highlight what is working well within the system to (a) provide advice to build on these positives across the system and (b) identify opportunities to support workforce needs.

It has begun consultation on the Queensland apprenticeship and traineeship system (JQ 2016), and will work with industry to develop the Advanced Manufacturing Skills, Training and Workforce Development Strategy, as well as workforce plans for aerospace, defence and mining equipment, technology and services.

Improving the flow of information between manufacturing firms and workers and training providers

Having accurate and timely information about the skills manufacturing firms and workers need supports the VET system to better serve students, business and the wider community. It helps:

• training providers to determine the nature of courses they might provide so the mix of skills coming into the workplace meets worker and firm needs
• government to set training priorities and make funding decisions to link the courses and funding offered with labour market conditions and state priorities.

However, gathering and assessing this information can be costly, and there can be a number of problems in practice (PC 2011, pp. 73–74).
• It can be difficult to identify what skills employers really need—especially in a diverse (and potentially fragmented) sector with different firms having differing needs, over different time-frames, and potentially operating in different regional labour markets.

• Employers and students might be looking for different training outcomes—with students looking for transferable, rather than sector- (or firm-) specific skills.

• Given new and emerging technologies and business practices, the future demand for skills for some manufacturing activities is subject to considerable uncertainty (see section 6.1 and 6.2).

The Advanced Manufacturing Action Plan and Roadmap provides for the development of an Advanced Manufacturing Skills, Training and Workforce Development Strategy to, among other things, identify the new skills required in advanced manufacturing; explore alternate training approaches for workers to improve their workplace readiness; and incorporate a stronger focus on training and education (DSD 2016a, p. 26).

Progressing the strategy may help provide greater clarity, focus and direction by identifying what needs to be done, how it can be done and, importantly, who is best placed to make this happen. It will put in place processes and structures to support ongoing skills needs, and clarify those factors that are within the power or capacity of firms and workers, and those that might be best dealt with by government action.

**Designing the VET system to accommodate changing labour market needs**

The VET system should deliver workers with relevant, adaptable skills in an effective and efficient manner. In deciding how to best deliver such a system, there are some key issues to consider.

• Understand that improving training for niche industries and thin markets is likely to become increasingly important as the nature of the manufacturing sector changes.

• Recognise the shift to adaptable skill sets and career-long learning, as well as the need for an efficient education and training ‘system’ (including VET and higher education subsidies and student support arrangements that influence when, where and how students undertake study and training).

• Reduce unnecessary compliance costs on businesses and students. Regulation should provide adequate consumer protections in a least-cost way. Unnecessary costs discourage students from undertaking otherwise beneficial training and reduce firm support for their training efforts (including workplace apprenticeships and traineeships).

**The right provider model**

In Queensland, VET can be provided by government-run TAFEs, private Registered Training Organisation (RTOs), universities, schools, and community education providers and in workplaces.

Under the Queensland Government’s draft *Advancing skills for the future strategy*, private and public training providers play different roles in delivering training. TAFE Queensland is a ‘premium public provider’ of VET—delivering key government priorities and in areas that may not be met through market settings, including having a key role in meeting the training needs of disadvantaged learners, regions and local communities. Private providers give students choice in relation to training suppliers and courses (DET 2017c, p. 16).

The provider model should provide the right incentives to providers, students and business to ensure that relevant training is offered, and undertaken, in an effective and efficient way.

**Funding issues**

The nature and scope of VET funding goes beyond the funding applied to training relevant to manufacturing, and so is beyond the scope of this inquiry. In principle, government funding of VET can be warranted:

• on efficiency grounds—to address any shortfall in the level of VET that might occur because there are public benefits from VET that firms and workers cannot fully capture (and do not take into account in their decision making)

• on equity grounds—to improve access, participation and outcomes of students from disadvantaged groups or regions.
To promote a high quality, sustainable VET system, the Queensland Government should ensure VET funding is efficient (reflecting the public and private split of benefits), with any equity-related matters (primarily around access to training) being dealt with transparently.

While this would appropriately be considered as part of a broader review of VET funding and principles for determining price and fee arrangements, it would require an understanding of:

- the efficient costs of providing training to the required quality standard for various qualifications
- the relative share of private and public returns from undertaking particular qualifications
- likely affordability and accessibility impacts for students across the VET spectrum, given a finite VET budget.

Draft recommendation 5

As part of ongoing broader reforms to the education and training sector, the Queensland Government and Jobs Queensland should:

- reform the Vocational Education and Training (VET) system to:
  - adapt and respond to provide for thin and emerging markets
  - reduce unnecessary compliance costs on businesses and students
  - encourage the right level of training for the right people, both within VET and across tertiary education
- establish the right incentives for providers—including TAFE, other agencies and private sector providers
- develop a funding model by determining:
  - an efficient price for each qualification
  - the optimal balance between public and private contributions.
7.0
Reshoring
The terms of reference asks us to investigate the international experience with reshoring initiatives. This chapter defines reshoring, examines the extent and possibilities for reshoring, and experience with international policy initiatives.

**Key points**

1. Reshoring refers to the reversal of a previous decision to offshore a business activity. In the manufacturing context, reshoring results in the transfer of an activity, usually a production process, from an overseas location back to a country of origin.

2. Interest has been growing in reshoring as a corporate strategy and public policy objective, with advocates stating that it creates jobs in the domestic manufacturing sector.

3. There have been some high-profile cases of firms reshoring to the United States and United Kingdom. However, the quantitative evidence on the extent and opportunities for reshoring overall is subdued.
   - Foreign direct investment has created more manufacturing jobs than reshoring in the United States manufacturing sector.

4. Where reshoring is occurring, it is being driven by opportunities for production cost savings from producing at home, and the growing commercial risks of managing a global supply chain.

5. Factors that are driving reshoring elsewhere—particularly narrowing labour and energy cost differentials—are less relevant in Queensland. Few firms have returned production to Queensland.

6. There is a lack of publicly available information on the effectiveness of government reshoring policies, in terms of the direct benefits (such as the number of companies which repatriated production and the number of jobs created) and the cost of those policies.
   - Reshore UK, Britain’s high-profile government initiative to reshore manufacturing production, was closed down in 2016.

7. On balance, the evidence suggests that reshoring will occur if it is in the financial interest of the manufacturer. The primary role for government is to ensure firms have accurate and accessible information to assess location decisions.

8. In the United States, the Reshoring Initiative’s Total Cost of Ownership Estimator is a widely used tool to identify the overall costs of different sourcing strategies.
7.1 Globalisation, competition and the fragmentation of production

Manufacturing firms have responded to the forces of globalisation by establishing production networks across firms and locations, based on factor endowments and relative costs. In doing so, they have delinked:

\[...\text{any part of [the] production process that ... is not absolutely central to [their] corporate core value and move[d] it to the cheapest provider, the cheapest location. (Brookings Institution 2004, p. 23)\]

Offshoring has been a direct consequence of this process (see Box 7.1).

**Box 7.1 Offshoring**

Offshoring is closely related to outsourcing, a common commercial practice.

Outsourcing involves the contracting out of business functions to third-party service providers. These functions are commonly (but not exclusively) non-core activities, such as back-office services including payroll processing and information technology support. Outsourcing allows firms to reduce their business costs and free internal resources for other purposes. The country in which an outsourced task is to be performed is irrelevant.

Offshoring occurs where the outsourced activity takes place in a foreign country.

Offshoring includes both international outsourcing (where work is contracted out to independent third-parties overseas) and international insourcing (where the work is undertaken by foreign affiliates). Its distinguishing feature is the cross-border nature of the activity, rather than the firm’s relationship with the provider.

Offshoring has been a prominent feature of the manufacturing sector for many years.

As identified in Chapter 3, modern manufacturing supply chains are divided among a range of specialist component suppliers, often located in different countries. By sourcing inputs and services from overseas, firms are generally able to secure cost savings through the economies of scale and scope provided by specialised suppliers.

In particular, offshoring has allowed domestic firms to reduce costs associated with:

- labour—one of the biggest cost components for a manufacturing business
- overheads—including utility charges, maintenance and other indirect labour expenses.

For industrialised countries, such as the United States, the United Kingdom and Australia, manufacturing firms have generally relocated the labour-intensive elements of production to low labour-cost locations overseas. This has been the case particularly for products produced in high volume. Capital- or skill-intensive production activities, such as high-end design and research and development (R&D), have tended to remain in the higher-cost and more knowledge-intensive domestic economies.

For example, technology companies that design electronic hardware have offshored production to businesses specialising in manufacturing and supply chain logistics. By taking advantage of very low labour rates, these companies have been able to build and sell new generations of electronic products at relatively competitive prices.

**7.1.1 Economic impacts of offshoring**

Offshoring has resulted in greater industrial efficiency. It has been a means for businesses to boost competitiveness, enabling them to cut costs, grow profits and enhance returns for shareholders. In addition, it has provided firms with exposure to new markets and delivered opportunities for them to develop new products.

For consumers, offshoring has resulted in greater choice, with a wider variety of cheaper products available and higher real incomes with which to purchase those goods.
However, as production has relocated, the practice has brought about a decline in output and employment in the manufacturing sector. Firms, no longer requiring a large ongoing labour force, have shed jobs.

Critics argue that the:

...transfer of jobs to developing nations erodes the traditional advantage of [developed] nations in value added fields. (Grant 2005, p. 4)

and that the country now finds itself in a ‘race to the bottom in terms of jobs, wages and ... standard of living’ (BCA 2004, p. 3).

Moreover, structural adjustment in the economy associated with the decline in manufacturing could have persistent effects on unemployment and income inequality, particularly if displaced workers are unable to quickly secure a new job.

In addition, growth in innovation may slow as manufacturing activity becomes increasingly separated from R&D activities. When production is moved offshore, there is a risk that the engineering knowledge that supports that process will eventually follow, and the competitive advantage of those firms diminishes commensurately.

There are no reliable estimates of the number of jobs in Queensland or Australia lost as a result of domestic manufacturers moving production offshore over the last few decades. However, anecdotal evidence suggests that the number is large.

### 7.2 Reshoring

Since the global financial crisis, there has been a growing interest in reshoring as a corporate strategy and policy objective. Headlines about large multinational firms repatriating production have increased the visibility of reshoring.

The action of reshoring refers to the reversal of a previous decision to offshore a business activity. In the manufacturing context, reshoring results in the transfer of an activity, usually a production process, from an overseas location back to a country of origin.

There are four categories of reshoring, as set out in Box 7.2.

Reshoring does not necessarily result in the termination or repatriation of all previously offshored activities. A domestic firm may elect to continue to manufacture some proportion of its output overseas for purposes such as meeting demand in the foreign marketplace.

#### Box 7.2 Reshoring categories

Each reshoring category is differentiated by the particular sourcing of production, prior to and subsequent to repatriation:

- **In-house reshoring** is the relocation of manufacturing from a company’s international facility back to its own domestic plant.
- **Reshoring for outsourcing** is the relocation of manufacturing from a company’s international production facility back to a domestic supplier.
- **Reshoring for insourcing** is the relocation of production, previously outsourced to an offshore supplier, back to a company’s domestic facilities.
- **Outsourced reshoring** is the relocation of production, previously outsourced to an offshore supplier, back to a domestic supplier.

Source: Gray et al. 2013, p. 28.

---

47 In media commentary and policy discussions, the terms reshoring, onshoring, inshoring and backshoring are often used interchangeably.
Proponents of reshoring maintain that it:
• creates jobs for skilled workers in the domestic economy, reducing unemployment and boosting economic growth
• revitalises an industry which has stagnated or been in decline
• reduces the total cost of production for manufacturers, improving their profitability
• strengthens innovation as production becomes more integrated with R&D
• streamlines the distribution of goods from factory to customer, reducing the time to market
• results in the production of higher-quality products for consumers.

7.3 Which factors are driving the international reshoring movement?
The interest in reshoring from a corporate perspective is being driven by a gradual erosion of the production cost savings from offshoring. In addition, reshoring offers opportunities to reduce the commercial risks associated with managing a geographically-dispersed supply chain.

7.3.1 Cost-related factors
Relative labour costs
Companies generally identify higher offshore labour costs and a narrowing of the labour cost differential with developing countries, particularly China, as a key reason for shifting production back onshore (The Economist 2013a, p. 1).

Figure 7.1 shows that, between 2001 and 2015, real wages in China have risen annually on average by 11 per cent. Labour costs per unit of output are now around three times higher than in 2000 (Moser 2014, p. 1).

By comparison, real wage growth in the major developed countries has been relatively lower for many years.

New technology and the relative price of capital
Emerging technologies have also eroded some of the financial benefits of manufacturing in low-wage economies. Automation of low-value production reduces the need for a large workforce and commensurately lowers labour costs. This makes manufacturing in industrialised countries, where those technologies are available, relatively more attractive.

Recent estimates indicate that, in the United States alone, demand for 3D printers is expected to grow by more than 16 per cent per year between 2016 and 2020, largely due to reductions in capital cost.

and evolution of the technology. This is increasing the range of applications available to manufacturers (International Data Corporation 2016, p. 1), with implications for manufacturing business models, supply chains and the workforce (Srinivasan & Bassan 2012, p. 3).

In addition, the declining costs and improved capabilities of advanced robotics, which can operate alongside workers, will reduce the need for labour in more advanced domestic production (Boston Consulting Group 2015, p. 1).

The International Labour Organization recently forecast that over 50 per cent of all employees in Cambodia, Indonesia, the Philippines, Thailand and Vietnam are at high risk of displacement due to technology (Chang & Huynh 2016, p. 4). Similar prospects are likely to be faced by workers in China.

Other costs

In the United States, lower energy costs due to falling oil prices and the shale gas boom have significantly reduced the price of domestic gas. This has lowered costs of domestic production, particularly for energy-intensive firms such as those manufacturing petrochemicals, fertiliser and steel.

Some transportation and cross-border transfer costs have risen over time and become increasingly volatile, adding to the complexity of managing the movement of component and final goods (Russell et al. 2014, p. 1). In addition to direct freight costs, there are also costs associated with insurance, the need to carry higher inventories and the potential for inventories to become obsolete, and greater operational travel requirements for management purposes.

7.3.2 International supply chain risks

Concerns around the quality, security and responsiveness of an international supply chain include:

- challenges monitoring and guaranteeing the quality of goods produced in foreign facilities
- vulnerability to disruptions arising from civil or political unrest and extreme climate events, which can disrupt production
- risks associated with intellectual property (IP) theft, potentially resulting in lost revenue, competitive advantage and licensing opportunities
- longer lead times, reducing the ability to respond to fast changes in consumer preferences.

Draft finding 7.1

Internationally, opportunities to reshore are being driven by production cost savings from producing at home, and the growing commercial risks of managing a global supply chain.

7.4 How strong is the reshoring movement?

In 2011, the Boston Consulting Group (BCG) foreshadowed an emerging reshoring trend for manufacturing production around the world, and in the United States in particular, noting:

[The reallocation of global manufacturing] will become more pronounced over the next five years, especially as companies face decisions about where to add future capacity. (Sirkin et al. 2011, p. 4)

This view strengthened further with its 2013 annual survey of manufacturing executives finding that most large companies had plans to move some production from China back to America, or were at least considering it (Barrentine & Whelan 2015, p. 1).

Well-publicised examples of large companies that have returned production to the United States include:

- Caterpillar, which relocated production of equipment from Japan and Mexico, creating 2,100 machinery jobs in Texas and Georgia
• General Motors, which invested $185 million on a new plant in Tennessee in 2014, creating 3,000 jobs, to manufacture Cadillacs which were previously produced in Mexico. This relocation followed a deal with the union, allowing for greater pay flexibility
• Ford, which reshored 3,200 manufacturing jobs from Mexico and Spain to produce particular truck models and engines
• General Electric, which added 2,656 jobs over four years in Kentucky, Texas and Ohio, manufacturing high-efficiency light bulbs, batteries and water heaters. The Kentucky plant was re-opened after a dormant period of 15 years
• Walmart, which has reshored almost 5,000 positions through its Made in America initiative. The company’s goal is to purchase $250 million in American-manufactured goods for its stores in the 10-year period to 2023
• Apple, which invested $100 million and created 200 jobs, to produce its Mac Pro computer in the United States, rather than China (American Manufacturers Association 2016; Yarrow 2013; Sligar 2016).

However, the extent to which an underlying trend exists, in the United States or elsewhere, is unclear.

As noted by the International Labour Organisation (ILO), reshoring:

...is a difficult phenomenon to measure both at the aggregate and firm level. The difficulties stem especially from the fact that it is challenging to attribute changes in investment and employment trends directly to [reshoring]. (International Labour Organization 2015, p. 2)

In particular, the basis for a company’s decision to close an overseas plant or reduce its foreign direct investment is not always apparent. Moreover, data at the firm level is often confidential and no official statistics on offshoring or reshoring manufacturing trends are published (ISLI Supply Chain Forum Team 2015, p. 9).

As a result, key market data and commentary tend to be provided by the media, industry groups, consulting firms and other private sector organisations, making it difficult to estimate the extent of reshoring:

[Despite reports on high-visible cases of reshoring, the quantitative evidence .... is still fragmented and often of an anecdotal nature, making it very difficult to assess the importance and analyse the characteristics of the phenomenon. (De Backer et al. 2016, p. 11)]

Moreover, there is often inconsistency in the data and findings provided by the different sources.

In the United States, the two most comprehensive and regular analyses of reshoring are provided by the Reshoring Initiative, a not-for-profit industry association, and AT Kearney, a global management consulting company.

In its report, Reshoring and FDI boost US manufacturing in 2015, the Reshoring Initiative found that in 2015 about 68,000 new jobs in the country were created following ‘reshored production’, bringing the total number of manufacturing jobs brought from offshore since 2010 to over 249,000 (Reshoring Initiative 2016a). This represents only a small fraction of the 12.4 million employees in the US manufacturing sector (Bureau of Labor Statistics 2017).

The Reshoring Initiative calculated that the United States has now gone from losing about 220,000 manufacturing jobs per year in net terms, from 2000 to 2007, to breaking even.

While this data appears to suggest a strong reshoring trend, AT Kearney cautioned that:

...even though manufacturing in the United States [is] on the upswing, the impact of reshoring [is] significantly less that what press reports and pundits would have had us believe. (Van den Bossche et al. 2015, p. 1)

Based on its own research and dataset, which contains around 700 records of reshoring cases, AT Kearney forecast that reshoring would continue to decline in 2015 (Figure 7.2) and noted:

[The reshoring phenomenon, once viewed by many as the leading edge of a decisive shift in global manufacturing, may actually have been just a one-off aberration. Indeed, the 2015 data confirms that offshoring seems only to be gathering steam, while the U.S. reshoring train that so many predicted has yet to leave the station. (Van den Bossche et al. 2015, p. 1)]
AT Kearney is of the view that the Reshoring Initiative’s employment growth figures overstate the number of jobs actually reshored because they include the impact of foreign direct investment (FDI)—new jobs created by multinational firms that decided to increase their production capacity in the domestic market. In particular, it points out:

(T)he data does not show that US companies are returning. In fact, it shows that foreign companies are coming. We don’t consider an FDI to be an example of ‘reshoring’, because the company was never here to begin with. (Callari 2016)

By removing the impact of FDI from the Reshoring Initiative’s data, as depicted in Figure 7.3 and Figure 7.4, the two sets of findings can be largely reconciled.

Figure 7.3 illustrates that that the employment gains from FDI in the United States have been steadily outstripping the number of jobs created by reshored production for some time.

**Figure 7.3 Reshoring and FDI job growth in the US, cumulative, adjusted**

Moreover, Figure 7.4 demonstrates that the number of jobs reshored annually to the United States has actually been declining since 2013.
AT Kearney’s conclusion is also consistent with the findings of a number of other analysts. For example:

Over the past five years, there has been little evidence to suggest that reshoring has resulted in any significant change in the US economy. While peripheral evidence indicates growth in manufacturing, a large-scale push towards reshoring has not been apparent. (Haider 2015, p. 2)

Our analysis suggests that there is no clear reshoring trend in the U.S. Companies do not appear to be abandoning overseas operations in droves; some are building new capacity in the U.S. and other countries to meet domestic demand. And the level of reshoring activity varies widely, depending on the industry involved. (Rice & Stefanelli 2014, p. 3)

Increasing FDI and a few prominent reshoring moves by multinationals provide some indication of a shift in the competitive landscape of US manufacturing. However, more evidence is required before we can conclude that the manufacturing pendulum has swung back toward the United States. (Majumdar & Hussain 2016)

An MIT study cast further doubt on the significance of reshoring, by revealing that, in the majority of the publicised cases for reshoring over the previous five to seven years:

[T]he companies involved plan to invest in US-based production capacity; they have not actually made the move. (Rice & Stefanelli 2014, p. 3)

Others have also expressed caution:

[T]he reshoring movement has to be kept in proportion. Most of the multinationals involved are bringing back only some of their production destined for the American market. Much of what they had moved over the past few decades remains overseas. And for many of the biggest firms the amount of work that they are still sending abroad outweighs the amount that they are bringing back onshore. (The Economist 2013a)

### Draft finding 7.2

In the United States, foreign direct investment appears to be creating more jobs in the manufacturing sector than reshoring.

In the United Kingdom, there is only limited evidence of reshoring in the manufacturing sector.

In a 2013 survey of 500 SMEs, the Manufacturing Advisory Service (MAS) found that 15 per cent of those manufacturers surveyed had returned production (Groom 2013, p. 1). This is broadly consistent with the findings of Civitas, which could identify only 64 SMEs across the nation that had reshored (Gibson 2014, p. 5).
Similarly, EEF’s 2014 survey of the industry found that:

- One in six UK-based manufacturers had brought production back in-house in the three years to 2014, up from one in seven, when a similar study was carried out in 2009.
- A further six per cent were planning to reshore, either in-house or to a UK supplier, in the next three years (EEF 2014, p. 9).

UK Trade & Investment48 (UKTI) was able to identify only 1,500 manufacturing jobs that had been created as a result of reshoring since 2011 (Ernst & Young 2015, p. 11). To put this into perspective, it was estimated that around £36 billion of UK manufacturing output was offshore between 1995 and 2011, equating to around 567,000 jobs (Ernst & Young 2015, p. 5).

7.5 What are other countries doing to encourage reshoring?

Given the potential economic and financial benefits associated with reshoring, government and private sector organisations around the industrialised world have actively encouraged the activity. This section identifies examples from the United States, the United Kingdom and mainland Europe.

7.5.1 Government initiatives

In general, governments implement a range of policies to enhance the attractiveness of a country or region as a location for foreign investment. While not a stated policy objective, many of the initiatives that provide incentives to attract and retain business activity, are also likely to encourage domestic reshoring.

The policies and programs identified below have specified reshoring of manufacturing as a primary objective.

United States

Around the world, government support for the manufacturing reshoring movement has been strongest in the United States, particularly since the Global Financial Crisis.

Federal Government—Obama Administration

In 2012, the Obama Administration’s Blueprint for an America Built to Last (the Blueprint) put forward a new fiscal framework to encourage the reshoring of manufacturing production. This framework included proposals to:

- establish a minimum tax on overseas profits to prevent other countries attracting American business by offering low tax rates
- eliminate the tax deduction that companies can claim for moving production offshore
- create a tax credit to cover moving expenses for companies closing production overseas and relocating to the United States
- lower tax rates for companies that manufacture in the United States, including doubling the tax deduction for high-tech manufacturers
- adopt a more rigorous approach to trade enforcement, including the creation of a new trade enforcement unit to pursue unfair trade practices in foreign countries, and the enhancement of trade inspections on imported goods
- make investments in logistics infrastructure to improve transportation (Compton 2012, p. 4).

A number of these fiscal proposals faced political obstacles and, as a result, not all were subsequently legislated.

In 2012, to complement its reshoring efforts in the Blueprint, the Obama Administration announced the Make it in America Challenge, providing $40 million in competitive grant funding from a range of federal agencies49 to encourage businesses to build, continue or expand their operations in the United States.

---

48 UKTI was replaced by the Department for International Trade in July 2016.
49 Those agencies were the Department of Commerce’s Economic Development Administration (EDA), the Department of Labor’s Employment and Training Administration (DLETA), the Delta Regional Authority (DRA), and the National Institute of Standards and Technology – Manufacturing Extension Partnership (NIST-MEP).
To be eligible for funding, projects needed to demonstrate an ability to encourage companies to bring work and jobs back home, foster more foreign direct investment or help train local workers to meet the needs of those businesses (Office of Public Affairs 2012).

Ten projects were successful in obtaining grants, including the PA Made Again Initiative (Box 7.3). However, the total grant money paid out by government agencies as part of the program appears to be only just over one-half of the amount initially budgeted for.50

Box 7.3 PA Made Again

The PA Made Again Initiative is operated by the SEDA–Council of Governments in Pennsylvania, and partners including the Northeastern Pennsylvania Industrial Resource Centre and the Pennsylvania Workforce Development Corporation. It received $2.2 million in grant funding from the Federal Government’s Make it in America Challenge to establish its activities.

PA Made Again is focused on creating and retaining manufacturing jobs in Pennsylvania by spurring direct foreign investment, encouraging firms to reshore, and encouraging those considering relocation to keep operations in the state, by:

- building well-connected networks of industrial clusters that foster efficiencies, collaboration and innovation between firms along supply chains and value streams
- fostering a collaborative environment between manufacturers, colleges and other research institutions that focuses on the development of new technologies, product development and process innovation
- building a strong pipeline of middle-skilled and highly-skilled manufacturing workers.

A key element of PA Made Again is Reshore2PA, a platform for connecting manufacturers that want to reshore parts and products to Pennsylvania with suppliers that can manufacture them. Manufacturers post reshoring requests online and Pennsylvania’s regional economic development partners scout potential suppliers and help make buyer–supplier connections.

Source: NIST–MEP

The Federal Government’s Department of Commerce offers a number of services to encourage businesses to return production to the United States or expand their domestic operations. These include:

- the Assess Costs Everywhere (ACE) tool, providing online links to public and private resources and case studies, to assist manufacturers understand the costs of investing and sourcing in the United States
- the Manufacturing Extension Partnership (MEP), a public–private partnership between the federal government and various public and private entities, including state, university and non-profit organisations. It operates as a system of centres in each state, offering a wide range of services to enable small and medium businesses identify opportunities to grow and strengthen their competitiveness in the global marketplace
- SelectUSA, a government-wide program to encourage domestic business and foreign direct investment. The program works with large and small companies, assisting them to obtain information, connect to people and organisations at the local level, and navigate the federal regulatory system.

The new United States administration has committed to a policy platform of Making America Great Again, with job creation in the manufacturing sector, particularly through the reshoring of production, as a cornerstone of that platform.

On 23 January 2017, President Trump signed an executive order to:

...withdraw the United States as a signatory to the Trans-Pacific Partnership [TPP], permanently withdraw the United States from TPP negotiations, and to begin pursuing, wherever possible, bilateral trade negotiations to promote American industry, protect American workers, and raise American wages. (The White House 2017, p. 1)

50 $20.5 million was provided by the EDA, DLETA and DRA (Office of Public Affairs 2013) whilst NIST–MEP provided each of the 10 projects with $125,000 per year for three years (Manufacturing Extension Partnership 2014, p. 2).
President Trump has also foreshadowed penalties for companies which shift operations overseas and the provision of a one-off tax holiday for corporate profits held offshore at a tax rate of 10 per cent (Trump 2016, pp. 1–2).

**State and local governments**

Local administrations and state governments are also offering financial and other forms of incentives to attract manufacturing employment to their region and promote reshoring (Branham 2014, p. 26). Many of these incentives take the form of tax abatements on income, loans or property and cash rebates (Reshoring Institute 2017a).

**The United Kingdom**

The United Kingdom Government has considered reshoring as a means of strengthening local economies and the industrial base as a whole. At the World Economic Forum in January 2014, the then British Prime Minister proposed to make the UK a ‘Re-Shore Nation’, noting:

> For years we have had UKTI out there helping our businesses to export and encouraging inward investment. Now I want to give that same dedicated specific support to helping businesses reshore. (Cameron 2014, p. 1)

To facilitate this initiative, UKTI and the Manufacturing Advisory Service (MAS) launched Reshore UK, a comprehensive ‘one-stop shop’ to assist firms return production to the United Kingdom.

The Prime Minister considered that the service would ‘create jobs and [ensure] that hard-working people can reap the benefits of globalisation’ (Cable et al. 2014). Reshore UK was designed to bring industry and government together to identify opportunities and unify available support to take advantage of business opportunities created by reshoring. The service was open to all SME UK businesses, and those overseas that could make a significant contribution to the economy.

MAS was to have a domestic focus, assisting:

> ...businesses to be globally competitive and [ensuring] that there is capacity in the UK supply chain to take advantage of reshoring opportunities. (Cable et al. 2014)

UKTI was to complement MAS in using its global networks to attract foreign companies.

For firms considering reshoring, Reshore UK offered dedicated technical and strategic advice on a range of matters, including grants and other financial incentives, the identification of supply chain opportunities and development of business cases.

For UK-based SMEs, seeking to take advantage of new supply chain opportunities created by reshoring firms, the service provided them with:

- an objective assessment of market capability and assistance in developing a business strategy
- referral to reshoring organisations where their requirements could match those capabilities
- continued support in establishing the reshored supply chain (Solent Growth Hub n.d.).

Reshore UK was supported by the Government’s Advanced Manufacturing Supply Chain Initiative, a competitive £245 million fund, providing subsidies for capital investment, R&D expenditure and training for industrial projects involving collaboration across supply chains, including projects involving the reshoring of manufacturing. The initiative was expected to assist in developing local suppliers around the UK’s major manufacturers, in particular the automotive industry (De Backer et al. 2016, pp. 24–5).

---

51 MAS was part of the Department for Business, Innovation and Skills. In 2014, it was incorporated within the Department’s Business Growth Service, which offered support to businesses with growth potential.
Following the government’s expenditure review in 2015, the Business Growth Service, which incorporated
MAS, was closed down with:

...
all contractual commitments to be honoured, as long as all support and related activity is completed by
31 March 2016. (The National Archives 2016)

It appears that, at this time, the Reshore UK service also ceased.

DSD (sub. 11, p. 8) indicated that:

...reshoring manufacturing operations [in the UK] faltered due to a lack of skills and capacity among
’smaller’ manufacturers. The data also indicated the majority of manufacturers view reshoring as
‘irrelevant’ to their strategic and corporate intention (with uptake by remaining manufacturers being less
than predicted).

There is no publicly-available information which evaluates the effectiveness of Reshore UK. It is unclear as to
the number of companies that it assisted or the number of jobs that were directly created.

Advice from the Department of International Trade indicates that, while the government still supports
businesses seeking to reshore to the United Kingdom, this support is not conducted under a specific
program. Rather, assistance with reshoring business is provided as part of broader programs that encourage
foreign direct investment and provide domestic company support.52

Europe

There has been some, albeit limited, interest in reshoring in Europe. This likely reflects that China will
continue to be an important low-cost supplier to mainland Europe, largely because:

- Europe’s labour market remains relatively inflexible, with labour costs relatively high, despite rising
wages in Asia
- there has been a smaller reliance on offshoring production in the first place, compared to the United
States or United Kingdom (The Economist 2013b, p. 1).

In addition, offshoring by French, Spanish and Italian firms has tended to be held back by domestic political
and social pressures (Margulescu & Margulescu 2014, p. 91).

At the supra-national level, European Union institutions have acknowledged and expressed support for
reshoring initiatives.

Backshoring is a goal of the European Parliament’s Renaissance of Industry for a Sustainable Europe Strategy
(De Backer et al. 2016, p. 24). This strategy is part of Europe 2020, the European Union’s overarching 10-year
jobs and growth strategy, launched in 2010.

Consistent with Europe 2020, the European Commission, in its 2012 and 2014 Communications to the
European Parliament, referred to reshoring in the context of arresting the decline of the manufacturing
industry’s share of European GDP (Needham 2014, p. 6).

In addition, the European Parliament’s Committee on Regional Development noted that it:

...is concerned at the massive deindustrialisation affecting many of Europe’s traditional industrial
heartlands; takes the view that former industrialised regions can make a significant contribution to
reindustrialisation; ... supports, in this context, ‘reshoring’ initiatives seeking the reentry of production and
services from third countries. (Committee on Regional Development 2013)

This position was subsequently adopted by the European Parliament in January 2014 (Needham 2014, p. 6).

In general, most European governments do not have a specific policy on reshoring manufacturing.

However, a few governments have (or have recently had) reshoring policies. While only limited detailed
information is available, it appears that these countries have adopted their respective measures with
different domestic policy objectives in mind (Box 7.4).
Box 7.4 Reshoring in Europe

In Germany, reshoring is being encouraged to further develop and strengthen the country’s manufacturing sector, consistent with Industrie 4.0, a strategic initiative to establish the nation as a lead market and provider of advanced manufacturing solutions. This initiative, undertaken as part of Germany’s broader High-Tech Strategy 2020, is founded upon the country’s:

- continued role as one of the world’s most innovative manufacturing sectors
- technological leadership in industrial production, research and development (Germany Trade and Investment 2017).

It is unclear whether the German Government is offering specific inducements to encourage companies to relocate production.

In France, the Government’s key policy initiative on reshoring is designed to:

...complement [the Government’s other] policy measures which discourage offshoring by French companies. (De Backer et al. 2016, p. 6)

A 2013 government study, Relocalisations d’activités industrielles en France, found that three types of companies were engaged in reshoring, namely:

- major firms seeking access to the best international locations for high-value-added activities (tactical reshoring)
- medium-sized firms recognising the higher ‘hidden’ costs of offshoring (home reshoring)
- start-up companies which commenced operations in a low-wage country, and now had a stable customer base (development reshoring) (ISLI Supply Chain Forum Team 2015, p. 21).

To further encourage this activity, the Ministry for Industrial Renewal developed and released the Colbert 2.0 software platform, designed to identify the relative merits of producing domestically.

In Italy, government policies to encourage reshoring are not coordinated (Marchese 2015). Despite this, the Uni-Club moRE Reshoring, a research group of scholars from Italian universities, found evidence of 125 domestic firms returning production to the country (Battochi 2016).

Most of these firms are in the clothing, footwear and electronics industries, seeking greater quality control over their production and capitalise on the marketing advantages of the ‘Made in Italy’ brand (Marchese 2015). In this context, many of the products are niche goods, being sold at the luxury end of the market.

Draft finding 7.3

There is a lack of publicly available information on the effectiveness of government reshoring policies, in terms of the direct benefits (such as the number of companies which repatriated production and the number of jobs created) and the cost of those policies.
7.5.2 Private sector initiatives

In the United States and the United Kingdom, key private sector organisations have developed reshoring programs, to complement the public policy agenda (the United States) or undertake a function previously provided by government (the United Kingdom).

Reshoring Initiative

The Reshoring Initiative is an industry-led non-profit organisation in the United States with an objective of bringing four million manufacturing jobs back to the United States, and reducing the unemployment rate by four percentage points (Reshoring Initiative 2016b).

The Reshoring Initiative works directly with:

- manufacturing companies to help them realise that local production can, in some cases, reduce the total cost of ownership of purchased parts and tooling
- suppliers, training them to effectively meet the needs of local customers and sell against lower-priced offshore competitors (Reshoring Initiative n.d.).

The Reshoring Initiative offers a range of free services to interested manufacturers and suppliers, including:

- an online software tool, the Total Cost of Ownership estimator, to comprehensively assess the actual costs of offshore production
- access to information and education on reshoring, foreign investment and workforce capabilities.

The Reshoring Initiative receives only limited assistance from government and relies on the financial support of sponsors and donations to operate.

Reshoring Institute

The Reshoring Institute is a non-profit organisation providing information, research and support for companies trying to reshore their manufacturing services back to the United States. Based at the University of San Diego, and working in collaboration with the institution’s Supply Chain Management Institute, it provides a range of services, including site selection, identification of tax credits and other incentives, marketing, public relations, cost comparisons, locating potential employees and developing strategic partnerships. The organisation uses industry experts and student interns to support its research and consulting efforts (Reshoring Institute 2017b).

Return One Million Jobs Campaign

The Return One Million Jobs (ROMJ) campaign was created in early 2017 to bring one million jobs back to the United States from offshore. It is seeking to raise $20 million to fund a major data analytics project that will allow 100,000 identified companies in the United States, which presently offshore production and sources, to compare the costs of domestic production (Return One Million Jobs 2017).

ROMJ will provide advisory services to interested companies and work closely with the Reshoring Initiative and the Reshoring Institute.

Reshoring UK

GTMA, a UK-based trade association representing leading companies in precision engineering, rapid product development, tool making and other critical manufacturing related products and services, recently established Reshoring UK.

Reshoring UK is an initiative that brings together:

...leading industrial engineering associations to assist manufacturers connect with trusted, accredited suppliers capable of delivering products and services that match their requirements.

(Reshoring UK 2015, p. 1)
To enable this initiative, GTMA is working with nine other trade associations and two high-value manufacturing catapults to comprehensively map the entire UK engineering supply chain with a view to making this information available online. The project is being supported by:

- Autodesk, a large design and manufacturing software company
- Barker Brettel, an intellectual property specialist

This information is designed to assist OEMs and tier one companies, particularly those bringing production back to the United Kingdom, to identify domestic companies to fill their supply chain or establish new ones. Key industries to benefit from the data include automotive, aerospace, rail, medical, energy and defence industries.

Reshoring UK receives no financial assistance from the government and is funded by members through a subscription service.

### 7.6 Manufacturing and the total cost of ownership

The total cost of ownership (TCO) is a tool to evaluate the financial merits of investment, by aggregating the direct and indirect costs over the life cycle of an investment.

Advocates of reshoring manufacturing use TCO estimates to demonstrate the financial benefits of a domestic sourcing strategy. Calculations are based not only on the costs of manufacturing a component, subassembly or product, but include costs associated with ‘doing business’ and the risks associated with reliance on global supply chains.

Harry Moser, founder of the Reshoring Initiative, strongly views that a company’s decision to offshore production to improve profitability does not take sufficient account of all costs and risks associated with that decision. He noted:

> Most companies make sourcing decisions based solely on price, oftentimes resulting in a 20 to 30 percent understatement of offshoring costs. (Moser 2016c)

In this context, he argues that businesses need to take a more holistic view of the total cost of sourcing, making and moving a product to its end consumer—rather than being fixated with production costs, and labour costs in particular.

In particular, Moser contends that:

> ...the savings from low offshore wages and purchase prices are increasingly offset by dozens of hidden costs. (Moser 2016d)

Hidden costs are generally indirect costs and risks, many of which are intangible, arising from commercial arrangements and production processes within the global supply chain.

TCO analysis requires these costs and risks to be identified, objectively quantified and forecast.

By effectively accounting for hidden costs, Moser argues that, in the longer term, the financial benefits of offshoring are likely to be less than otherwise expected, and could potentially outweigh the overall benefits of sending production out of the country.

He notes that, if a company:

> ...finds in-house manufacturing cost is 30 percent higher than the offshore purchase price, it is almost impossible to make a positive return on investment (ROI) with spending on automation, training and lean manufacturing initiatives here to overcome the cost difference. However, if the company measures with TCO and finds only a 5 or 10 percent difference, the ROI just went up dramatically, sometimes making in-house the most profitable choice. (Moser 2016c)

---

53. This online database is available at http://www.reshoringuk.co.uk/find-a-company/

54. A tier one company is the most importance member of the supply chain, supplying components directly to the original equipment manufacturer that established the chain.
To reveal the true costs of offshored parts or products, the Reshoring Initiative developed the Total Cost of Ownership Estimator (TCO estimator), an internet-based application that aggregates all costs, including hidden costs, into a single indicative figure and time series (Box 7.5).

**Box 7.5 Total Cost of Ownership Estimator**

The TCO estimator provides users with a comprehensive online framework for the identification and aggregation of all the costs associated with offshoring and reshoring. It offers a customisable and flexible framework which has been endorsed by the US Commerce Department, and is free of charge for all users.

To provide a complete picture of total cost by source (or supplier), all relevant cost factors must be fully accounted for. The TCO analysis takes into account up to 30 cost and risk factors for each source. These include readily identifiable costs such as wages, freight and duty, travel expense and time, inventory carrying costs and currency changes.

It also assists in quantifying more subjective costs and risks such as those associated with intellectual property loss, the impact on product innovation from having manufacturing distant from engineering, losses from stock-outs due to long delivery times, and supply chain shocks or disruptions caused by natural disasters and political unrest.

The analysis identifies the current TCO for each source, and provides:

- line charts showing each source’s current price and TCO, as well as a five-year TCO forecast
- line charts for each source showing cumulative cost, starting with price and progressively adding in more subjective costs.

Sources: Moser 2016b, 2016d.

By comparing costs incurred from an offshored supplier or through a supply chain with those arising from domestic supply and production arrangements, the software allows firms to evaluate alternative sourcing strategies, and potentially realise cost savings and higher profits.

The Reshoring Initiative notes that, as of November 2016, over 2,000 users had made use of the TCO estimator. As an example, it highlighted the case of the company Morey Corp, which was able to identify a saving of $60 million over four years on its production costs, when assessed against the costs of a lower priced Chinese competitor (Reshoring Initiative 2016c).

Cranfield University has developed TCO-UK, a TCO estimator for use by UK companies. The cost calculation methodology and online software has been adapted from the Reshoring Initiative’s TCO estimator.55

**Draft finding 7.4**

Total cost of ownership analysis provides firms with a comprehensive assessment of the overall costs of different sourcing strategies.

---

55 TCO-UK is available at http:/ /reshorenow.co.uk/
7.7 Reshoring in Queensland

The evidence on reshoring in Australia, and Queensland in particular, is very limited. No information is available, either from a government or private source, which provides any history or documents the magnitude of the activity.

Despite forecasts of impending growth in domestic reshoring activity (see, for example, Johnson 2016, p. 1), only a few individual cases have been publicly reported.

A recent example is Signet, a Brisbane-based packaging company, which has returned production to Australia through investment in new capital technology (Box 7.6).

Box 7.6 Signet reshores manufacturing to Brisbane

Signet is a national supplier and manufacturer of packaging and industrial supplies, based in Brisbane, with locations throughout Australia. It is a family-owned company, which has been operating since 1968, now employing over 300 people to produce inks and aerosol paints, signs, labels, poly tubing and plastic films.

Signet has national contracts with all of Australia’s major retailers including Woolworths and Metcash, plus a number of Australia’s largest logistics companies including Toll, Ceva, TNT and DB Schenker. It also services industrial businesses such as 3M and Ansell.

In 2016, the company invested $7 million to expand its factory and acquire a plastic extrusion machine that turns fingertip-size plastic pellets into sheets of stretch wrap. This has allowed the company to manufacture its own plastic packaging, previously shipped in from offshore, and nearly triple its domestic polyethylene capability for packaging and agricultural customers.

Signet’s chief executive officer, Jack Winson, cited the reasons for reshoring production as:

- the slow turnaround time associated with Asian imports, providing little flexibility with which to meet tight customer deadlines
- having the capability to control the manufacturing process in order to ensure products of a consistently high quality
- the lower Australian dollar.

Mr Winson also noted that the largely automated nature of advanced manufacturing had made local production more competitive.

Sources: Packaging News 2016; Norris 2016; Mallis 2016; and Sligar 2016.

While it is highly likely that there are other instances of reshoring in Queensland, it appears that reshoring is not a significant trend in the state. This may be for a number of reasons, including that the factors that may drive reshoring elsewhere—particularly more competitive energy and labour costs—are not available here. Chapter 3 notes the poor cost performance of the broader manufacturing sector in Australia since 2004.

Taking all of this into account, it would be ‘overstating the case to call [reshoring] the future of Australian manufacturing’ (Sligar 2016).
7.7.1 Implications for the Queensland Government

The Queensland Government has a strong focus on job creation and the reshoring prospects for Queensland firms currently manufacturing overseas.

A number of matters need to be considered in this context.

As noted previously, it is not clear that reshoring policies implemented overseas have been successful in meeting their objectives.

The link between United States Government policy and the number of jobs reshored in that country is not clear. Despite an initial surge, evidence suggests that actual reshoring has waned even as support measures have continued. Although it is difficult to be conclusive in the absence of a formal evaluation, there is a possibility that many of those companies that reshored would have done so in the absence of government incentives. Their decisions may have been driven by their own commercial or strategic imperatives, and influenced by market circumstances and opportunities at the time.

In the United Kingdom, Reshore UK was closed down only two years after its introduction. This timing suggest that the unpublished outcomes did not meet the government’s expectations and would have been unlikely to do so in the future.

Similarly, where companies have reshored, no comprehensive analysis has been done as to the nature of the jobs. The ILO notes the uncertainty in this regard, observing that some analysts:

...argue that bringing back jobs ... might mean creating higher quality jobs with better protection [while] ... others believe that any jobs that return will not necessarily be the same as those that previously left. (International Labour Organization 2015, p. 6)

In addition, whilst reshoring may provide profitable opportunities for firms, it may not necessarily generate the employment opportunities that could otherwise be expected. This is particularly the case with advanced manufacturing, where reshored production is undertaken in plants that are highly automated and make use of robotic technology.

For example:

[A] robot-assisted [worker] in a reshored factory might do the work of several workers abroad without machine helpers. And the returned plant won't have nearly as many workers as the original [domestic] manufacturer, simply because of increased efficiency from improved technology. (Walker 2016, p. 1)

In other words, new technology and advanced production processes ensure that less labour per unit is needed, than when more traditional manufacturing methods are used.

In this context, government policies to encourage reshoring may not result in a large number of new jobs.
7.7.2 What can the Queensland Government do?

Reshoring will occur if it is in the financial interest of the manufacturer.

A company’s location decision is a complex one, and transformational change is likely to incur significant costs. In making a critical decision to modify their sourcing strategy and produce domestically, businesses need to be confident that the change will be profitable.

However, assessing the relative merits of offshoring and reshoring does not just involve a direct comparison of labour, input and other logistics prices, but includes consideration of a number of indirect factors, often qualitative in nature. If businesses do not have access to accurate information, it will limit their capacity to undertake an objective, comprehensive comparison.

The Queensland Government may have a role in ensuring that the right information is available to allow firms to develop their own sourcing and production strategies. In this context, it can:

- identify which information that would enable firms to make a decision on reshoring production is not available in the market
- ascertain whether its suite of information offerings, including cost information, provided through the Department of State Development and Trade and Investment Queensland, addresses this gap
- ensure that this information is available to all firms in the market.

Chapter 10 discusses opportunities to improve investment facilitation services in Queensland.
8.0 Regulation
This chapter considers how the regulatory framework affects Queensland manufacturers and discusses the role for ongoing evaluation and review to manage the existing stock of regulations to better meet government objectives and limit unnecessary costs for businesses and the community.

**Key points**

1. Queensland manufacturers comply with multiple layers of regulation that can cut across different aspects of their activities and influence industry performance, productivity and competitiveness.

2. Often the regulations that Queensland manufacturers must comply with do not directly target the manufacturing sector, but nevertheless are a potential source of burden to manufacturing businesses. These include general business obligations that reflect on the structure and business model (tax, superannuation, business reporting) and nature of the business and operations (consumer protection, product safety, industrial relations, Workplace Health and Safety). Manufacturing businesses can also be subject to industry-specific regulations such as food safety.

3. The number and complexity of regulations affecting the manufacturing sector suggests that the cumulative burden of regulation on manufacturing firms and workers is likely to be substantial. Stakeholders raised particular concerns about the ‘red tape’ associated with running their businesses (particularly taxation structures and superannuation compliance requirements, employment and wage setting regulations).

4. It can be difficult to pinpoint a primary cause of regulatory burden, in part because of the diversity of the sector. However, key themes have emerged, relating to the unnecessarily complex and restrictive nature of some regulations; poor regulatory processes; and the ‘cumulative effect’ for firms in complying with the raft of regulations, across all levels of government.

5. These concerns are not new, and have been raised (along with others) in other reviews of regulatory burdens (on manufacturers, or on businesses generally).

6. The challenge for government is to ensure that the regulatory framework is necessary (responding to an identified problem); effective (separately and jointly achieving objectives) and efficient (maximising the net benefit to the community). This requires governments to actively manage the stock and flow of regulation, and requires regulators to administer and enforce regulation well.

7. There is an opportunity to look more closely at the current stock of regulation that applies to particular subsectors of the manufacturing industry — and identify priority areas where regulation needs to be improved, consolidated or removed in order to raise productivity.
8.1 Introduction

Governments introduce regulations as a way to improve economic, social and environmental outcomes, or to reduce undesirable outcomes. These benefits may not occur if left to markets to deliver.

Although regulations can bring benefits, they can also impose costs. A challenge for government is to ensure the regulatory framework achieves the government’s regulatory objectives in a way that also supports productivity growth and competitiveness, and provides an overall benefit to the community.

The inquiry was asked to consider the regulatory framework for manufacturing in Queensland, including changes that would reduce the regulatory burden on the manufacturing sector. This has been difficult to assess, given the diversity of manufacturing firms across Queensland and the different regulations that they must comply with, as well as challenges for manufacturers in distinguishing the costs of particular regulations—as distinct from the overall regulatory burden.

This chapter focuses on the impact of existing regulation on Queensland manufacturers, as matters raised by stakeholders during consultation.

It does not directly address other important elements of Queensland’s regulatory framework such as the effectiveness of processes for adding, changing and removing regulation; the performance of regulators in administering and enforcing regulation; and the operation of Queensland regulation in the broader Australian framework. These matters have economy-wide impacts, and are beyond the scope of an inquiry into manufacturing.

8.2 Existing regulation

Queensland manufacturers must comply with multiple layers of regulation that can cut across different aspects of their activities and influence industry performance, productivity and competitiveness (Table 8.1).

Much of the regulation affecting the Queensland manufacturing sector is set at a national level. As some manufacturing businesses are, or will be, increasingly globally interconnected through global supply chains, international regulation and standards are also important.

However, the Queensland Government continues to have a significant regulatory role. For example, the Red Tape Reduction Advisory Council (RTRAC) (now part of the Queensland Small Business Advisory Council (QSBAC)) found that a metal trade manufacturing business in Queensland is required to comply with a minimum of 29 state codes of practice, licences and regulatory obligations, including environmental controls, disposal of trade waste, hazardous goods management, taxation, and registration requirements (RTRAC 2016, Appendix B, p. 5).

Often Queensland manufacturers must comply with regulations that do not directly target the manufacturing sector, but nevertheless are a potential source of burden to manufacturing businesses. These regulations include:

• general business obligations that reflect a firm’s structure or business model — including relating to taxation (income tax, goods and services tax, payroll tax); superannuation; financial reporting and business registration
• general business obligations that reflect the nature of operations — including various consumer protection provisions, product safety obligations, industrial relations, Workplace Health and Safety (WHS) requirements, transport frameworks, planning and environmental requirements.

Manufacturing businesses can also be subject to industry-specific regulations that are designed, implemented and enforced to change outcomes in a particular industry or for a particular activity.

56 The RTRAC has been amalgamated into the Queensland Small Business Advisory Council (QSBAC) and will continue through the Better Regulation Taskforce, established as a sub-committee under QSBAC (QTESB 2017b).
Table 8.1 Types of regulations affecting Queensland manufacturers

<table>
<thead>
<tr>
<th>Australian Government</th>
<th>Queensland Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>National land transport regulatory frameworks</td>
<td>Upstream supply activities</td>
</tr>
<tr>
<td>Shipping and maritime safety laws</td>
<td></td>
</tr>
<tr>
<td>International maritime codes and conventions</td>
<td></td>
</tr>
<tr>
<td>Competition and consumer law</td>
<td></td>
</tr>
<tr>
<td>Environmental protection and biodiversity conservation</td>
<td>Acquisition of premises</td>
</tr>
<tr>
<td>Financial sector (access to finance)</td>
<td></td>
</tr>
<tr>
<td>Workplace Health and Safety</td>
<td>Operations</td>
</tr>
<tr>
<td>Industrial relations</td>
<td></td>
</tr>
<tr>
<td>National pollutant inventory</td>
<td></td>
</tr>
<tr>
<td>National greenhouse and energy reporting</td>
<td></td>
</tr>
<tr>
<td>Immigration</td>
<td></td>
</tr>
<tr>
<td>Water access</td>
<td></td>
</tr>
<tr>
<td>Industrial, agricultural and veterinary chemicals</td>
<td></td>
</tr>
<tr>
<td>Trade measurement</td>
<td></td>
</tr>
<tr>
<td>Export certificates</td>
<td>Logistics and distribution</td>
</tr>
<tr>
<td>National land transport regulatory frameworks</td>
<td></td>
</tr>
<tr>
<td>Shipping and maritime safety laws</td>
<td></td>
</tr>
<tr>
<td>International maritime codes and conventions</td>
<td></td>
</tr>
<tr>
<td>Competition and consumer law</td>
<td></td>
</tr>
<tr>
<td>Product safety</td>
<td>Marketing, sales and service</td>
</tr>
<tr>
<td>Competition and consumer law</td>
<td></td>
</tr>
<tr>
<td>Redundancy provisions</td>
<td>Cessation of operations</td>
</tr>
<tr>
<td>Corporation law</td>
<td></td>
</tr>
<tr>
<td>Land use and planning</td>
<td></td>
</tr>
</tbody>
</table>

Sources: QPC 2016c, p. 21; ASMC sub. 5, p. 6.
Is there a regulatory burden problem?

It is difficult to quantify the costs (or benefits) of regulation to the Queensland manufacturing sector given its diversity. It also reflects the challenges many manufacturers—especially those involved in small business—have in pinpointing particular concerns and identifying and specifying the costs. On this, the RTRAC said:

[M]any of these costs become less transparent over time as methods of operation are built upon a foundation, which includes existing regulation. As a consequence, business generally cannot quantify how regulation impacts their costs. The reason is that the costs are embedded in cost structures and become part of business as usual. (RTRAC 2016, p. 5)

The information that is available is often limited to particular (subsector) activities.

That said, the observed scope of the regulatory environment (through different agencies and levels of government) gives an indication of the size (and potential complexity) of regulatory arrangements. The information presented to this inquiry suggests that, at least anecdotally, ‘red tape’ associated with running Queensland manufacturing businesses can be significant and is not declining (Box 8.1).

Box 8.1 Some concerns about the regulatory framework for Queensland manufacturers

The CCIQ said the regulatory framework adds a ‘heavy cost burden’ to Queensland manufacturers, with the industry:

...‘hamstrung’ by an inefficient and uncompetitive tax system, an inflexible workplace relations framework, prescriptive regulatory compliance requirements, and rising energy costs ... the pendulum has swung too far towards a largely unnecessary and highly prescriptive regulatory framework. (sub. 6, pp. 15-16)

CCIQ reported the view of a dairy manufacturer, which emphasised the industry is:

...threatened by a culture of over-regulation that prevents innovative and/or entrepreneurial responses to problems or challenges that arise in the workplace and in the manufacturing industry more broadly. (sub. 6, p. 22)

Cook Medical said the current regulatory environment hampers Queensland manufacturers’ ability to compete globally and was the ‘fundamental impediment’ inhibiting broad-based manufacturing sector in Queensland (sub. 12, p. 4).

The CCIQ and TCF Roundtable said that existing industrial relations arrangements ‘go too far’ in regulating aspects of the employment relationship and lack flexibility (CCIQ sub 6, p. 17, TCF Industry Roundtable).

Packer Leather said over-regulation ‘suffocates initiative and diminishes risk taking’. This includes ‘extreme’ environmental restrictions on their activities; requirements to recertify technologies that are already certified overseas; and slow planning and approval processes that put it at a competitive disadvantage (sub. 13, pp. 2–3).

CCIQ and Cook Medical pointed to a lack of alignment across levels of government:

Driven largely by conflicting electoral cycles at both State and Federal levels, industry policy frameworks are in a constant state of flux. This lack of certainty clearly impacts manufacturing sector investment considerations, and ultimately has a negative effect on confidence. (sub. 12, p. 4)

A key issue for manufacturing businesses operating across multiple jurisdictions are the inconsistencies in requirements and regulations. (sub. 6, p. 16)

The Service Trades Council said plumbing and drainage and fire protection regulations do not properly reflect evolving building construction practices, which could pose significant health and safety risks (sub. 3, p. 2).

---

57 This includes regulations that restrict the activities of businesses or imposes compliance costs on businesses, to achieve particular social, economic and environmental outcomes.
For the most part, the concerns about the regulatory framework were about regulations that are not specific to the manufacturing sector.

Businesses often pointed to Australian Government regulation (taxation and superannuation compliance requirements, employment and wage-setting regulations, industrial chemicals regulations) as imposing the greatest individual regulatory burden. They noted the significant time spent on understanding requirements and undertaking the paperwork and other activities in order to comply.

More generally, stakeholders suggested that:

- regulations have ‘gone too far’, putting restrictions on business beyond what would be required to achieve a policy objective
- regulations are overly complex and highly prescriptive, failing to take account of the needs of extremely diverse and dynamic workplaces
- domestic regulations are more complex or onerous than comparable overseas regimes, putting onshore manufacturers at a disadvantage
- uncertainty about the scope or impact of (new) regulations has stopped firms buying capital equipment or employing new staff
- poor regulatory processes have led to slow responses and unanticipated delays, mistakes and inconsistencies, and requirements for large amounts of information for ‘no apparent reason’
- the combined or cumulative burden of complying with a raft of regulations, across all levels of government is significant (even when individual regulations are manageable).

The evolving nature of some manufacturing processes is particularly important. Regulations that mandate particular solutions for compliance may prevent or delay lower-cost solutions that may become available as the industry develops.\textsuperscript{58} In some cases, the market puts greater demands on manufacturers than the existing regulations.

These concerns are not new, and have been raised (along with others) in other reviews of the regulatory burdens on manufacturers, or on businesses generally. For example, similar concerns were raised in a Red Tape Reduction Advisory Council (RTRAC) report on the regulatory burden of businesses in three industry sectors (light metal manufacturing, cafes and restaurants and fruit growing) (Box 8.2).

Similar concerns have also been raised by the Manufacturing Taskforce (Prime Minister’s Taskforce on Manufacturing 2012), the VCEC’s inquiry into Victoria’s manufacturing industry (VCEC 2011) and the Productivity Commission’s review of the regulatory burdens in manufacturing (PC 2008).

At a broader level, the CCIQ’s 2015 Red Tape survey found that 78 per cent of Queensland businesses experience a moderate to major impact from complying with government regulation; and 57 per cent of Queensland businesses indicated that the costs of dealing with red tape had increased (CCIQ sub. 6, p. 16).
Box 8.2 Red Tape Reduction Advisory Council (RTRAC) 2016 Report

The RTRAC report identified key sources of regulatory burden across three industry sectors (light metal manufacturing, cafes and restaurants and fruit growing).

- Difficulties in navigating the legislation and regulations and understanding compliance obligations (Commonwealth and State).
- Complex employment and wage setting regulations, including for business with non-standard workforce requirements.
- Administrative burden of paper-based application and renewal processes for licences, permits and notifications.
- Lack of flexibility and consistency in approach.
- Poor communication between regulatory agencies and businesses, leading to duplication in reporting and compliance.
- Poor communication of obligations and changes to regulations, particularly for WHS and industrial relations obligations.
- Overly prescriptive regulations that focus on processes and procedures rather than outcomes.
- Insufficient consideration of the level of risk posed by the activities.

It also identified additional regulatory issues for light metal manufacturers.

- Significant costs in complying with the Australian standards and/or codes regarding manufacturing, including lengthy and complex approval processes.
- Duplication in product testing, registration and reporting requirements across regulatory agencies.

The Queensland Government has accepted, or supported for further investigation, all of the Council’s recommendations for reform, noting that many could deliver benefits more broadly to small and medium businesses across all sectors of the economy. The Government also committed to provide a detailed report, on a six-monthly basis, outlining the actions taken in response to each recommendation and the outcomes achieved.


8.3 Importance of an effective regulatory environment

Regulation is an important tool available to achieve policy objectives and respond to community needs.

In some cases, regulation seeks to support the operation of markets, so that they work more efficiently. This includes clarifying or establishing the overall institutional and legislative framework, property rights or processes for contract enforcement. Regulation can be introduced to protect against (or correct) a range of market failures. Other regulations seek to address social and equity objectives — including assisting vulnerable and disadvantaged people and the unemployed.

Good regulation can yield significant benefits — enhancing Queensland’s ability to compete and prosper economically. For example, the Commission was told that effective biosecurity arrangements can help Australian food processors take advantage of Australia’s ‘clean green’ reputation when seeking to access premium export markets. The CCIQ said:

Some well-targeted regulation is necessary to facilitate a level playing field for businesses ... (sub 6, p. 16)

Overall, manufacturing businesses support compliance and regulatory frameworks that are flexible to allow businesses to be more responsive to market trends and economic conditions. (sub. 6, p. 16)

However excessive, ineffective or inefficient regulation can impose unnecessary costs on businesses and the community (Figure 8.1).
Figure 8.1 Costs of ineffective or inefficient regulation

<table>
<thead>
<tr>
<th>Excessive compliance costs</th>
<th>Distort business decisions</th>
<th>Unnecessary costs to the community</th>
<th>Undermine confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Additional paperwork burdens</td>
<td>• Divert resources to compliance activities</td>
<td>• Higher prices</td>
<td>• Business and community lose respect for the regulations</td>
</tr>
<tr>
<td>• Additional costs to meet obligations</td>
<td>• Less innovation</td>
<td>• Restrict choices</td>
<td>• Significant non-compliance</td>
</tr>
<tr>
<td></td>
<td>• Less investment</td>
<td>• Unintentionally disadvantage particular groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fewer jobs</td>
<td>• Burden only falls on those who comply</td>
<td></td>
</tr>
</tbody>
</table>

The challenge for any government is to make sure regulation is:

• necessary—there is a convincing underlying problem that regulation seeks to rectify
• effective—regulations separately and jointly achieve their objectives
• efficient—regulation maximises the net benefit (benefits minus costs) to the community.

Regulation that delivers high-quality outcomes with minimum burden requires governments to ensure regulations are justified and well-designed. This is not just important in the context of new regulations. There also needs to be a focus on the stock of existing regulation. Poor management of the flow or stock of regulation can lead to a ‘rigid and conservative approach to regulation that imposes significant costs on the community’ (RTRAC 2016, p. 5).

It also requires regulators to administer and enforce regulation effectively and efficiently. The Productivity Commission highlighted that administration and enforcement can be just as important as the design of regulation in contributing to compliance costs:

\[\text{Regulation is an inescapable part of doing business and the way it is implemented is often as important to business and to compliance outcomes as the content of the regulation itself} \ldots \text{By exercising discretion and choosing judiciously how regulation should be implemented, a regulator can reduce costs for small businesses while maintaining or even improving compliance outcomes — a win-win for business and the community.} \text{(PC 2013a, p.iii)}\]

This can be particularly important for manufacturers, given many are small businesses and so might disproportionately feel the burden from complying with regulation (see below).

Effective regulation in a diverse, evolving industry

During the consultation process, feedback on the impact of regulation on Queensland manufacturers (and their responses in complying with regulation) varied considerably, depending on the activities undertaken and the size of the business. For manufacturers operating in higher-risk areas (such as biotech, food processing and heavy machinery), compliance would be expected to form a central part of a firm’s operation and decision-making. In contrast, regulatory compliance may be more peripheral to the core activities of lower risk businesses.

Stakeholders highlighted the importance of the regulatory framework being ‘fit for purpose’ in an environment where the tasks and activities being undertaken by Queensland’s manufacturers are diverse and changing, sometimes fundamentally. They said, that outdated or otherwise inappropriate regulation (that failed to take account of changing work practices and needs of diverse businesses) can impose unnecessary burdens on some businesses.

• Workplace relations was a significant issue for some firms, with the overly complex and highly prescriptive arrangements undermining the capacity of firms (particularly those with requirements for businesses with nonstandard workforce requirements) to run their business including taking on new staff (CCiQ sub. 6, p. 19; TCF Roundtable).
• Packer Leather said that requiring technologies that are already certified, and in use, in comparable overseas markets to be ‘recertified’ in Australia reduces its competitiveness and ability to compete in a
global market — by unnecessarily increasing the complexity and costs of it doing business and inhibiting its access to new technologies and scientific advances (Packer Leather sub. 13, p. 3).

Stakeholders said that regulations need to be evidence-based, and developed in consultation with industry to ensure they have the desired affect and avoid unintended consequences. On this, the Australian Sugar Milling Council (ASMC) noted that industries can be damaged when changes to regulations are ‘politically driven’. It suggested that the 2015 amendments to the Queensland Sugar Industry Act 1999 (which changed the marketing arrangements of Queensland sugar and introduced pre-contract arbitration):

...cost the industry millions of dollars in compliance response without generating any additional revenue ... halted major capital projects worth hundreds of millions of dollars and has put future foreign investment in regional manufacturing at significant risk. (ASMC sub. 5, p. 5)

A disproportionate impact on small businesses

Queensland manufacturers are mostly ‘small’ firms (employing 19 or less workers), with many of these operating with the owner as the primary person working in the business (Chapter 2). Small firms usually operate in a fundamentally different structure to larger businesses (Figure 8.2).

Figure 8.2 Common characteristics of small businesses

- Owner manager is the principal decision maker
- A small number of individuals in the business
- A simple management structure: no specialised managers or systems
- Limited resources, including finance, staff and skills
- A greater propensity to only supply the local market, or operate within a single state or territory

Firms take different organisational and legal operating forms.

Some firms are run on a part-time basis, sometimes from home; others operate from multiple offices and production sites in Queensland, interstate and overseas. Some firms have a comparatively low or declining revenue, turnover or profit margin; others are in a period of growth. Some have existed for many years; others are new.

These differences are seen by small business more generally.

Given their nature and typical characteristics, Queensland’s small manufacturing firms may ‘feel the burden of regulation’ more strongly than larger firms. For example, small firms might have relatively limited resources and specialist management functions to respond to regulation (or changes to regulations) and can face particular challenges in understanding and fulfilling compliance obligations. The CCIQ said:

Regulatory compliance burdens tend to be felt more severely by small businesses, as they often do not have the resources to undertake the breadth of compliance requirements compared to larger enterprises. (sub. 6, p. 16)

In addition, to the extent that many of the compliance costs are ‘fixed’ (in that they do not vary with output)59 compliance exerts a disproportionately large burden on small firms. This is because it costs more for small businesses to fulfil their regulatory obligations (per unit) compared to larger businesses, with compliance costs absorbed less readily within their smaller revenue base.

That said, good regulation will be designed and implemented to address a policy problem in a least cost way, regardless of the size of the firm. This includes carefully considering ways to reduce the compliance cost burden on all firms, including small firms.

59 These can include implementation costs, such as when regulatory requirements are newly introduced or updated relating to new or updated plant or other physical infrastructure, IT systems and software, business restructuring, staff training and, in some cases, payment for external services to facilitate compliance (PC 2013, p. 74).
8.4 Opportunities to reduce the regulatory burden on the manufacturing sector

The Commission has been asked to identify changes to the regulatory framework that would reduce the regulatory burden on Queensland’s manufacturing sector.

It has considered this issue in the following context:

- The regulatory framework that applies to the manufacturing sector is broad, with some regulations applying generally to manufacturers and other businesses and others applying only to particular parts of the sector.
- The stock of regulation in Queensland is large, with the Queensland Competition Authority estimating that Queensland had 50,443 pages of Acts and 21,993 pages of subordinate legislation in 2012 (QCA 2012, p. 35).
- The Queensland Government is committed to addressing red tape and creating a balanced regulatory environment for Queensland businesses across all sectors of the economy, and has:
  - established the RTRAC (now the Better Regulation Taskforce subcommittee of the QSBAC) to inform the development of policy options to reduce the regulatory burden faced by Queensland small business owners
  - begun implementing its response to the first RTRAC report (and has committed to provide a detailed report, on a six-monthly basis, outlining the actions taken)
  - directed the independent Office of Best Practice Regulation (now part of the Commission) to assist agencies in applying effective and rigorous regulatory impact analysis as part of standard policy development processes
  - required that regulatory processes be consistent with the Council of Australian Governments (COAG) Best Practice Principles for Regulation Making (Box 8.3)
  - released *The Queensland Government Guide to Better Regulation*, as an administrative policy approved by the Treasurer, to assist agencies in developing regulation.

**Box 8.3 COAG Best Practice Principles for Regulation Making**

- Establishing a case for action before addressing a problem.
- Considering a range of feasible policy options including self-regulatory, co-regulatory and non-regulatory approaches, and an assessment of their benefits and costs.
- Adopting the option that generates the greatest net benefit for the community.
- Ensuring, in accordance with the Competition Principles Agreement, legislation should not restrict competition unless it can be demonstrated that:
  - the benefits of the restrictions to the community as a whole outweigh the costs; and
  - the objectives of the regulation can only be achieved by restricting competition.
- Providing effective guidance to relevant regulators and regulated parties in order to ensure that the policy intent and expected compliance requirements of the regulation are clear.
- Ensuring that regulation remains relevant and effective over time.
- Consulting effectively with affected stakeholders at all stages of the regulatory cycle.
- Ensuring that government action is effective and proportional to the issue being addressed.

*Source: COAG 2007*
This inquiry has nevertheless identified deficiencies (see section 8.2) that, taken together, imply that the regulatory system, as it relates to the manufacturing sector, is operating below its potential. The CCIQ said:

\[ \text{Government must focus on reining in business operating costs for manufacturers and burdensome regulatory requirements that inhibit growth and investment. (sub. 6, p. 15)} \]

These deficiencies do not appear to be systematically different to those experienced by other firms or in other industries. Accordingly, the Commission considers that opportunities to reduce the regulatory burden on the manufacturing sector are best considered as part of broader regulatory reform.

As noted above, improving outcomes requires governments to actively manage the flow and stock of regulation to better meet government objectives with minimal regulatory burden—and ensure regulators administer and enforce regulation effectively and efficiently.

Efforts to strengthen regulatory impact analysis go some way in improving the ‘flow’ of regulation by ensuring new regulations are justified and well-designed (going some way to protect against kneejerk or reactive responses). However, there is more limited review of the effect of the existing ‘stock’ of Queensland regulation on Queensland firms and workers, including in the manufacturing sector. The risk is that ineffective and unnecessary regulation may be continuing to be applied to the manufacturing sector (and elsewhere)—reducing flexibility, innovation, competitiveness and productivity, and imposing unnecessary compliance costs.

**Evaluation and review**

The Commission supports the ongoing efforts of departments, agencies and regulators to monitor and evaluate the impact of regulations on businesses and communities, and identify and respond to emerging issues for improved regulatory practices. In Queensland:

- Section 54 of the [Statutory Instruments Act 1992](#) requires that all subordinate legislation expire after 10 years, unless extended. This means agencies wanting to ‘remake’ regulation must demonstrate its continuing relevance, effectiveness and efficiency.
- Acts can require the government to undertake a review of legislation to evaluate whether it is effective and improvements are required (although there is no consistent approach to the expiry of primary legislation, like there is with subordinate legislation).
- Agencies, sometimes at the instruction of government, can determine that particular regulatory frameworks should be reviewed to ensure they remain current and fit for purpose.
- A Post Implementation Review to assess the impacts, effectiveness and continued relevance of a new regulation may be required where a regulatory proposal has been exempted from completing a Regulatory Impact Statement.

Formal large-scale reviews have been undertaken at the state and national level. More recent reviews have included: trading hours in Queensland (Trading Hours Review Reference Group 2016); taxis and personalised transport in Queensland (OPT Review Taskforce 2016); and Australian Agriculture (PC 2016c).

Other options to improve regulatory outcomes include: benchmarking studies, and agency rules and administrative arrangements (Box 8.4), although the usefulness of these approaches depends on their ability to alter the underlying causes of the regulatory burden.

**A way forward**

There are no easy answers to address the regulatory burden on Queensland’s manufacturing sector. Regulation that delivers high quality outcomes with minimum burden requires governments to ensure regulations are justified and well designed. This is important for any new regulations. However, there also needs to be a focus on the stock of existing regulation.

---

61 Benchmarking studies compare regulation in different areas, in order to identify leading practices. Often the best comparators will be found in other jurisdictions, which means that state governments are unlikely to make extensive use of this approach.
There is an opportunity to look more closely at the current stock of regulation that applies to particular subsectors of the manufacturing industry, to ensure the regulatory framework is ‘fit for purpose’—identifying priority areas where regulation needs to be improved, consolidated or removed in order to raise productivity. This stocktake could usefully identify:

- regulatory ‘hotspots’ — regulations that impose an unnecessary burden on manufacturers, with a focus on those that have a material impact on competitiveness and productivity
- circumstances where a lack of connectedness between regulations and regulators has resulted in duplication, inconsistency and unnecessary complexity
- the cumulative burden from multiple overlapping regulators or duplication when regulators do not coordinate (or consolidate) information collection, reporting or audit requirements
- options to improve outcomes and address issues identified.

Box 8.4 Agency rules and administrative arrangements to improve regulatory outcomes

- In New Zealand, the Cabinet has set out its expectation that departments will keep the regulatory regimes for which they are responsible up to date. The New Zealand Productivity Commission has suggested that to make this work more effectively: departments should be required to publish their regulation review strategies and to publish their review reports; the Treasury should articulate principles that would help departments to focus reviews where they have the largest anticipated benefits; there should be preliminary assessments to identify areas requiring attention; there should be targets that require departments to identify reviews expected to yield the largest benefits (NZPC 2014, pp. 392–3).
- Departmental performance in managing the stock of regulation could be linked to chief executive performance agreements.
- The government could provide more information about the stock of legislation and regulation, including historical data on the number of legislative instruments, and the number that have been reviewed, repealed or amended in each year. This would give some indication—albeit only a crude one—of how the burden of regulation is changing.
- Regulators could be required to review their own performance. Many Queensland agencies already report on their performance (focusing on enforcement, administration and engagement with stakeholders) to work out what is working well and what can be improved. There could be a perceived conflict of interest if regulators are asked to review whether regulations they administer are required.
- The amount of regulation could be controlled through ‘one in one out’ rules or red tape reduction targets. While such rules can be used to galvanise action, their main limitation is that they do not take into account the benefits of regulation.
- The period for sunsetting reviews of subordinate regulation could be reduced below 10 years.

The stocktake will provide a better understanding of both the broad reach and economic impact of key regulations as well as the cumulative impact of scores of individual regulatory requirements. This information could feed into broader programs of regulatory reform that seek to explain observed outcomes and understand the logic of government involvement to suggest opportunities for improvement. Case studies at a more detailed level could support analysis.

This will supplement the role of sunsetting reviews. These reviews are important, but:

- their timing is driven by an imposed cycle—rather than by when there is evidence of regulations that are not working or are imposing an unnecessary burden
- their effectiveness can be limited if the data required for evaluation has not been collected over the life of the regulation.

Sunsetting reviews are also focused on a particular piece of subordinate legislation, and so tend not to address the linkages between different regulations (such as overlapping coverage and duplicated reporting
requirements), or the cumulative impact of different regulations, which were identified as key concerns for Queensland’s manufacturers. They also do not tend to consider whether other approaches might deliver better outcomes.

Which subsectors?
Given the diversity of Queensland’s manufacturing sector, sharpening the focus to key subsectors across key production types (food, metals, coal and petroleum, machinery and equipment, chemicals) will assist in prioritising efforts to obtain meaningful information about existing regulatory burdens and the extent to which the regulations are achieving their intended outcomes. It can be a useful way to pilot this approach to confirm its effectiveness.

In its final report, the Commission intends to provide the Queensland Government with a priority list of key manufacturing subsectors and timeframes for action. The Commission is seeking stakeholders’ views on which subsectors they consider should be given priority.

The focus is on identifying those subsectors with the greatest potential opportunity for reform (QCA 2013, pp. 111–112) not simply ‘counting’ the number of regulatory restrictions or obligations (Figure 8.3). In addition, it will be useful to identify whether the burden comes from general regulations or sector-specific regulations, and whether particularly burdensome regulations are at the state, national or local level.

**Figure 8.3 A framework to identify priorities for further investigation**

<table>
<thead>
<tr>
<th>Sector Specific Acts &amp; Regulations</th>
<th>Regulation that is clearly unnecessarily burdensome, complex, redundant or of questionable benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Acts &amp; Regulations</td>
<td>Regulation with significant ‘reach’ between business and the community and government agencies</td>
</tr>
<tr>
<td>Number of Regulators</td>
<td>Areas where there are potentially large benefits from reform (for manufacturers or for the broader community)</td>
</tr>
<tr>
<td>Other recent reviews</td>
<td>Areas where the need for reform is well understood and changes are likely to receive community acceptance</td>
</tr>
<tr>
<td>Size of subsector</td>
<td>Greatest opportunity to reform</td>
</tr>
</tbody>
</table>

Which approach?
The Commission considers that success is most likely, where the stocktake:

- builds on existing evaluation and review, but is undertaken independently of existing programs. This has the advantage of stepping away from possible conflicts of interest or loss of objectivity and potentially taking a broader perspective where regulations cut across several departments or levels of government.
- is undertaken by an agency that is familiar with Queensland’s existing regulatory frameworks, good regulatory practice and regulatory review (including cost-benefit analysis)
- is genuine, rather than compliance-based—which requires ‘buy in’ from government, industry and the community, to develop a strong evidence base
- provides its outcomes in a timely and transparent way—so that those affected can see the analysis undertaken and continue to contribute to ongoing reform. It also provides a level of accountability for government, departments and agencies to ‘follow through’ and implement meaningful change.
Draft recommendation 7

The Queensland Government should commission an independent stocktake of the regulations that affect key subsectors of the manufacturing industry and complete it as soon as possible.

The stocktake should identify priority areas for reform that will contribute to improved productivity for Queensland manufacturers as well as the wider Queensland economy. This includes areas where there is the most scope to:

- reduce unnecessary regulatory burden and pursue regulatory objectives in more efficient (least cost) ways
- better coordinate action across (Australian, state, local) governments to reduce unnecessary overlaps.

Seeking further views

The Commission is seeking stakeholders’ evidence and views to identify regulations that could be reformed and which subsectors could be given priority in undertaking a stocktake of the regulations, having regard to the greatest potential opportunity for gains.

Which regulations are unnecessarily burdensome, complex, redundant or of questionable benefit? Where will reform provide the greatest benefits (for manufacturers or the broader community)?
9.0 Structural adjustment
As markets evolve, the relative size and characteristics of industry change. In response, businesses, workers and communities must adapt and reposition themselves. During the adjustment period, there may be costs to various parties and regions of the economy.

The role of government in providing adjustment assistance remains a contentious issue.

This chapter discusses the drivers and impacts of structural change, and the characteristics of past and present assistance measures. It also identifies likely future impacts on the manufacturing sector and potential policy challenges confronting government.

**Key points**

1. The forces driving structural change are diverse. They include globalisation, technology, economic shocks, consumer preferences, demographic factors and domestic government policy.

2. The majority of structural adjustment assistance is provided by the Australian Government. The Queensland Government has supported these initiatives and, where such initiatives are absent, has generally relied on the provision of labour market assistance to affected workers.

3. In Queensland, high energy prices and new technologies are likely to drive structural change in the manufacturing sector.

4. Adjustment assistance may play an important role in facilitating change and easing the adverse transitional impacts of adjustment. Such assistance needs to be justified, well-targeted and facilitate rather than impede change.

5. Structural change may require workers to relocate to obtain alternative employment. Labour mobility for manufacturing workers is lower than for workers in other sectors.
9.1 Structural change

9.1.1 What is structural change?

Structural change involves relatively large and long-lasting transformations in the composition of production in the economy. It reflects the aggregate responses of individuals and firms to changes in relative prices which, in turn, affects the allocation of resources among firms, industries and geographic areas.

Structural change is an ongoing characteristic of economic development. As the patterns of production and consumption change, resources are allocated to more profitable uses. In the process, new firms and industries emerge while others decline or disappear.

Structural change occurs:

- within firms, as they respond to changes in the relative price of inputs, and implement new production processes through the adoption of new technology and management practices
- within industries, as competitive pressures favour one firm over another
- across sectors of the economy as domestic or global consumption patterns change, or industries lose their comparative advantage (Downes & Stoeckel 2006, p. 12).

The process through which the economy transitions is referred to as structural adjustment. It relates to the period in which the factors of production—land, labour and capital—move between activities in search of higher returns. Depending upon the source of change, and the way individuals and firms respond, structural adjustment can occur gradually or relatively quickly.

9.1.2 Drivers of structural change

The factors that drive structural change are diverse.

As discussed in Chapter 3, globalisation and the increasing connectivity of economies, have had a large impact on developed countries around the world. The emergence of China and other East Asian nations as major producers of goods has resulted in a proliferation of low cost imports, increasing the competitive pressures on domestic producers. These pressures have been reinforced by government policies of market liberalisation.

Domestic and international economic shocks can also generate structural change. The extent of change depends upon the nature of the shock, including its duration and severity. The recent mining boom in Australia led to a large appreciation of the currency, which weighed heavily on trade-exposed sectors of the economy, including manufacturing and agriculture. It also diverted labour and capital from non-mining industries, forcing many firms to raise wages in an effort to retain workers.

Advances in technology, particularly in relation to mechanisation, computerisation and telecommunications, have had significant impacts on domestic production and distribution processes. In particular, the wider application of robotics in industry has increased the range of functions that can be automated and resulted in the substitution of capital over labour.

In many developed economies, consumer preferences and demographic factors have produced structural shifts towards the services sector. In Australia, for example, as consumer incomes have risen over time, expenditure on leisure activities has increased more than proportionately. There has also been a growing demand for health care services, due in part to the country’s ageing population (Office of the Chief Economist 2014, p. 86).

In addition to market forces, domestic government policies bring about structural change. Examples in Australia include deregulation of the dairy industry and the reduction in subsidies to the automotive manufacturing sector. Broader government regulation and policies—such as energy policy—can also have financial impacts on businesses.
9.1.3 Benefits, transitional costs and distributional impacts

Overall, structural change normally brings benefits, with resources flowing to higher value uses. These benefits can be reflected in lower prices, improved quality and a greater choice of goods and services for individuals and businesses. For communities, structural change can create employment opportunities and enhance economic growth.

However, structural adjustment may bring significant disruption and economic and social costs. It can also have distributional impacts.

For employees, the loss of work will likely prompt them to seek alternative employment. If, given their particular skills and experience, there are no jobs available locally, some may relocate to find work elsewhere. Others may reskill to take advantage of employment opportunities offered by local firms in different industries. Those who do not (or cannot) relocate or retrain, face the prospect of long-term unemployment. This can lead to a deterioration in skills, making it even more difficult to find work in the future.

At the industry level, structural change reduces the number and size of individual firms, and often the nature of their business. In the process, labour and capital are diverted to alternative activities. If the economic forces are sufficiently strong, an affected industry may cease to exist.

Communities, particularly at the regional level, can be heavily impacted where they rely on an affected firm or industry for economic opportunities. In the absence of prospects for alternative employment, the population is likely to decline. This could impact on the delivery of public services and maintenance of infrastructure. Financial returns to surviving businesses, including those businesses providing services to the region, are also likely to diminish.

In addition to the economic impacts, structural change may also adversely affect the health and wellbeing of workers and their families, and the social cohesion of the community.

It should be noted that, while job losses associated with industry closure come at significant cost to individuals and the community, they need to be placed in the context of employment opportunities elsewhere. In 2016, almost half of the state’s 154,000 unemployed workers moved out of unemployment each month (Queensland Treasury 2017a, p. 4). Moreover, since 2000, the total number of employed workers in Queensland has grown by over 40,000 per year on average (ABS 2017d).

9.2 Structural adjustment assistance

In the past, government intervention has occurred where these impacts have been a direct consequence of policy reforms. However, governments have also provided assistance where structural change has been brought on by market forces—particularly where the transition period is protracted or where the burden of adjustment falls upon a particular region or industry.

Aither (2014, pp. 26–7) notes that the key objectives of government intervention include:

- overcoming distributional or equity impacts
- facilitating and incentivising adjustment to more quickly and efficiently realise economic benefits
- complying with legislative obligations that compel the payment of compensation in the event that policy change results in an economic loss for particular stakeholders, such as a loss of property rights
- buying off opposition to reform to make adjustment more politically acceptable
- avoiding adjustment altogether in the expectation that the forces driving change are temporary and do not reflect longer-term economic fundamentals.
9.2.1 Scale of assistance

In a comprehensive study of structural adjustment assistance in Australia between 2000 and 2012, Beer (2015, pp. 23–24) observed that assistance programs:

...constitute a large, and relatively costly, part of the Australian government’s engagement with industry and communities.

Key findings of this study included:

• There were 135 structural adjustment programs implemented between 2000 and 2012, with costs generally ranging in size from $5 million to $500 million.
• The total value of commitments was in excess of $88 billion, with most of the assistance provided by the Australian Government.
• While a diverse range of industries received assistance, some were in receipt of repeat adjustment packages.

Often, adjustment programs have yielded short-term support, but made adjustment more difficult later, requiring additional assistance to be provided. The Australian car industry is a good example.

Beer (2015, p.24) noted an observation by the Productivity Commission that, across the nation, the manufacturing industry has been the recipient of the greatest level of assistance.

Box 9.1 highlights many of the more comprehensive structural adjustment programs provided to the sector since 2000. Most of these measures have been funded by the Australian Government.

**Box 9.1 Manufacturing Structural Adjustment Packages since 2000**

- Textile Clothing and Footwear Structural Adjustment Package
- Textile Clothing and Footwear Strategic Investment Program Scheme
- Textile Clothing and Footwear Post-2005 Strategic Investment Program Scheme
- Automotive Industry Structural Adjustment Program
- Automotive Competitiveness and Investment Scheme
- Structural Adjustment Fund for South Australia
- South Australia Innovation and Investment Fund
- Innovation and Investment Fund for South Australia
- Geelong Investment and Innovation Fund
- Automotive Transformation Scheme
- Automotive New Markets Program
- Australian Paper’s Maryvale Pulp and Paper Mill
- Clothing and Household Textile Building Innovation Capability Scheme
- Textile, Clothing and Footwear Strategic Capability Program
- Textile, Clothing and Footwear Small Business Program
- Automotive Diversification Program
- Bluescope Steel Structural Adjustment Program
- Arrium Structural Adjustment Program
- Queensland Nickel Structural Adjustment Program

Source: Beer 2014.

In many of these examples, the Australian Government established a structural adjustment fund, with the purpose of supporting retrenched employees and promoting diversification in affected regions. Rather than create specific new policies, it augmented existing schemes, such as training programs and other forms of labour market assistance, and tailored them to the specific needs of affected workers (PC 2014a, p. 225).
9.3 Queensland Government support measures

Since 2000, several Queensland Government programs have been in place to:

- assist employees in finding alternative work
- restructure industry
- facilitate investment and provide broad economic opportunities in affected regions.

The Queensland Government also has a range of general employment programs (see Chapter 4).

9.3.1 Labour market assistance

For around a decade, the Queensland Government’s Worker Assistance Program (WAP) was its leading program to assist workers impacted by business closure.

WAP was established in 1999, as part of the government’s Breaking the Unemployment Cycle budget initiative. It was an early intervention program to prevent workers who lost their jobs in large-scale retrenchments from becoming long-term unemployed. The key objective of WAP was to help workers who needed to increase or diversify their skills to secure another job.

WAP was available for rural and regional communities where 15 or more people were retrenched from an enterprise and, in larger cities, where 50 or more people were laid off (Braddy 1999).

Under the program, retrenched workers could receive financial assistance of up to $5,000 for training, job preparation, wage subsidy and relocation (Foley 2002a). An example of WAP and its support for affected workers is given in Box 9.2 below.

**Box 9.2 Lakes Creek Meatworks**

The Lakes Creek abattoir, established in 1871, was for many years the largest employer in Rockhampton. At its peak, the facility employed around 2,000 out of a local population of around 50,000. In 2001, it was the second biggest meat works in Australia, and provided work for 1,350 people. It was estimated to contribute $20 million in wages and $5 million in related goods and services annually to the local economy.

Following a long dispute over remuneration and conditions, the facility’s owner reduced the workforce in May 2002. It subsequently closed the abattoir entirely in September 2002, citing financial reasons.

As part of the Queensland Government’s WAP, retrenched meatworkers were offered up to $2,000 in job preparation and training assistance. A specialist job provider was contracted to provide this individual career transition support. In addition, local support was provided by:

- Capricorn Training, which offered the use of their training facilities
- the Community Informatics Project, an initiative of Rockhampton City Council and Central Queensland University, which provided basic computer and internet training.

This assistance for affected workers was subsequently widened to include about 20 permanent employees of Tempo Cleaning Services, who were contracted to the meatworks.

For those workers able to secure employment at other abattoirs in Queensland, the $2,000 WAP funding was available to use for relocation expenses.

Sources: Barton 2002a; Barton 2002b; Foley 2002b; Webster 2004.

In a review of Breaking the Unemployment Cycle, the Department of Employment and Training (2002, p. 45) found that, in the three years to 2002, WAP assisted 3,029 workers through 33 interventions, at a cost of $2.41 million. There is no publicly available data that examines the cost and levels of assistance across the entire life of the program.
The review foreshadowed modifications to the program to encourage more active participation and boost employment outcomes. These included:

...a greater focus on participants developing return to work plans, providing training that more clearly articulates with these plans and a more focused period during which participants can receive assistance (six months as opposed to twelve months). (DET 2002, p. 46)

WAP was considered to have limited overlap with employment services offered by the Australian Government, given its early intervention focus.

During the global financial crisis, WAP was the main program providing assistance to displaced workers. In 2008, the government increased the annual provision for the program from $5 million to $10 million (Queensland Treasury 2008, p. 33).

This program is no longer offered by the Queensland Government.

In providing assistance for affected workers, the Queensland Government now works closely with the Australian Government to secure priority access to tailored employment services, offering amongst other things:

• help with job application preparation, interview skills and presentation techniques
• referrals to jobs in the local area and help with relocating for work
• targeted training that is suited to the skills that local employers need
• opportunities to connect to a range of other government initiatives, including the New Enterprise Incentive Scheme, which provides advice on starting a business.

The Queensland Nickel Structural Adjustment Program, outlined in Box 9.3, is a recent example of this type of assistance program.

### Box 9.3 Queensland Nickel Structural Adjustment Program

On 20 January 2016, the Australian Government announced a $500,000 adjustment program for Queensland Nickel employees who had lost their jobs.

Under the Queensland Nickel Structural Adjustment Programme (QNSAP), retrenched workers were eligible for immediate access to Stream B assistance through jobactive, the national employment services network. Eligible workers also received a $2,000 credit for use by a jobactive provider for work-related items, post-placement support, professional services, targeted training and licences.

Stream B assistance provides workers with case management support and requires job service providers to play a more prominent role in preparing jobseekers for alternative employment.

Subsequently, the Australian Government, on 10 March 2016, announced a further $1.9 million to assist retrenched workers and affected downstream suppliers.

At the same time (but separate to QNSAP) the Queensland Government, working in conjunction with the Australian Departments of Employment and Human Services, mobilised a Rapid Response Team to connect workers with services, including:

• access to financial assistance
• information and support for job seekers
• training and career information
• support for supply chain businesses
• referral to advice on debt and bills
• access to mental health services.

9.3.2 Industry restructuring assistance

Industry restructuring programs are designed to make industries as a whole more sustainable in light of prevailing economic conditions. They tend to be more common in primary industries, particularly agriculture, forestry and fisheries, which have been challenged by global market forces or other environmental factors.

In general, they involve assistance measures to:

- improve the efficiency of producers so that they can adjust to lower market returns
- encourage unviable enterprises to exit the industry, or diversify into other activities.

A recent example of an industry restructuring program in Queensland is the *East Coast Commercial Net Fishing Reduction Scheme*, highlighted in Box 9.4 below.

**Box 9.4 East Coast Commercial Net Fishing Reduction Scheme**

In 2012, the Queensland Government committed $9 million to buy back commercial fishing licences along the eastern seaboard of Queensland. The aim of the buyback was to:

- reduce the commercial fishing pressure on resources
- reduce the impact of inshore netting on protected species
- improve economic conditions for commercial fishermen.

Between 2012 and 2014, the Queensland Government ran three buy-back schemes, comprising voluntary competitive tenders, and fixed price and capped offers. In total, the scheme yielded 74 commercial fishing vessel licence packages, representing a 31.9 per cent reduction in large mesh netting authorities on the east coast of Queensland.

*Source: DAF 2015.*

9.3.3 Regional assistance programs

Regional assistance programs aim to attract new investment to regions and cushion any adverse impact of structural change. They encourage the entry of new businesses and the expansion of existing firms by improving infrastructure and programs.

In Queensland, the most recent example of a regional assistance program is the *North Stradbroke Island Economic Transition Strategy*, which was developed in response to a major government policy decision to cease sand mining on the island (see Box 9.5).
Box 9.5 North Stradbroke Island Economic Transition Strategy

Mineral sands have been mined on North Stradbroke Island (NSI) since 1949. In May 2016, the Queensland Government legislated to phase out sand mining by 2019. A report by Deloitte Access Economics, commissioned by the government, previously found that closure of the industry would result in an annual direct job loss of 95 mining workers and an annual loss of direct economic activity on NSI of between $55 million and $86 million.

To support the NSI’s economic transition, the Queensland Government developed the North Stradbroke Island Economic Transition Strategy (NSIETS). The five-year strategy provides over $20 million in initiatives designed to diversify and expand the current tourism industry, expand education and training opportunities, stimulate local business development and growth. Through this funding allocation and the initiatives proposed, it is seeking to facilitate co-investment with private sector stakeholders.

In addition to these measures, the Queensland Government allocated a further $5 million for the North Stradbroke Island Workers Assistance Scheme to assist affected workers to transition to alternative employment. The elements of the scheme include:

- job search support (up to $2,000 per worker)
- training and skills support (up to $2,000 per worker, as well as compensation for up to four weeks leave to undertake training while employed by the mining company, Sibelco)
- housing assistance and commuting subsidy (mortgage or rent assistance up to $5,000, commuting subsidy up to $5,000 per worker who continue to reside on NSI)
- income supplementation for permanent workers who did not receive a redundancy and continue to reside on NSI
- dislocation assistance (varies based on length of eligible service)
- up to $4,000 per worker to eligible employers who engage an affected worker in permanent employment continuously for six months or more.

Sources: DSD 2016e; Queensland Treasury 2016b; Finance and Administration Committee 2016.

Draft finding 9.1

The majority of structural adjustment assistance is provided by the Australian Government. The Queensland Government has supported these Commonwealth initiatives and, in their absence, generally relied on the provision of labour market assistance to affected workers.
9.4 Future Queensland Government intervention

9.4.1 Manufacturing and the nature of future structural change

The diversity of Queensland’s manufacturing sector, and the absence of major industries supported by high trade barriers, has limited the effects of the structural shocks and forces for structural change which have impacted on the sector in other parts of the country.

It is difficult to forecast with any degree of certainty the potential nature and extent of future structural change in Queensland’s manufacturing sector. Nonetheless, it is likely that:

- technology, such as advanced manufacturing, will have an impact on established firms, in terms of the level of capital investment, the manner in which they produce, the amount of labour they employ and their ability to compete with domestic and international rivals
- higher electricity and gas prices will erode the commercial sustainability of energy-intensive industries. Energy prices are discussed further in Chapter 10.

9.4.2 Principles for future assistance measures

The Productivity Commission (2012, p. 24) observed that, in the past, the effectiveness of structural adjustment policies in retaining or creating employment has generally been limited, with regions receiving assistance not appearing to adjust better to structural change than their unassisted counterparts.

In general, this is consistent with the findings of Daley and Lancy (2011, p. 26) who also identified that structural adjustment programs:

- had a high cost per job created
- did not significantly affect overall long-term employment trends in the assisted regions.

As a result, adjustment assistance is typically best provided through the general welfare system. The Productivity Commission (2001, p. x) observed that:

> ...the social security and tax systems ... will usually be the most appropriate vehicles for assisting the adjustment process and moderating adverse distributional impacts.

These mechanisms provide assistance effectively and efficiently, and directly target those in need without unduly introducing inefficiencies in the market. They meet a simple equity objective in responding to structural adjustment.

However, the Productivity Commission (2001, p. x) also accepted that the general welfare system is not designed to handle all contingencies and that selective support may be appropriate, depending upon the circumstances.

In particular, more specific support measures may be warranted where adjustment costs are significant, concentrated and systematically different to those experienced by other firms or workers adjusting to change.

Accordingly, depending on the circumstances, there may be a role for the Queensland Government in providing assistance to facilitate community adjustment and recovery.

In circumstances where a case for government support is identified, the Queensland Government should be guided by clear policy principles, set out in Box 9.6 below, to ensure that assistance is suitably targeted and the measures effective.
Box 9.6 Structural adjustment principles

**Clear objectives:** the basis for any government intervention and the underlying policy objectives of any assistance package should be clear.

**Focus on individuals and the community:** assistance should be targeted at individuals and the community, rather than businesses. Affected employees generally find it difficult to diversify risk and are often poorly informed about risks when making employment decisions. Providing assistance directly to workers is less likely to impede efficiency-enhancing industry change.

**Facilitation of adjustment:** government assistance should facilitate adjustment and not be distortionary. It should not impede industry adjustment to market conditions.

**Jurisdictional coordination:** where relevant, there should be coordination between the Australian, Queensland and Local Governments in the content and delivery of adjustment assistance programs.

**Time limit:** the time period over which assistance is provided should be limited. Without this limitation, any incentive for innovation and efficiency-enhancing change is impaired.

**Cost:** the level of assistance should have regard to the costs to be met by government and the wider community.

**Transparency:** assistance measures should be delivered in a transparent manner.

**Evaluation:** assistance programs should be subject to regular assessment to determine that they are having their intended impact.

Sources: QCA 2015a; OECD 2005a.

Draft finding 9.2

Adjustment assistance may be required to facilitate change and ease the adverse transitional impacts of adjustment. However, this assistance needs to be justified, well-targeted and facilitate, rather than impede, change.

9.4.3 Policy challenges

In providing adjustment assistance to the manufacturing sector, the Queensland Government is likely to encounter a number of potential challenges in the design of an appropriate policy response.

First, there appears to have been only limited monitoring and evaluation of the effectiveness of previous assistance measures. As a result, policy-makers may have little guidance as to the relative merits of different forms of assistance and the manner in which they are best delivered. This underlines the importance of future assistance programs being monitored and reviewed so that policy-makers can learn the lessons of past decisions.

The government should establish a longitudinal study of retrenched workers when assistance is provided to identify which programs have best led to permanent re-employment.

Second, there is potentially a timing problem in the provision of assistance for displaced workers. Often, affected employees are not able to access support measures and benefits until a firm has closed and they have been formally provided notification of retrenchment.

This delays the time until a worker is able to commence training or reskilling programs and, in turn, extends the period in which they could be without alternative work.
It is in the best interests of employees that, where necessary, they are engaged in training programs as soon as practicable—even prior to them losing their job. This would assist in making them ‘job-ready’ as soon as possible and smoothing the transition to alternative employment.

The Australian Manufacturing Workers’ Union (sub. 9, p. 4) proposed that:

…it is in the best interests of employees that, where necessary, they are engaged in training programs as soon as practicable— even prior to them losing their job.

Outside planned firm closures, a greater emphasis on lifelong learning and ongoing skill development through a robust and effective education and training system is important (see Chapter 6).

Third, manufacturing workers may face substantial barriers to re-employment, which will be exacerbated by barriers to labour mobility.

Geographic labour mobility is an important mechanism in adapting to labour market shocks associated with structural change.

Labour mobility improves community wellbeing by enabling workers to move to locations where they are more productive and highly valued. This can increase employment and incomes across the state. However, where mobility is low, regional labour markets can be adversely impacted, unemployment is likely to be high, and there could be greater inequality in income and social conditions.

The Office of the Chief Economist (2014, p. 116) highlighted the low levels of geographic labour mobility among manufacturing workers, compared with workers from other sectors. It observed that this:

...may inhibit structural change and, to some extent, explain why the decline in manufacturing has had a negative impact on regional labour markets.

Often labour immobility is driven by personal and lifestyle factors, such as a reluctance to leave family members, friends and the community. However, the Productivity Commission (2014a, pp. 169–190) found that relocation costs, housing affordability, working conditions and other administrative barriers may also play a part.

The Commission considers that the Queensland Government should remove state-based barriers to geographic labour mobility. In particular:

• improving land-use planning processes to expedite the release of land for residential development that would otherwise limit the supply of housing
• removing unnecessary occupational and/or business licensing, whilst ensuring the regulation that remains is the minimum necessary to achieve consumer protection, safety or environmental objectives
• reforming stamp duty to reduce the additional costs on property transfers.

Finally, adjustment is likely to be most difficult for older, lower-skilled manufacturing workers. Callan and Bowman (2015, p. 11) highlight the problems facing older workers with limited or non-transferable skills in finding a new job following retrenchment:

The probability of being re-employed is much lower for older lower-skilled displaced workers... More skilled and highly qualified workers typically have skills that are transferable to other sectors and they gain new jobs relatively easily. However, substantial challenges are faced by employees in industries where large proportions of the workforce are older, with lower skills, no formal qualification and associated lower literacy and numeracy skills.

This has implications for their continued participation in the labour market. In their review of mature-age unemployment in Australia, Spoehr, Barnett and Parnis (2009, p. 5) observed that:

...many older workers who become unemployed do not intentionally retire but find this happens by default when they fail to find employment.

Accordingly, the government should target this cohort of affected workers as soon as practicable once retrenched to ensure that they have the best possible chance of securing meaningful employment.
Where training is provided, it should target the needs of older workers and focus on developing specific skills that directly relate to the current and emerging needs of firms, rather than be more generic in nature.

There is also a case, however, to shift beyond the conventional policy approach of retraining—particularly given limited evidence of effectiveness—towards new pathways for older, lower-skilled workers, be it to alternative employment, other forms of work or semi-/permanent retirement.

The Commission understands that the Australian Manufacturing Workers’ Union is working with its members to identify additional pathways for future employment of workers in the sector, including older employees with more traditional manufacturing skills.

Draft recommendation 10
The Queensland Government should:

- where appropriate, provide early training assistance where there are planned firm closures
- remove barriers to labour mobility across regions in Queensland, particularly in relation to housing, occupational/business licensing and stamp duty
- go beyond retraining programs and adopt practical alternatives for older, low-skilled manufacturing workers who are displaced.

Seeking further views
The Commission is seeking further views on potential measures for displaced older, low-skilled manufacturing workers.

Are there alternative options to retraining programs for older, low-skilled manufacturing workers? Are there examples where such programs have been successful? For some groups of workers, is there a case to shift beyond retraining and redeployment objectives to transition to other forms of work or retirement?
10.0 Framework policies
This chapter reviews and identifies opportunities to improve broader framework policies that affect manufacturers in Queensland.

Key points

1. Overall, the evidence presented to this inquiry suggests that economy-wide policies affect the sector more than sector-specific policies.

2. Rising electricity and gas prices are putting manufacturers (and other energy users) under pressure. In this environment, the government should avoid hasty policy or new regulatory changes that impede the efficiency of the national electricity market and place further pressure on energy prices.

3. The Queensland Government's gas action plan should:
   • reduce the costs and remove impediments to gas exploration and development
   • improve processes to resolve land-use conflicts arising from gas activities
   • increase transparency to improve market efficiency.

4. Procurement preferences to support local manufacturing, while superficially appealing, would likely come at a cost to other businesses and lower household incomes. The Queensland Government should reform its procurement policy, creating a single procurement policy with a single objective—value for money—and overhaul procurement processes to enable genuine participation by all firms, including Queensland businesses.

5. Trade facilitation services could be improved by addressing information barriers for all firms. In addition, gathering and publishing information about which government processes are most challenging for investors to ‘navigate’ could identify opportunities to simplify regulatory processes without undermining outcomes.

6. Financial incentives to attract investment are unlikely to provide a net benefit to the Queensland community. Where the government provides such incentives, it should report the size of the assistance; the number, names and size distribution of firms assisted; the reasons why assistance is provided; and the basis on which it is provided. The outcomes should be publicly evaluated and reported.

7. The government should reform the state tax system, placing less reliance on distortionary taxes and moving towards more efficient broader-based taxes. A shift to broad-based efficient taxes would allow those taxes to be set a lower rate (which is likely to benefit manufacturing overall) as well as providing for the removal of more distortionary taxes.
10.1 Introduction

A key finding from this inquiry is that policy measures have a significant impact on manufacturing sector performance. Manufacturers supported the view that economy-wide policies affect the sector even more than sector-specific ones.

This chapter examines some key framework policies. Sections 10.2, 10.3, 10.4 and 10.5 examine four policy areas that are particularly important to manufacturers:

- energy
- procurement
- investment facilitation and attraction
- state taxation.

Section 10.6 briefly outlines other issues that manufacturers raised, including workplace relations, section 457 skilled migration visas and planning and zoning regulation. The discussion is less detailed because:

- the government is introducing significant initiatives in planning and zoning regulation, the effects of which cannot yet be evaluated
- the Australian Government is responsible for most of the aspects of workplace relations policy that stakeholders raised.

10.2 Energy

Manufacturers stated that access to competitively priced and secure energy supply, together with policy certainty, would improve their international competitiveness and increase their willingness to invest. Submissions concentrated on electricity supply (see Box 10.1) but the Commission also heard concerns about rising gas prices.

Box 10.1 Stakeholder views on energy

CCIQ considered that:

Energy is the most significant input cost for Queensland manufacturing businesses. In a recent CCIQ survey, 65% of businesses cited electricity price rises as a major or critical concern. Manufacturers use a diverse range of energy sources and the ability to secure long-term supply is a key factor in their decision-making on whether to invest in, grow, or close their business operations entirely. Mostly, however, the provision of reliable and cost-effective electricity supply is vital to manufacturing businesses in Queensland continuing their operations (sub. 6, p. 18).

The Australian Sugar Milling Council noted that:

- the lack of certainty in energy policy has already significantly impacted on investment in renewable electricity by the sector
- poor tariff structures discourage demand management
- associated policies relating to biofuels are under-developed (sub. 5, pp. 3–4).

The Northern Iron and Brass Foundry found it difficult to remain viable with escalating electricity prices (sub. 1, p. 1).

Rio Tinto believed that Queensland’s ‘long history of industrial manufacturing of natural resources [is] underpinned by access to competitively priced energy, especially electricity. But this is now under serious threat’ (sub. 4, p. 1).
The head of the Australian Food and Grocery Council (AFGC), Ms Tanya Barden, has commented that, nationally, rising energy costs are having a ‘massive impact’ on the industry, and are ‘going to make a difference between some businesses staying and going offshore’. The AFGC represents food, drink and grocery manufacturers (Heffernan 2017).

10.2.1 Electricity

**Market pressures**

Queensland is part of the national electricity market (NEM). The pressures that manufacturers in Queensland are facing from rising electricity prices, and their concerns about reliability, can be sourced to developments in the NEM and in the surrounding policy framework. Similar concerns about affordability, security and reliability are being voiced across Australia.

The Australian Energy Regulator’s (AER) 2017 overview of the energy market suggests that the past 12-18 months have ‘been some of the most challenging since the ... NEM was established in 1998’ (2017b, p.8). Contributors to the tightening conditions in the electricity market include:

- rising peak grid demand for electricity, particularly in Queensland
- the retirement of several coal-fired generators, following an influx of wind and solar generation
- gas-powered generation often setting dispatch prices, and gas generators responding to higher fuel costs by bidding into the market at higher prices
- uncertainty about energy and climate change policies affecting investor confidence. Apart from renewables, private investment in new plant has stalled, while governments have announced plans to invest, or to explore investment, in gas, pumped hydro and energy storage (AER 2017b, pp. 6, 8).

These conditions have led to a tightening supply-demand balance across the NEM, and to projections by the Australian Energy Market Operator (AEMO) that, without any market response, there could be insufficient capacity to meet maximum demand in Victoria and South Australia by the summer of 2017-18. Wholesale electricity prices increased across the NEM in 2015-16 and continued to increase in the nine months to 31 March 2017, with the steepest increases occurring in South Australia, Queensland and New South Wales. The market has also been extremely volatile, for reasons that are complex and differ across regions. Futures prices indicate that wholesale prices in Queensland are expected to moderate from 2016-17 levels more than in other states, but remain above 2016 average spot prices (AER 2017b, pp. 51-58).

Concerns about the affordability, security and reliability of electricity supply have prompted reviews and policy responses that are outlined below.

**The Queensland Government’s role**

The Queensland Government has state and national policy responsibilities for electricity supply. It is a significant service provider through its shareholdings in Energy Queensland, Powerlink, CS Energy and Stanwell.

The government owns or controls 65 per cent of NEM-connected electricity generation in Queensland (through CS Energy and Stanwell) and the rest is privately owned. It owns 100 per cent of both electricity transmission (Powerlink Queensland) and distribution (Energy Queensland). Through Energy Queensland, it also provides retail electricity services to most regional Queensland customers.

Large electricity consumers have been able to choose their retailer since 1998 and residential and small business customers have done so since 2007, although competition has been largely restricted to south east Queensland, where retail electricity prices were deregulated on 1 July 2016. The Queensland Competition Authority (QCA) sets regulated retail tariffs for the rest of Queensland annually.

Many of the NEM's governance and regulatory arrangements are set nationally. However, the government regulates retail pricing for some consumers, network reliability settings, derogations from nationally harmonised laws (for example, consumer protections), planning requirements in relation to electricity infrastructure, and safety requirements for electrical work and equipment (QPC 2016a, pp. 45, 78-79).
In July 2017, the Queensland Government announced its Powering Queensland Plan (Box 10.2), which:

... sets out the Government’s strategy to guide the state through the short-term and long-term challenges occurring in the market. The plan aims to deliver stable energy prices, ensure long-term security of electricity supply, transition to a cleaner energy sector and create new investment and jobs. (DEWS 2017)

Box 10.2 The Queensland Government’s Powering Queensland Plan

The Powering Queensland Plan seeks to address the state’s current and future energy needs through the following series of initiatives:

• Provide electricity price relief by transferring to the Government $770 million to cover the cost of the Solar Bonus Scheme
• Return Swanbank E gas-fired power station to service, to support the market over the summer period
• Direct Stanwell Corporation to alter its bidding strategies to help put downward pressure on wholesale electricity prices
• Investigate the restructure of Government owned generators and the establishment of a ‘CleanCo’, to operate Queensland’s existing renewable and low emissions energy generation assets and develop new renewable energy projects
• Deliver a $386 million Powering North Queensland Plan to strengthen and diversify the north’s energy supply and create a North Queensland clean energy hub
• Confirm the Government’s commitment to a 50 per cent renewable energy target by 2030
• Facilitate up to 400 megawatts of diversified renewable energy, including 100 megawatts of energy storage through a reverse auction
• Improve large-scale renewable project facilitation, planning and network connections
• Establish the Queensland Energy Security Taskforce, to develop an energy security plan for the state
• Implement the Queensland Gas Action Plan and release over 450 square kilometres of new gas tenure for supply to the Australian market
• Continue to advocate for stable, integrated national climate and energy policies.

Source: DEWS 2017

Policy reviews

The electricity policy framework in Queensland and nationally is undergoing significant review and change.

Queensland Productivity Commission

At the state level, the Commission has reviewed solar feed-in pricing and electricity pricing in Queensland (QPC 2016a, 2016b).

The electricity pricing inquiry considered issues such as the competitive electricity market, productivity growth, efficiency and reliability, environmental outcomes, vulnerable customers and responsible management of Queensland’s finances. It identified the major drivers of recent price increases in Queensland were escalating network costs and the introduction of the Renewable Energy Target and the Solar Bonus Scheme. The Commission found there to be no simple fix to the problem of rising electricity prices. It made 52 recommendations including:

• the minimisation or deferral of future network capital expenditure through the pursuit of tariff and non-tariff demand management programs
• the removal of price regulation in south east Queensland’s retail electricity market
• the introduction of additional measures to assist vulnerable customers.

The Government accepted most recommendations (Queensland Government 2016e).
Finkel Review

The Independent Review of the Future Security, Reliability and Affordability of the National Electricity Market (Commonwealth of Australia 2017b) (the Finkel Review), was presented to the COAG Leaders’ meeting on 9 June 2017. The review focused on three areas: reliability (a reliable system has enough generation and network capacity to meet demand), security (a secure system continues to operate across the entire region despite disruptions), and governance (making sure the electricity market can run effectively). It made 50 recommendations, some of which are summarised in box 10.3 below.

Box 10.3 Key features of the Finkel Review

Reliability

- A Clean Energy Target would provide incentives to new low-emissions generators that produce electricity below a specified emissions intensity threshold.
- A Generator Reliability Obligation would require wind and solar generators in regions that have a high proportion of intermittent generation to provide backup for some of their supply, through new storage or contracts with new dispatchable generators such as gas.
- Large generators would need to provide three years notice before leaving the market, to ensure there is enough time for new generation to be installed.

Security

- Transmission companies would be required to provide and maintain a prescribed level of inertia in the system, to prevent rapid and damaging changes in frequency. Fossil fuel generators may be required to change their settings to control the frequency in the system.
- The Australian Energy Market Commission (AEMC) should report on rule changes to encourage distributed energy resource participation to provide services such as frequency and voltage control.
- A data collection framework should be developed to provide static and real-time data for all forms of distributed energy resources.
- The Finkel Review supports the development of ‘demand response’ schemes to give consumers incentives to switch off and help smooth the load at peak times.

Governance

- An Energy Security Board (ESB), made up of an independent chair and vice-chair, as well as the heads of the three governing bodies: the AEMC, AEMO and the AER, would have primary responsibility for energy security and reliability and would be responsible for implementing the review’s recommendations.
- COAG should agree to a new Australian Energy Market Agreement (AEMA), recommitting all parties to a nationally consistent approach to energy policy and requiring any party to notify the COAG Energy Council if they propose to take unilateral action that falls within the scope of the AEMA.

Source: Commonwealth of Australia 2017b; Blowers 2017a

The Australian Government announced soon after the review was published that it will:

- ask AEMO how to ensure that new continuous dispatchable power is provided, including what support is needed to promote new investment
- strengthen the Australian Energy Regulator by providing it with an additional $67.4 million
- progress, through the COAG Energy Council, the recommendations of the Finkel Review which focus on enhanced security, stability, transparency and governance of the energy system, and will continue further to consider and analyse the Clean Energy Target. (Turnbull et al. 2017)

At its meeting on 14 July 2017, the Council of Australian Governments Energy Council agreed on a timeline to implement 49 of the 50 recommendations, but did not support tasking the AEMC to develop design options for implementation of a Clean Energy Target. However, Queensland, Victoria, South Australia and the Australian Capital Territory will separately commission the AEMC to do further work in this area (COAGEC 2017).
Australian Energy Market Commission

Complementing the discussion of security in the Finkel Review, on 27 June 2017, the AEMC released the Final Report from its System Security Market Frameworks Review (AEMC 2017a). The Final Report recommends regulatory changes to strengthen system security as the NEM moves from being dominated by coal, gas and hydro to a system powered by renewable sources such as solar and wind. The AEMC’s recommendations are ‘in large part’ consistent with the Finkel Review’s proposals to improve security (AEMC 2017a, pp. vii–ix).

Key elements of the AEMC’s plan for improving system security are contained in Box 10.4 below.

AEMO will progress some of the Final Report’s recommendations through a review into market frameworks necessary to support better frequency control, while others will be pursued through foreshadowed changes to National Electricity Rules.

Box 10.4: AEMC’s proposed plan for power system security

The AEMC’s proposed plan for power system security:

• makes networks provide minimum levels of inertia where AEMO identifies shortfalls
• enables networks to contract with suppliers of inertia substitutes like fast frequency response services from emerging technologies like batteries, if AEMO agrees
• gives AEMO more tools to increase inertia and help keep frequency in required operating bands
• includes faster emergency frequency control schemes to strengthen the “last line of defence” to help stop system-wide black-outs
• makes networks responsible for maintaining a minimum level of system strength for each connected generator
• requires new connecting generators to pay for remedial action if they would cause minimum system strength for other generators to be breached
• foreshadows a new market-sourcing mechanism for inertia services and facilitates greater use of new technology like battery storage to back-up the system when something goes wrong.

Source: AEMC 2017b

Reviews of retail electricity

The Finkel Review and the AEMC report on power system security concentrate on generation and network issues.

The Australian Government has also directed the Australian Competition and Consumer Commission (ACCC) to inquire into the supply of retail electricity and the competitiveness of retail electricity prices. Its preliminary report is due in September 2017, with the final report required by the end of June 2018 (Morrison 2017).

The Victorian Government has also established a review of electricity and gas retail markets in Victoria (State of Victoria Department of Environment, Land, Water and Planning 2017).

Moving forward

Wood et al. (2017), from the Grattan Institute, argue that the NEM is at a ‘fork in the road’, with three possible futures:

• a competitive market, with clear expectations for both emissions reduction and reliability
• a fundamental restructure, with alternative market structures and policies (such as a capacity market)
• a centrally planned approach, with a government-led program of investment, planning and coordination (Wood et al. 2017, p. 27).
One view is that the Australian Government’s proposed approach to dispatchable power is part of a trend towards a central planning approach to the electricity market:

Efficiently, the government is asking AEMO to identify whether Australia has enough “baseload” generation and, if not, how the government should go about getting more. ... [T]he announcement follows a broader trend of increasing government involvement in the electricity market. Whether it is the Commonwealth with its proposed Snowy 2.0 scheme, South Australia’s plan to build a state-owned gas power station, or Queensland’s manipulation of wholesale prices, electricity is now government business. (Blowers 2017)

It is too early to tell whether governments have chosen to move away from a competitive electricity market and towards central planning. However, governments are responding to strong pressures for early action to improve system security, reliability and affordability, which could push them towards more direct involvement in the electricity market. For example, Wood et al. (2017, p. 9) identify four recent state and Australian government announcements that appear to involve significant government investment in generation and to commit governments to investments prior to cost-benefit analysis. They suggest that such measures:

... may further weaken the NEM and could lead to a spiral of government actions away from a reliance on market solutions and towards regulation and central planning and control (Wood et al. 2017, p. 10).

They consider that this approach has considerable risks. For example:

A government-led program of investment, planning and coordination is likely to lock-in existing technologies at the expense of better solutions that may emerge in future. Investment risks and costs would be transferred to consumers and would be heavily reliant on forecasts (that are never quite right and often quite wrong). Over-investment would lead to higher costs, while under-investment would lead to supply shortfalls. (Wood et al. 2017, p. 27)

While there are risks from rushed interventions, there are also risks of excessively delaying the benefits of worthwhile reform. Recent reviews have made a strong case for changing the regulatory and governance framework within which the NEM operates, and have set out how this can be done. Governments have accepted some recommendations and are considering others. The changes being proposed are complicated and implementation will be challenging, with details still to be resolved and important decisions involving many stakeholders yet to be made. This will take time. But it can take too long if, as the Australian Productivity Commission notes has happened in the past, reform is frustrated by:

... complex processes, constant and overlapping reviews, and a lack of agreement by relevant governments about either the reforms themselves or the need for more timely progress to a genuinely NEM-wide approach to energy regulation. (PC 2013b, p. 36)

Indeed, frustration with the slow pace of decisions through regular processes could encourage governments to seek quick ‘fixes’ through direct interventions that run the risk of weakening pressure on market participants to reduce their costs and to introduce the most effective and efficient technology solutions. There is some evidence that this is already happening, as governments have felt compelled to act by significant disruptions to an essential service. Should such changes become the norm, leading to less use of market processes in the NEM, this would ultimately be to the detriment of consumers, including energy-intensive manufacturing businesses.

In this regard, the Finkel Review’s proposals for strengthening governance arrangements, so that energy market bodies can respond in a coordinated and timely way to changes in the NEM, are a particularly important part of the overall reform program. While the proposed Energy Security Board will drive implementation of reforms to the NEM, it will be accountable to the COAG Energy Council—comprising energy and resources ministers—which remains responsible for coordinating the institutional arrangements and providing strategic direction. The review notes that ‘in recent times, the commitment of governments to this national approach to energy policy has been tested’. It has therefore proposed a new intergovernmental agreement to reaffirm governments’ commitment to the NEM and an integrated approach to energy and emissions reduction policy. It recognises that different levels of government have different priorities and pressures, but considers that the securing the new agreement would ‘reinforce to governments the importance of taking a national approach to energy markets’ (Commonwealth of Australia 2017b, p. 168).
In this regard, Queensland’s recently-established Energy Security Task Force, which has been given the task of providing advice on long-term market design for Queensland and the NEM, taking into account the outcomes of the Finkel Review, will play a particularly important role.

10.2.2 Natural gas

Natural gas is Australia’s third-largest energy resource after coal and uranium. Liquefied natural gas (LNG) exports from Queensland are transforming Australia into the world’s second largest gas exporter and the major gas supplier to East-Asian markets.

Rising gas prices

AEMO and the AER analysed the significant domestic impacts of integrating the eastern Australian natural gas market into the Asia Pacific market in two recent reports.

AEMO (2017c, p. 11) forecasts that by 2020, gas for LNG exports will account for 73 per cent of total eastern and southern Australian natural gas demand for residential, commercial, industrial and electricity uses. Originally, the three LNG projects (Queensland Curtis LNG, Gladstone LNG and Australia Pacific LNG):

... were expected to source much of their gas requirements from newly developed reserves in the Surat-Bowen Basin. But gas well development by Santos’ Gladstone LNG project has been slower than expected, disrupting the domestic market. Because the project lacks sufficient reserves to meet its LNG requirements, it is sourcing about half of its gas from elsewhere—much of it from the Cooper Basin in central Australia but also gas from Victorian production sources. (AER 2017b, p. 11)

Local consumers are experiencing cost pressures as gas prices rise towards export parity, and even exceed it in the short term in circumstances where LNG producers have difficulty meeting the requirements of their LNG supply contracts (ACIL Allen Consulting 2013, p. 16). The sharp increase in demand for LNG exports, and limited supply of gas, has made the market more susceptible to outages and shocks.

Coinciding with the first winter of material LNG demand in 2016, spot prices increased from an average of $5.00 a gigajoule (GJ) across gas markets in April 2016 to an average of $12.00/GJ in July 2016. (AEMO 2017c, p. 22)

Offers of about $20 per GJ have been quoted in 2017. With many long-term contracts expiring between 2016 and 2018, customers have reported difficulties securing new arrangements—offers are often at sharply higher prices, for shorter durations, and on ‘take it or leave it’ terms (AER 2017b, pp. 13, 82).

Longer term, AEMO (2016, p. 17) forecasts that the delivered wholesale price of gas in Australia will increase by 48 per cent by 2036, driven mainly by rising domestic production costs, as new gas is sourced from higher-cost fields, combined with the effects of less domestic supply relative to demand. Step changes in wholesale prices are projected in 2018 and 2023, as contracts for significant levels of reserves come to an end. AEMO forecasts retail prices (before inflation) to rise at 5.8 per cent for large industrial users in the short term, and then to stabilise, but there is considerable uncertainty around these projections owing to climate change policy, international market linkages and the spillover effects from uncertainty in electricity markets (AEMO 2016, pp. 26–28).

Impact on gas users

In Queensland, industrial demand and gas-fired power generation account for most gas use (AER 2017b, p. 67). Rising gas prices and uncertainty about future price movements and availability affect heavy trade-exposed users of natural gas in the manufacturing sector that cannot switch to alternative energy sources. These users are concentrated in two manufacturing sub-sectors, and made up 60 per cent of large gas-using businesses surveyed by AEMO (2016, p. 38):

- basic chemicals and chemical products (such as fertilisers, explosives and methanol)
- primary metal and metal products (such as alumina refineries, iron and steel mills, and smelters).

The largest industrial gas consumers in Queensland include Rio Tinto Alcan (Yarwun), Glencore (Mt Isa Mines), Incitec Pivot and Queensland Alumina Limited (DNRM 2016, p. 36).

Natural gas can comprise a large part of the operating cost of plants in these sub-sectors. For example, ACIL Allen Consulting (2013, p. 19) estimated that in 2013 natural gas priced at $4 per gigajoule made up
40 per cent of the total operating cost of an ammonia-based fertiliser plant, increasing to about 60 per cent at a wholesale gas price of $8 per gigajoule. The alternative to purchasing gas for feedstock is to cease production and switch to imported products.

AEMO expects the volume of gas consumed by large industrial users to fall in all states over the next two decades. Closures of gas-intensive businesses are expected, and businesses will also reduce gas usage where possible. AEMO expects the largest impact to occur in the next five years, projecting that by 2021, gas consumed by large industrial users in Queensland will fall by 24.9 per cent (27.3 petajoules).

Between 2016 and 2036, Queensland consumption is projected to fall by 37 petajoules (33.8 per cent), compared with 3.5 petajoules (3 per cent) in the rest of the country. Queensland consumption is expected to fall by more than 10 times the reduction in the rest of Australia because it has a significant proportion of large industrial users of natural gas (AEMO 2016, pp. 37–38).

Higher energy prices also encourage residential and commercial users to change behaviour in the short term, and invest in energy efficiency in the long term. AEMO projects that such changes will reduce gas consumption by residential and commercial customers in Queensland by 1.0PJ (11.7 per cent) by 2036 (AEMO 2016, p. 35).

Increasing the supply of gas

In the long term, reducing gas market pressures will require that gas supply increases from existing and new fields. Finding, proving up and developing gas reserves require significant investment over long periods, as the development of coal seam gas (CSG), for which exploration as a standalone resource in Queensland commenced in the late 1970s, demonstrates.

The lead times for specific gas developments differ considerably, depending on factors such as:

- project scale and complexity
- whether the project is greenfields or incremental
- the presence or absence of supporting transport and other infrastructure
- environmental and social considerations
- the state of the natural gas market.

Even simple projects are likely to take some years to reach the market and then to be operational for 20 or more years, making investors sensitive to the risk of swings in government policy.

Multiple reviews have recommended different proposals to improve the policy framework. However, there is general agreement that a multi-faceted approach is necessary to make gas markets work better by: strengthening and more closely aligning incentives between different participants; improving regulation, and increasing transparency.

Finkel Review

The Finkel Review focuses on the interdependencies between gas and electricity markets, rather than on industrial uses of gas (Commonwealth of Australia 2017b, pp. 105–120). It argues that gas markets will need to be highly efficient if gas is to play an increasing role in affordable electricity supply. However, gas-fired generators are finding it difficult to secure firm gas supply contracts and are being forced to rely on the short-term trading market. At current prices, they may have an incentive to close or mothball their plants and to sell their contracted gas, as Stanwell did with its Swanbank E Power Station (although it is to be returned to service under the Powering Queensland Plan).

While 4,900 MW of proposed gas-fired generation capacity has been announced, whether these projects are built will depend in part on whether they can access reliable and affordable gas supply. If gas-fired power generation is to play a significant role in the NEM, long-term gas supply certainty is essential.

The Finkel Review states that, to foster efficient gas markets that contribute to energy security and reliability:

> Effective government policy and regulatory settings have a dual role. They should:

- Facilitate new investment and enable the development of Australia’s gas resources.
- Address community concern about the environmental and social impacts associated with unconventional gas extraction. (Commonwealth of Australia 2017b, p. 106)
Within this broad framework, the Finkel Review concludes that:

- AEMO should have better oversight of gas supply contracts for gas-fired generators
- Governments should work with communities and industry to enable safe exploration and production of unconventional gas, including ensuring that landowners receive fair compensation
- Gas industry performance data should be transparent, clear and accessible (Commonwealth of Australia 2017b, p. 105).

Productivity Commission

The Productivity Commission (PC) has also proposed improvements to policy settings across the supply chain, arguing that the ‘rapid transformation of the eastern Australian gas market puts a premium on policies that would facilitate (rather than impede) adjustment’ (PC 2015a, p. 8). There is overlap with the Queensland Government’s proposals (discussed below), with the PC also making suggestions that would improve the industry’s social licence to operate and to increase gas supply.

The PC’s proposals include:

- ensuring that the process for allocating the rights to explore and produce gas allocates these rights to the parties that can undertake those activities most efficiently
- policies to resolve land use conflicts arising from gas activities, through a framework for managing land use issues that includes: a compensation regime that helps to align relevant interests; developing template access agreements and negotiation guides for landholders; better engagement with affected communities; policies to deal with economic and amenity effects for local communities; and risk-reflective environmental insurance/assurance provided by gas companies for rehabilitation of adverse effects
- policies to ensure that gas transmission markets are operating efficiently
- avoiding policies to restrict exports (PC 2015a).

Gas reservation

There are concerns, however, that a multi-faceted approach will not ‘fix’ the situation quickly enough and more immediate initiatives are required. Calls have been made for gas to be reserved for local users, so that they can access gas while being sheltered to some extent from higher prices.

Both the Australian and Queensland governments have rejected this approach. The Australian Government’s Energy White Paper noted that gas reservation would:

...act as a tax on the production of LNG ... leading to fewer economic benefits that would not be offset by gains in other sectors of the economy ... artificially low domestic prices do not encourage gas users to use gas more efficiently or encourage innovation in the use of alternative fuels and processes ... The Australian Government believes that having diverse suppliers and encouraging additional supply are the best responses to high prices. (DIS 2015, p. 20)

The Queensland Government’s gas discussion paper states that:

...market interventions such as reservation policies on existing tenures to improve domestic gas affordability and availability are not supported. (DNRM 2016, p. 12)

Similarly, most economists surveyed about this issue oppose gas reservation, although that view is not universal (see Box 10.5).
Box 10.5 Some views on gas reservation

Views of economists opposed to gas reservation policies:

A gas reservation policy ... makes no sense as a solution. First, unless the government was going to make the policy retrospective, it would only apply to future gas developments. These will not occur until the current problem is history. ... [If the policy was applied retrospectively] gas sellers will have to bear the loss—a great example of sovereign risk. Second, even if there was a long term problem, a reservation policy is a poor policy to help ensure the viability of businesses that have high demands for carbon intensive fuels like gas. (Professor Stephen King)

In the short run, however, some firms have committed to export volumes they do not have. This is temporarily forcing some local prices above the world prices as firms bid for volumes to export. It would be better if they bought gas on the world market to meet their offshore contracts rather than forcing local prices up unnecessarily. The short run spike has the potential to cause significant short term damage especially to the manufacturing industry. Reserving gas for local uses will create a long term distortion if it keeps domestic prices below world prices. (Professor Rodney Maddock)

Almost certainly, government choices of the reservation gas quantity for the domestic market will result in a mixture of large effective subsidies/taxes which misallocate gas resources. (Professor John Freebairn)

Although some disagree:

[D]omestic reservations policy is very much a ‘second best’ compared with a much better designed domestic market combined with more appropriate resource rent taxation (or royalties) for onshore gas production, and more rational rules governing gas production. But since we don’t have any of those, the ‘second best’ may be the best available alternative. (Saul Eslake)

Energy policy in Australia is a mess. Prices don’t reflect economic or climatic costs. Availability of low cost gas would obviously improve the situation here, in particular allowing an adjustment away from coal. (Professor John Quiggin)


Studies have concluded that a reservation policy would have adverse effects.

- Modelling by the Productivity Commission (2015a) showed that at least 25 per cent of production of gas from new fields would need to be reserved for domestic use to hold down long-term gas prices. Moreover, reserving supplies for domestic use would deter investment in new supply sources.
- The ACCC’s (2016, p. 7–8) review of the east coast gas market concluded that gas reservation policies would weaken incentives to search for and develop gas resources.
- Deloitte Access Economics (2013 p. ii), in a report prepared for the Australian Petroleum Production and Exploration Association, argued that a reservation policy in effect places a simultaneous tax on domestic gas production and subsidy on domestic gas consumption, and that this combination generates ‘an unequivocal economic loss’.
- The Economic Regulation Authority of Western Australia (2014, p.382) recommended that the state rescind its gas reservation policy as soon as practicable.

The Ai Group points out that retrospective action would be needed to address immediate shortages, and that ‘depending on how this was done it could raise serious sovereign risk, trade law and compensation issues’ (Ai Group 2017b).

The Australian Government has not imposed a gas reservation policy but introduced an Australian Domestic Gas Security Mechanism on gas exports on 1 July 2017. When an exporter draws more from the domestic market than they put in through local production, the company will be required to inform the Minister for Resources how they will fill the shortfall of domestic gas as part of their overall production and exports.
If they cannot adequately explain how they will meet the domestic shortfall, the Minister will order them to limit their export of Australian gas to ensure local supply. The export orders will not dictate how the companies will achieve this, enabling them to use commercial mechanisms such as gas swap contracts or the spot market (Anderson 2017).

The Queensland Government has announced that two new parcels of land totalling 395 square kilometres will be released in the Surat Basin. Any gas produced will only be able to be sold in Australia (Lynham 2017c).

**Improving the policy framework**

State and national policies both have important roles in securing the best outcomes from the transformation of the natural gas market. The Australian Domestic Gas Security Mechanism is aimed at addressing the impacts of short-term spikes in gas prices and does not reduce the significance of other measures for improving market functioning and for strengthening incentives to increase the long-term supply of gas.

As part of this longer-term framework, in August 2016, the COAG Energy Council committed to a Gas Market Reform Package, which includes a new information disclosure and commercial arbitration framework for certain pipelines, transportation capacity trading-related reform, market transparency reforms, and wholesale gas market reforms (Commonwealth of Australia 2017b, p.111).

The ACCC is undertaking an inquiry into the supply of and demand for wholesale gas in Australia and will publish regular information about the supply and pricing of gas for the next three years. The inquiry will examine how gas suppliers will make more gas available to Australian industry and, through increasing transparency, will help to ensure that the market is operating efficiently and that competition is benefiting all gas users. It will also monitor commitments made by gas suppliers to the government to make more gas available and to ensure gas is delivered at times of peak electricity demand (ACCC 2017).

In November 2016, the Queensland Government issued a discussion paper, *Queensland Gas Supply and Demand Action Plan* (Box 10.6), outlining 29 reform ideas to increase community trust of the gas sector, while removing barriers to gas supply through improving regulation, land release strategies, geoscientific data, investment attraction, technological innovation, access to gas and gas infrastructure (DNRM 2016, pp. 4–5).

The Queensland Government has also put forward proposals to the Australian Government, including:

- a jointly-funded study into infrastructure options
- addressing groundwater management
- guaranteed funding, possibly from the North Australia Infrastructure Facility, for viable options, such as new pipelines, that will deliver gas to the Australian market (Lynham 2017b).

As noted above, the Queensland Government announced, in its *Powering Queensland Plan*, that it will implement a Queensland Gas Action Plan.

**Box 10.6 Queensland gas supply and demand action plan**

The Queensland Government’s discussion paper sets out 29 reform ideas organised into two areas:

- **improving the industry’s ‘social licence’ to operate**, through measures such as introducing a reporting system for sector-wide performance and regulatory compliance; improved complaints management; basin-wide community messaging before land release; and improving capability of local suppliers to the gas sector
- **decreasing barriers to gas supply**, through measures such as: improving collaboration across regulatory functions; a basin and sub-basin-wide approach to exploration approvals; whole of government case/project management support for pre-exploration through to production; removing obstacles to economies of scale; streamlined lease application and approval processes; introducing a strategic exploration tenure lease framework; developing a Queensland exploration strategy; less prescriptive tenure work programs; and reforming pipeline trading arrangements.

Source: DNRM 2016.
The Queensland Government’s decision to implement a Gas Action Plan has the potential to improve the performance of the state’s gas market. Policies aimed at reducing regulatory impediments to gas supply while building community trust in the gas industry are more likely to improve the efficiency of gas markets than are reservation policies, which studies suggest may be ineffective and impose costs.

An effective plan should seek to improve the operation of gas markets by strengthening and more closely aligning incentives between different participants, to:

- avoid land use conflicts
- improve regulation by removing unnecessary costs but without damaging desired outcomes
- increase transparency to improve market efficiency.

The plan should also be developed through consultation, testing and refinement with all stakeholders.

**Draft recommendation 2**

The Queensland Government should ensure that its energy policies and regulation promote the long-term interest of consumers and efficient energy prices. This includes:

- avoiding policy or regulatory changes that impede the efficiency of the electricity market and place further pressure on energy prices
- structuring the Queensland Government’s gas action plan (due for release mid-2017) to remove supply barriers by:
  - reducing the costs and impediments to gas exploration and development through, for example, measures to improve land release and tenure management, and cooperation between different mineral and energy regulators
  - improving processes to resolve land-use conflicts arising from gas activities (including through providing better information to landholders and an evidence-based approach to regulation)
  - increasing transparency to improve market efficiency, through measures such as reporting sector-wide performance and regulatory compliance.

**10.3 Government procurement**

The Queensland Government spends large amounts on procuring supplies and services. Determining exact procurement expenditure is difficult, but as a guide, Queensland Treasury expects that about $17.4 billion was spent on ‘Goods and Services’ in 2016-17 (Queensland Treasury 2017b, p. 167). About 70 per cent of government expenditure is with local suppliers (IDC 2015, pp. i, 46).

Queensland manufacturers are keen to ensure that they can bid for this market. They have concerns in two areas:

- some procurement processes do not provide a level playing field that enables them to compete with interstate or overseas businesses
- they consider that local suppliers should be given preferential treatment over those from interstate or overseas.

**The policy framework**

**The Queensland Procurement Policy**

The Queensland Procurement Policy (QPP), administered by the Department of Housing and Public Works (DHPW), is the overarching policy framework, seeking excellence in procurement outcomes through applying six principles (Box 10.7), of which value for money is the overriding one. Achieving reasonable value for money is a legislative obligation for accountable officers under section 61 of the Financial Accountability Act 2009.
Value for money has held primacy of position in successive versions of Queensland Government procurement policy. (IDC 2015, p. 42)

When considering value for money, agencies are required to consider:

- the overall objective of the procurement and the outcome being sought
- cost-related factors including the up-front price and whole-of-life costs
- non-cost factors such as being fit-for-purpose, quality, delivery, service, support and sustainability impacts.

### Box 10.7 Six principles of procurement policy

**Primary Principle**

1. We drive value for money in our procurement.

**Secondary principles**

2. We work together across agency boundaries to achieve savings and benefits.
3. We are leaders in procurement practice—we understand our needs, the market, our suppliers and have the capability to deliver better outcomes.
4. We use our procurement to advance the government’s economic, environmental and social objectives and support the long-term wellbeing of our community.
5. We have the confidence of stakeholders and the community in the government’s management of procurement.
6. We undertake our procurement with integrity, ensuring accountability for outcomes.


The policy also requires agencies to ‘ensure that competitive local suppliers are afforded a full, fair and reasonable opportunity to supply government’ (DHPW 2015, p. 6).

The Queensland Government is a signatory to the Australia–New Zealand Government Procurement Agreement and has agreed to observe the requirements of other bilateral agreements that the Australian Government has signed. The objective of the procurement rules within the agreements is to create and maintain a single government procurement market between partner countries (QCA 2015a, p. 311).

### The Charter for Local Content

The Charter for Local Content (the Charter), administered by the Department of State Development (DSD), operates within the framework provided by the QPP. The Charter’s core objective is ‘maximising local content through greater participation of capable local industry in major government procurement activities’ (DSD 2016c, p. 1).

DSD considers that the Charter provides a framework for encouraging government agencies to apply best practice in local content procurement while minimising the compliance burden on government agencies and contractors, and ensuring full, fair and reasonable opportunity for local suppliers.

The Charter applies to all government procurement (not just from manufacturers) above value thresholds that vary by location (as the value threshold is lower in regional Queensland) and by strategic significance, which is determined by factors such as the procurement’s impact on regional development or local industry’s competitiveness or value-adding activities (DSD 2016d, pp. 8–9).

It defines local industry as ‘Australian and New Zealand small and medium sized enterprises’ (DSD 2016c, p. 2). However, the Charter’s focus on anticipated benefits for ‘wealth generation and the creation of employment opportunities for Queenslanders’ suggests that the intent is to focus procurement on firms located in Queensland, rather than from across Australia and New Zealand.
The Charter does not define local content or explain how to measure it, perhaps because it is difficult to measure how much of a product is ‘local’, particularly when global supply chains are involved (see Chapter 3). Nevertheless, those who apply the Charter’s core objective of ‘maximising’ local content implicitly, if not explicitly, make judgements about the proportion of local content.

**Other measures to enable local content**

The Queensland Government provides or supports services that help local businesses to participate in procurement processes. For example:

- DSD delivers workshops to assist businesses to tender for government projects. Capability statements are a key requirement in pre-qualification for government projects and tendering opportunities. The workshops help businesses to understand what capability statements are and how to prepare them; how to access the latest information about Queensland’s major projects; and how to participate in major project supply chains.

- DSD runs *Tendering for Government Business* workshops, which help suppliers maximise their chances of winning government work (DSD sub. II, p. 7).

- Industry Capability Network Queensland (ICNQ), a not-for-profit organisation supported by the Queensland Government, offers services that help to link project proponents with capable local suppliers, including:
  - maintaining datasets and Queensland supplier registrations on ICN Gateway to better match project proponents with potential suppliers
  - placing procurement specialists with project proponents or managing contractors
  - communicating public sector procurement plans to industry through, for example, information sessions
  - arranging networking opportunities between project proponents and suppliers.

The $41 million redevelopment of the Gold Coast Aquatic Centre is an example of ICNQ involvement.

> The managing contractor, Watpac, offered 74 work packages for tender, 90 per cent of which were awarded to South East Queensland suppliers. By working closely with ICN, Watpac greatly enhanced their procurement process by quickly identifying the most suitable suppliers, as well as connecting with potential suppliers they were not previously aware of. (DSD 2016f)

**What is the impact of the Charter?**

The need to demonstrate outcomes and improve transparency of results through performance measurement and reporting has been a consistent theme of reviews of government procurement in Queensland (IDC 2015, p.vi). However, little data is available to assess the impact of the Charter, and so analysis tends to be undertaken on an ‘in principle’ basis.

The Charter states that it is:

> ...not a matter of mandating that government agencies use local suppliers. Rather, it is about providing a mechanism for government agencies to effectively and efficiently give consideration to a wide range of potential suppliers when making decisions relating to major procurements (DSD 2016c, p. 1).

While local procurement is not mandatory, as noted above, the Charter’s objective is to maximise local content. If procurement agencies interpret this objective literally, they would purchase locally whenever possible, irrespective of the additional cost. This implies that if local content policy is effective in bringing in local suppliers who otherwise would not have won contracts, it will raise the cost of procurement. The QCA identified eight pathways through which this could happen. DSD agreed that these pathways could have this effect, but said that strategies have been put in place to minimise the impact (QCA 2015a, pp. 320–321).

Evaluations of procurement under the Charter could reveal whether it is achieving value for money or whether this is subsidiary to other objectives. However, evaluating local content policy is challenging. This is partly because assessing its impact on value for money is complicated—value for money involves trade-offs between price and features such as service levels, reliability and delivery time; and partly because of the inherent difficulty of knowing what would have happened if there were no Charter.
Thus there appears to be little published information that could be used to assess the policy. The QCA reported in 2015 that agencies have started to capture data on the ‘number of firms new to managing contractors’ supply chains that have been able to win work packages. However, no information was provided on government procurement costs or on what would have happened in the absence of the policy (QCA 2015a, p. 331).

Published examples mention the amount of local procurement rather than whether there has been any increase in local content and cost, or impacts on other features of value for money:

"Between 1 July 2014 and 22 June 2015, the Charter was applied to 28 Queensland Government projects comprising four Commonwealth Games and 24 other projects, involving expenditure of more than $1.66 billion. ... Queensland-based firms won over $1.35 billion (81 per cent) of the contracts awarded. (DSD sub. 40, p. 7, reported in QCA 2015a, p. 331)"

DSD (2016f) uses construction of the office tower at 1 William Street in Brisbane’s government precinct to illustrate the effects of employing the Charter’s procurement principles. Brookfield Multiplex, which is the managing contractor, reported to DSD that as of January 2015, $244 million worth of goods and services have been procured and south east Queensland companies have won 89 per cent of these tenders.

These examples do not reveal what would have happened without the Charter; for example, whether:

- production was diverted from other local firms that could have done a better job
- ‘leakages’ reduced the impact of the local purchasing. For example, if preferential purchasing from local suppliers pushes up the prices of locally produced goods, some non-government purchasers who would otherwise have brought the same goods locally may turn to imports
- impacts on service quality or delivery dates increased costs.

It is even more difficult to find data to assess whether local content policy encourages firms to innovate, and so develop their capacity to build a sustainable competitive advantage. DSD argues that the Charter supports innovation as it encourages agencies to consider a broader field of suppliers, which helps to build a more competitive and innovative supply environment (QCA 2015a, p. 321).

A counter argument is that preferential purchasing can lead to more prescriptive contracts, which specify requirements about how local content is to be achieved and so discourage innovation to seek better ways to approach the task. As well as building into contracts approaches that involve higher costs than are necessary, encouraging a ‘follow the rules’ approach to procurement is likely to reward firms that feel comfortable with this approach rather than ones that use innovation as the way to build their competitiveness.

Can preferential procurement benefit Queensland?

Some submissions advocated that the government should introduce preferential purchasing. For example, CCIQ (sub. 6, p. 20) said:

"Overwhelmingly, public sector contracts are awarded to firms that are based outside of Queensland or the region in which the contract is to be executed. The reasons for this are twofold. First, there is excessive emphasis on government securing the lowest price for a tender, thus sidelining the overall economic impact of awarding a contract to a local company."

The AMWU supported minimum local content requirements:

"That a program of enforcement of Local Industry Policy be adopted and driven by the Minister for Manufacturing. This program must be backed by strong legislation with sanctions for non-compliance and strong incentives for business to voluntarily adopt Local Industry Participation Plans and benchmarks.

That the Queensland Government introduce a minimum local content requirement for jobs and manufactured materials in all major projects. (sub. 9, p. 10)"
Similarly, TCF Connect recommended preferences to offset Australian regulatory costs:

*State procurement policies should seek out local and State suppliers before going off shore.*

*Weight procurement selection criteria towards local and state suppliers where State and Federal regulations make local manufacturing non-competitive.* (sub. 2, p. 2)

Although procurement preferences to support local manufacturers may be superficially appealing, the case for preferential procurement of local content is weak.

Measures that enable local participation in procurement processes—such as simplifying tendering processes and improving databases and procurement capabilities—can increase value for money, by creating opportunities for local suppliers to demonstrate their capabilities in competition with interstate or overseas suppliers. However, explicit procurement preferences can be at the expense of value for money. If the policy increases the cost of procurement, the government must reduce expenditure on other programs, which may affect other government objectives or employment elsewhere, or increase taxes or borrowing.

Even where preferences can directly benefit some local sectors, if they divert purchasing from the best value options, they are likely to impose a cost on other businesses and household incomes. To illustrate these effects, the QCA commissioned general equilibrium modelling of a scenario in which an additional $100 million of ICT product is sourced from Queensland rather than from the rest of Australia or overseas, at a cost of an additional 10 per cent. While this is not a manufacturing example, its results give a sense of the direct and indirect effects of local procurement. The results show that while the preferential purchasing is favourable for the ICT sector, activity in the economy as a whole is lower as production in other sectors falls. Queensland’s gross state product is $26 million lower in the long term (QCA 2015a, pp. 335–337).

**Improving the policy**

There is a sound case for government to remove impediments to participation by local firms in procurement processes. This can improve value for money by increasing the number of potential suppliers, given that local firms may not bid if the process is too complicated or costly. New start-ups may also be excluded from the market. Or, government procurement officers may overlook local firms if they are not aware of what they can offer, opting instead for interstate or overseas suppliers with established reputations that appear to involve less risk. Such effects can distort supply outcomes, and reduce competition for procurement tenders (QCA 2015a, p. 323).

Making procurement processes less complicated, or helping firms to navigate through them, can expand the pool of local and overseas bidders for government work. ICN organisations also improve procurement by providing databases that reduce search costs for contractors and by identifying import replacement opportunities and providing information about local supplier capabilities (PC 2014c, p. 474, VCEC 2011).

Yet, there is limited evidence on whether the current patchwork of procurement policies genuinely facilitates local content and, where it does, it is likely to come at an overall cost to the Queensland community.

**A single policy with a single objective**

The current Queensland procurement landscape is complex and fragmented. It is difficult to navigate for those working in procurement agencies and those seeking to supply government. A single policy with a single objective would be simpler for business and for government, and more likely to achieve value for money for taxpayers.

As noted by the QCA:

*Public sector procurement should operate to a single principle of achieving value for money. Multiple objectives, combined with incentives created through the centralised monitoring of tender outcomes, provide incentives for contracts to be accepted which are not in the best interests of Queensland taxpayers. … Where there are broader economic, social or environmental policy objectives, these should be addressed directly, generally through targeted expenditure programs.* (QCA 2015a, pp. 343–344)

The Queensland Audit Office’s (QAO) report on procurement arrangements found deficiencies in organisation, data and capabilities.
• Most departmental managers do not have the data or the tools they need to inform strategic procurement decisions (QAO 2016, p. 3).
• Sixteen out of 21 departments do not have a current agency procurement plan, which the QPP requires (QAO 2016, p. 4).
• The procurement transformation program lacked good quality procurement data (QAO 2016, p. 4).
• Government departments have not agreed on the procurement skills their staff need, to improve the effectiveness of their procurement functions (QAO 2016, p. 5).

Given these skill gaps, procurement agencies are unlikely to have the sophisticated skills and information required to achieve multiple objectives through procurement. And if they do, this would likely be at the expense of value for money.

Reducing impediments to local procurement

Given the government’s large expenditure on supplies and services, improving procurement practices is an opportunity to realise efficiencies and value for money.

Stakeholders see opportunities to reduce impediments to local participation in procurement processes. For example, CCIQ stressed that:

...the tender process itself is highly onerous and often small businesses do not have the time and resources than larger businesses to effectively compete for local tenders... Currently, scale can present a significant challenge for SMES when tendering for contracts. (sub. 6, p. 20)

To address this problem, the CCIQ supports a:

...clearer definition and methodology on how value for money will be assessed in the procurement process so industry can become more involved in procurement contracts and embrace innovation as a core business improvement activity... Better leverage expenditure, introduce smarter sourcing practices, take an innovative one Government approach to purchasing and develop procurement and contract management capability. (sub. 6, p. 21)

The QCA reached a similar conclusion:

The Queensland Government should continue to improve procurement processes with the objective of simplifying processes, including requirements concerning the structure, breadth, scale and complexity of procurement contracts. Simplification should include removal of the many local content oriented requirements in procurement processes, including industry plans, from procurement policy. (QCA 2015a, p. 345)

The Interdepartmental Committee review of government procurement (IDC) also saw opportunities to improve local procurement, through agencies working more closely with suppliers and publishing a pipeline of supply opportunities. It recommended that:

...departments better understand regional supplier capability and supply chains, apply greater emphasis to developing competitive markets regionally, and collaborate to produce regional procurement plans for longer term programs of works and supply arrangements. It is also recommended that departments contribute information to a forward procurement pipeline for publication, to help ensure earlier identification of supply opportunities. (IDC 2015, p. 48)

The IDC’s other recommendations for improving procurement included:

• developing and implementing a capability development strategy for procurement within Queensland Government
• improving agencies’ understanding of the knowledge and information needs of procurement
• more clearly defining value for money, with a continuing emphasis on reducing process costs, such as tendering costs
• recognising probity as a core element of procurement (IDC 2015, p. xiv).
These reviews suggest that there is considerable scope to improve procurement processes in ways that would both improve the achievement of the value for money objective and provide better opportunities for local participation.

Consulting with local firms to help re-design procurement processes may provide useful insights about how to reduce the impediments they face. This co-design approach was used in the Government Information Technology Contracting (GITC) review, which comprised interviews, workshops, and an online survey, all involving government agencies and suppliers to assess options for improving the framework for ITC procurement. This review sought to achieve, amongst other things, a flexible, and scalable contracting environment, reduced barriers to access by small to medium enterprises, start-ups and international suppliers; intuitive and easy-to-use framework documents; and alignment with best practice in other jurisdictions (Queensland Government 2016d).

**Draft recommendation 4**

In developing the new procurement model, the Queensland Government should:

- establish a single procurement policy based on a single objective—value for money
- remove impediments to local firms participating in procurement, including by:
  - simplifying tendering requirements including the structure, breadth, scale and complexity of procurement contracts
  - improving the capability of the public service to review and assess tenders
  - providing clear advice to tenderers on the definition and method that will be used to apply the value for money principle
  - to the extent possible, specifying contracts in terms of the desired outcomes rather than inputs
  - publishing a pipeline of supply opportunities.

### 10.4 Investment attraction

Many factors influence business location decisions (Chapter 3). Often, firms are mobile because factors of production (such as access to raw materials or skilled labour) are available in many places. Governments compete to attract mobile investments, primarily by developing effective business environments. However, they also try to draw in investors through:

- **investment facilitation**, which can involve: providing information about regulatory requirements; assisting with site identification; identifying infrastructure and utility needs; coordinating and brokering development approval processes; assisting with business development programs; and introductions to industry networks (VCEC 2011, p. 184)
- **investment assistance**, through financial incentives that increase the return on investment in a particular location.

The Queensland Government offers both investment facilitation and investment assistance.

**Investment facilitation**

*The policy framework*

DSD and Trade and Investment Queensland (TIQ) deliver investment facilitation services.

DSD’s case management approach to investment facilitation includes:

- providing the business case information as to ‘Why Queensland’
- delivering information about project requirements, business costs, skills availability and other business investment drivers
- identifying suitable site options reflecting project requirements
- streamlined access to government services
Queensland Productivity Commission

- coordinating pre-lodgement meetings and giving advice about the development approval process, to expedite approvals and reduce red tape barriers
- providing advice and contacts or introductions to universities and service providers such as property groups, utilities, education and training organisations, raw materials suppliers and other organisations (sub. 11, p. 12).

TIQ’s mission is to win trade and investment by matching Queensland’s capability with international market opportunities. A key objective of the organisation is to ‘facilitate, identify, attract and develop trade and investment opportunities’ (TIQ 2016, p. 7).

Its three main functions are to assist:

- Queensland businesses to export
- international businesses to access Queensland
- international investors to take advantage of Queensland opportunities, by providing detailed market intelligence, assisting in preparing business cases, arranging site visits, liaising with government and partnering with other economic development agencies and industry to identify investment ready projects.

TIQ will also be a primary driver in the delivery of the Government’s new five-year trade and investment strategy (Box 10.8), released in April 2017.

Box 10.8 Queensland new trade and investment strategy

The Queensland Trade and Investment Strategy 2017-22 sets out a plan for cooperation between governments, business, educational institutions and local councils, which aims to use Queensland’s natural and acquired strengths to tap into the opportunities created by expanding international markets.

In doing so, it seeks to achieve two aspirational targets:

- increase Queensland’s share of national overseas exports to 22 per cent and maintain through to 2022
- increase the number of investment outcomes facilitated by the Queensland Government by 20 per cent by 2022.

The strategy’s priorities are to build on Queensland’s existing strengths, further diversify the economy, target key overseas markets, build the export capabilities of small and medium-sized businesses, increase international engagement with Asia and beyond, and promote investment in businesses, infrastructure and innovation.

The strategy recognises the contribution of foreign investment to funding development and opening up and securing markets and that trade and investment will remain significant sources of economic growth for Queensland.

It also recognises TIQ as the Queensland Government’s dedicated global business agency, through which the Queensland Government has one of Australia’s largest international networks of 15 trade and investment offices in 12 markets. In 2016, the Government established two new TIQ international offices in Singapore and Chengdu. The strategy proposes:

- establishing an additional office in north America
- strengthening TIQ’s presence in Jakarta and Singapore
- developing country-specific trade and investment strategies
- conducting a comprehensive review of Queensland’s international operations.

The delivery of investment facilitation services is fragmented. In addition to DSD and TIQ, services are also provided by private sector firms, the Australian Government (through Austrade), interstate trade offices and local governments. For example, the members of Brisbane City Council’s investment attraction team specialise in the industrial sector, commercial property, tourism infrastructure, and technology and innovation. The senior manager (industrial) assists with:

...preparation of tailored business cases, facilitating interstate and intrastate relocation projects, as well as international and local expansion. ... key information regarding property selection, labour analysis, incentives, and [facilitating] key introductions to local stakeholders. (Brisbane City Council 2017)

Are investment facilitation services effective and efficient?

The effectiveness and efficiency of investment facilitation services needs to be considered in the context of the extent to which they achieve a specified output at least cost. Given TIQ’s objective of attracting and developing trade and investment opportunities, its output could be considered to be increased trade and investment.

However, rather than assessing how its activities affect trade and investment, TIQ’s 2015-16 annual report (2016, pp. 7–9) lists the following impacts of its activities:

- Queensland firms achieved 245 export deals with TIQ support.
- TIQ assisted in attracting 26 inward investment deals to Queensland.
- TIQ facilitated a large number of trade missions and inbound visits and hosted various events.
- TIQ nominated business migrants who were expected to invest $436 million in the Queensland economy.
- TIQ nominated 551 skilled and 182 business applicants for Queensland Government sponsored visas.
- TIQ facilitated the signing of a number of Queensland Government memoranda of understanding.

It would be very difficult for TIQ to set out how it has increased trade and investment, because it is not possible to determine whether its involvement tipped the balance in favour of a project proceeding or expanding. Instead, it measures its efficiency in terms of costs per investment lead and cost per investment deal (TIQ 2016, p. 16). This means, however, that it is difficult to assess whether $30 million, which is about the size of the government grants that TIQ receives each year (although it is not all used for investment facilitation), is the ‘right’ expenditure on investment facilitation or value for money. This difficulty is exacerbated because facilitation services are provided without charge. This limits the information available about what firms want from the services. As users pay nothing for the services, some may value them less than it costs to provide them.

Could investment facilitation services be made more effective and efficient?

TIQ and DSD appear to offer similar services, possibly to similar clients, as do local governments, other interstate trade offices and Austrade. This could indicate scope through reorganisation to reduce costs without losing service quality.

The Queensland Trade and Investment Strategy 2017-22, TIQ (2017, p. 31) establishes as a new initiative ‘a comprehensive review of Queensland’s international operations’. This review should consider the scope to restructure investment facilitation services to:

- address at lower cost the primary information barriers and deficiencies to firms locating in Queensland.
- This would involve identifying information gaps and ensuring that the information offerings provided through DSD and TIQ address these gaps effectively and efficiently
- use facilitation services to identify opportunities to reform regulation and policy, so there is a less complex system for firms to navigate and to enable them to do so at lower cost. For example, evidence that facilitation services focus on particular areas where firms find complex approval processes difficult to navigate may indicate opportunities to simplify these processes. This information could also be used in sunsetting reviews of regulation and in the regulatory stocktakes proposed in Chapter 8, to enable them to undertake a more focused analysis of opportunities to reduce the cost of regulation. TIQ and DSD could also build on this information to provide general advice to investors, helping them to identify the most appropriate supply network and determine whether elements of production are best made locally, regionally or globally (see Chapter 7).
Draft recommendation 6

The Queensland Government should reorganise the investment facilitation activities of Trade and Investment Queensland and the Department of State Development to:

- address the information barriers to firms locating in Queensland
- identify opportunities to reduce/streamline regulation—so there are fewer government requirements to navigate, at a lower cost.

Investment assistance

The Queensland Government provides both firm—and project—based investment assistance.

Governments typically provide grants to encourage investment in projects that they anticipate would otherwise not proceed. Competition from other jurisdictions trying to attract the same projects, combined with political pressures to be seen to be assisting development, pressures governments to offer grants.

The Queensland Government provides assistance through investment grant programs (Table 10.1). The Industry Attraction Fund is the primary program described as being specifically for investment attraction. However, the other funds perform a similar role by offering financial support to potential investors.

Table 10.1 Some investment grant programs

<table>
<thead>
<tr>
<th>Fund name</th>
<th>Amount allocated</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Made in Queensland</td>
<td>$20 million</td>
<td>Supports the manufacturing sector to become more internationally competitive and adopt innovative processes and technologies. Offers matching grants to Queensland based manufacturers.</td>
</tr>
<tr>
<td>Business Development Fund</td>
<td>$40 million</td>
<td>Provides a co-investment in Queensland businesses commercialising ground-breaking research or innovations. The fund’s investment is a direct investment in the business. It is not a payment to the co-investor, a grant or a loan.</td>
</tr>
<tr>
<td>Platform Technology Program</td>
<td>$10 million</td>
<td>Provides financial incentives to larger scale co-funded projects (minimum &gt; $1 million) that accelerate the development and deployment of significant and highly collaborative industry based platform technology projects.</td>
</tr>
<tr>
<td>Commercialisation Partnership Program</td>
<td>$480,000</td>
<td>Places Queensland innovators in Chinese incubators to collaborate, access facilities and accelerate commercial outcomes.</td>
</tr>
<tr>
<td>Industry Attraction Fund</td>
<td>$40 million</td>
<td>Designed to attract businesses to Queensland, either to relocate or establish new projects in the state. Objectives include: employment creation, regional growth and encouraging innovation.</td>
</tr>
<tr>
<td>Ignite Ideas Fund</td>
<td>$16.5 million was spent in the first two rounds.</td>
<td>Supports the development of new or improved products, processes or services to secure investment, launch into global markets and grow business.</td>
</tr>
<tr>
<td>Small Business Innovation Research Pilot</td>
<td>Unknown—part of the Advance Queensland fund.</td>
<td>Provides commercial opportunities to innovators while solving Queensland Government challenges. At the end of the process, applicants have the possibility to secure a contract with a Queensland Government agency.</td>
</tr>
</tbody>
</table>

What are the policy’s effects?

There are no data publicly available on the effects of investment grants. The Queensland Government Investment portal, which lists grant and funding programs, does not provide information of the programs’ outcomes.

This is not unusual. For example, the VCEC’s review of investment assistance in Victoria found little information about the effects of assistance in that state. It therefore commissioned a study of five large projects, which found that in only one case was government financial support a deciding factor. The VCEC concluded that:

...whatever one's position [on the conceptual arguments for and against investment attraction], there would seem little reason to provide assistance if it is not effective in encouraging additional investment. (VCEC 2011, p. 195)

The case for government involvement in investment attraction is not convincing even though the pressures on governments to provide it are strong. Commentators such as the OECD, the Productivity Commission, the QCA and the VCEC have suggested that assistance may be justified when the investment is accompanied by spillovers. However, the use of this rationale can trigger rent-seeking behaviour. Spillovers are difficult to identify and anticipated benefits do not occur automatically (OECD 2011, p. 11).

Opponents of providing financial incentives to attract investment argue that:

- they are not usually large enough to affect location decisions
  - interstate bidding is a zero sum game—simply shuffling resources between states rather than making the Australian community better off. If grants do lead to projects proceeding, because these projects depend on government support they may divert resources from other activities that would have generated a higher return
- grants’ opportunity costs—as the funds could have been used in other government programs or to reduce taxes—are usually ignored, and may exceed their value in investment attraction
- states collectively would be better off if they stopped competing through grants, and they can do so through inter-state agreement
- the confidentiality that usually surrounds grant allocation discourages performance evaluation, and can undermine decision-making processes.

Improving policy

Notwithstanding the weak case for investment attraction, it is common practice. This makes it difficult for any state to stop using taxpayers’ funds for this purpose. Where the Queensland Government decides to provide incentives, improving transparency can help improve outcomes:

Transparency provides scrutiny of the assumptions and methods used to support assistance proposals, opportunities to test competing claims and ultimately a basis for the Queensland community to judge the success or failure of industry assistance. It can also lead to improvements in assistance design and implementation over time. ... Transparent policy development can help reduce the likelihood of policy failure. (QCA 2015a, p. 63)

Opportunities for policy improvement include:

- Publishing the criteria for allocating grants would make it more likely that they are allocated where they generate most value.
- The main criterion should be that the project is anticipated to generate spillovers in other businesses (for example, through access to new technology leading to productivity improvements) that would otherwise not have occurred, and that the value of the spillover benefits is expected to exceed the value of the grant.
- Assistance should be transparent, rather than through less transparent forms such as tax concessions.
- Grant payments could be spread over time, and linked to measurable deliverables
- Transparency could be increased by publishing indicators such as the selection criteria for grants; the number, names, and size distribution of firms assisted; the value of assistance provided to each firm; and the details of contracts with individual firms.
• There should be performance assessment, to identify whether assistance is offering a net benefit to Queensland (QCA 2015a, VCEC 2011).

Transparency would be further enhanced if the government was to report annually the expected outcomes and performance milestones agreed in the case of each grant and the performance of each project against these milestones. Over the longer term, the information could be used to evaluate grant programs.

**Draft recommendation 8**

The Queensland Government should avoid providing investment attraction incentives to individual firms unless it can be demonstrated that there are likely spillovers that would otherwise not occur. If the government does provide incentives it should:

• publish the criteria for allocating grants to attract mobile investors
• provide assistance in transparent forms, rather than through less transparent forms such as tax concessions
• link grants to measurable deliverables
• publish the number, names and size of firms assisted; the value of assistance provided to each firm; and the details of contracts with individual firms
• report annually the expected outcomes and performance milestones agreed in the case of each grant and the performance of each project against these milestones.

### 10.5 State taxes

**The policy framework**

Revenue from state taxes is expected to contribute 23.8 per cent of Queensland Government revenue in 2017–18 (Figure 10.1).

**Figure 10.1 Queensland Government revenue by source, 2017-18**

Source: Queensland Treasury 2017b.

Queensland has a history of being a ‘low tax state’. The government considers that:

> …maintaining the competitiveness of Queensland’s tax system provides a competitive advantage to business and moderates the tax burden for its citizens, and is therefore fundamental to the Government’s commitment to job creation and sustainable development. (Queensland Treasury 2017b, p. 84)

The amount of tax citizens pay is one measure of competitiveness. Treasury estimates that taxation per capita in Queensland will be $2,691 in 2017-18, which is $843 below the average of other jurisdictions.
Treasury reports two other measures, which also indicate that Queensland taxes are competitive with other states. To maintain the state’s position, the government seeks to keep general government sector own-source revenue at or below 8.5 per cent of projected nominal gross state product on average across the forward estimates period (Queensland Treasury 2017b, pp. 84-5).

While levels of taxation contribute to Queensland’s attractiveness as a business location—provided that low taxes do not lead to inadequate government services—the ways in which that revenue is raised also has significant impacts.

Queensland (like other states) relies on payroll tax, land tax, transfer duties, insurance taxes and gambling duties. Payroll tax (28.7 per cent of total tax revenue in 2017-18) is the largest source of state taxation revenue, followed by transfer duty (24.0 per cent), motor vehicle registration fees (13.1 per cent), other duties (11.2 per cent), land tax (9.0 per cent) and gambling taxes and levies (8.9 per cent) (Queensland Treasury 2017b, p. 83).

Competition between states has focused on taxation thresholds and exemptions as well as on tax levels. This has led to complex tax structures and concessions, and Queensland frequently has more generous tax concessions than other states. For example:

- As well as having the lowest payroll tax rate of all states and territories (New South Wales Treasury 2016), the exemption threshold of taxable wages of $1.1 million in Queensland is the highest of any mainland state. Taxable wages between $1.1 million and $5.5 million also obtain a partial deduction, with the deduction withdrawn at a rate of $1 in every $4 of taxable wages.
- The principal place of residence owned by individuals is exempt from land tax in Queensland, as it is in all states. Resident individuals become liable for land tax once the total taxable value of residential land exceeds $600,000, which is the highest threshold among Australian states (New South Wales Treasury 2016).

Queensland Treasury (2017b, p. 216) estimates that $5.264 billion of revenue was foregone in 2016-17 through concessional treatment of payroll tax, land tax, duties and gambling taxes. Payroll tax ($2.447 billion) was the biggest contributor, followed by land tax ($1.562 billion).

Assessing state taxes

Taxes are typically assessed in terms of their administration costs, compliance costs, efficiency costs and equity.

Recent reviews of state tax systems against these criteria (including QCA 2015a and 2015b and Australian Government 2015) found:

- Compliance costs increase as tax systems become more complicated.
- Compliance costs are regressive in the sense that they are proportionately higher for small businesses.
- Quantitative estimates of efficiency costs of taxes as they are actually implemented suggest that gambling taxes and insurance duties have the largest efficiency costs of state taxes and land taxes the lowest.
- Payroll tax, in theory, has low efficiency costs compared with other taxes, but in practice the costs are higher than some other taxes because exemptions reduce the base of the tax. Complying with their payroll tax obligations can be complex for firms.
- The measured efficiency costs of land tax, while lower than of other taxes, are increased by exemptions and concessions.

Impacts on manufacturing

In 2015-16, 2,900 tax payers in the manufacturing sector paid $436 million in payroll tax (Office of State Revenue 2017). This was 12 per cent of payroll taxes collected in Queensland. Manufacturers also pay stamp duties and land taxes and indirectly insurance duties. However, the proportion paid by manufacturers is currently unknown.

---

62 These measures are taxation revenue as a share of GSP and taxation effort, as measured by the Commonwealth Grants Commission. Taxation effort indicates the actual effort by a jurisdiction to raise tax revenue relative to the average effort of all states.
Manufacturers pay relatively more payroll tax per employee and per dollar spent on wages, than other selected industries\(^6\) (QPC calculations, Office of State Revenue 2017, ABS 2017h). Per employee, manufacturers pay about $2,700 in payroll tax, 72 per cent more than other industries. On average manufacturers pay a tax rate of 4.25 per cent on the wages they pay their employees. This is 33 per cent higher than in other industries.

This larger share may affect the distribution of activity between sectors. Modelling undertaken by the QCA sheds some light on this. The QCA modelled a scenario in which industry assistance schemes in Queensland were discontinued and the revenue savings used to reduce payroll taxes. Industries with a higher share of payroll tax relative to subsidies benefited most—as measured by industry level changes to value added—from replacing industry assistance with lower rates of payroll tax. Of all sectors, the manufacturing sector expanded the most (QCA 2015b, p. 184).

**Improving taxation**

There is consensus that state tax systems can be substantially improved. For example, the Goods and Services Tax was introduced in 1999 on the basis that the revenue raised would be distributed to the states in exchange for removing various inefficient duties, levies and taxes. In more recent times, the ‘Australia’s Future Tax System’ review, published in 2010, proposed significant reform of state taxes. This was followed by the Australian Government white paper on tax reform in 2015, which also commented on state taxation.

While these recent reviews provide a strong conceptual underpinning for additional reform, it has not happened. Against this background, CCIQ sees the need for further improvements:

> The priority for Queensland manufacturers is for comprehensive tax reform that considers the taxation system holistically, with a focus on addressing the complexity of the system and reducing the reliance on income taxes in favour of consumption taxes like the Goods and Services Tax (GST), which will enable the removal of inefficient State taxes. [...] [It supports] the expansion of a GST, and the abolishment of inefficient state taxes such as payroll tax and stamp duties. (sub. 6, p. 15)

The need for comprehensive, rather than sectoral, reform is well-founded. For example, in the absence of clear evidence of state taxes that disadvantage manufacturing specifically, looking at tax reform through a manufacturing lens could lead to changes that distort resource allocation away from other sectors even when alternative uses have higher value. Manufacturing-specific changes would also increase administrative complexity and compliance costs. Moreover, changes in taxes will have distributional consequences. Taking a comprehensive approach to tax reform will provide more opportunities to design a package of changes that enables some balancing out of the distributional impacts.

The CCIQ’s support for removing stamp duties is consistent with the view of reviews of taxation that:

> Stamp duties are some of the most inefficient taxes in Australia ... they are levied selectively on activities or products and are taxed on total transaction value, rather than the ‘value added’ component. Such transaction taxes are more likely to discourage turnover of taxed goods, as taxpayers attempt to reduce or avoid paying tax. (Australian Government 2015, p. 145)

An additional benefit of reforming stamp duties is that reducing the additional costs they impose on property transfers would assist labour mobility and structural adjustment, as discussed in Chapter 9. The 2009 review of Australia’s tax system recommended that most stamp duties should be abolished and replaced with a broad-based land tax (Henry et al. 2010, p. 263). Land tax is more efficient, because if properly designed it has little impact on decisions about working, saving or investing. Because land is an immobile and fixed factor in productive activity, an ideally designed land tax would result in a once-off reduction in the value of land but with no reduction in land supply (Australian Government 2015, p. 148). However, several features of current land taxes, particularly their narrow base, make them less efficient and fair than they could be (Henry et al. 2010, p. 262).

Payroll tax could in principle be one of the most efficient state taxes, because it is designed to tax the value added from labour, which is relatively immobile (Henry et al. 2010, p. 293). In practice, however, payroll tax is ‘less efficient and more complex than it could be because of tax-free thresholds and other exemptions, often introduced to reduce tax paid by groups such as small business’ (Australian Government 2015, p. 144).
thresholds increase tax payable by small firms that cross the threshold and so may either discourage growth or encourage firms to change their corporate form in order to avoid tax.

The Australia’s Future Tax System review (Henry et al. 2010, p. 680) suggested that payroll tax should be replaced by a broad-based wages tax or by a cash flow tax. Because the states would lose some autonomy over tax revenue if payroll tax were absorbed into a new national cash flow tax and there would be practical limitations on using land tax to fund increases in expenditure, the review suggests that the states might need to seek a tax base sharing arrangement in respect of personal income tax or company tax.

Even if reform of state taxes should ideally take place at a national level, the question is whether the Queensland Government should seek to improve its own tax system in the absence of national reform. The Commission’s view is that it should do this, provided that the direction of state-based reform is consistent with the direction that national reform might ultimately take, and therefore makes national reform more, rather than less, likely. It therefore agrees with the QCA’s view that:

*Longer-term, there is a strong economic argument for Queensland and other state governments to undertake tax reforms which result in a significantly larger share of state revenues being generated by land tax and, potentially, payroll tax. (QCA 2015a, p. 200)*

A shift to broad-based efficient taxes would allow those taxes to be set a lower rate (which is likely to benefit manufacturing overall) as well as providing for the removal of more distortionary taxes.

**Draft recommendation 3**

The Queensland Government should reform the state tax system by removing or reducing distortionary taxes (such as stamp duties and insurance levies) and moving towards less distortionary taxes (such as broad-based land and payroll taxes).

**10.6 Other issues**

Stakeholders identified several other economy-wide policy areas that are significant for manufacturers, including workplace relations, urban planning and zoning, transport policy and infrastructure. Workplace relations and urban planning and zoning are briefly discussed below.

**Workplace relations**

Workplace relations featured prominently in the Commission’s consultations. For example, CCIQ considers that:

*...workplace relations are one of the most significant issues facing Queensland businesses as it directly shapes their employment and operational arrangements, and influences their cost bases. The top five workplace relations issues for Queensland businesses are unfair dismissal, complexity of the system, penalty rates, wages, and lack of flexibility. ... [CCIQ supports] embracing workplace flexibility. ... A system where the rights of employees are balanced against the rights of employers, with adequate protections in place to ensure the sustainability and fairness of the system. ... Enhanced wages and conditions need to be offset by delivering equal benefits to employers through higher efficiency or productivity improvements. (sub. 6, p. 17)*

The Commission also heard concerns that legislative requirements for permanent part-time workers are inconsistent with employment patterns in industries that are seasonal or hire staff who work from home.

The Queensland Government’s jurisdiction in workplace relations is, with exceptions such as regulation of workplace health and safety, limited to local and state government employees, through the Industrial Relations Act 2016. Workplace relations for private sector employees are regulated through the Fair Works Act 2009 (Cwlth), which the Australian Government administers. Given the Queensland Government’s limited role in workplace relations in the private sector, the Commission does not intend to review workplace relations in this inquiry.
The government is already reviewing workplace health and safety, which is one of the main areas for which it is responsible. The review will, amongst other things, examine Workplace Health and Safety Queensland’s (WHSQ) effectiveness in light of contemporary regulatory practice. It will cover all of WHSQ’s functions, including inspections, investigations, prosecutions, enforceable undertakings, research, strategy and policy development, information and education and awareness campaigns (Grace et al. 2017).

Section 457 skilled immigration visas

Stakeholders expressed different views about section 457 skilled immigration visas. The AMWU considers that the government should strengthen regulation to ensure that local workers are given priority for local work, and foreign workers are not exploited by local business in terms of pay, conditions and other workplace rights (sub. 9, p. 5). Some businesses, on the other hand, consider that section 457 visas help them to fill skill gaps when there are local shortages.

Since these submissions were made, the Australian Government has abolished section 457 visas and replaced them with the Temporary Skill Shortage visa (DIPB 2017a, 2017b). It will be important to manufacturers that they continue to be able to fill skill gaps under the new system.

Urban planning and zoning

Urban planning and zoning regulation influences manufacturers indirectly—through its impacts on urban form—and directly; for example, by influencing the supply of industrial land and infrastructure, and when projects require development approval.

Government also provides industrial land. Economic Development Queensland acquires, develops, manages and sells land to meet industry requirements, by bringing to market selected industrial land to help foster industry growth in Queensland, especially where there is a strategic outcome for the state.

The CCIQ considers that:

...the interaction between state and local government planning and development legislation, in addition to environmental and health regulations, is inhibiting decision-making. [It supports] introducing more streamlined state based law and policy in the area of planning and development, environmental regulation and health and safety. (sub. 6, p. 16)

The Australian Sugar Milling Council (sub. 5, p. 3) noted that ‘conflict in land planning and competition for land from other forms of agriculture, urban expansion and industrial use can result in the fragmentation of cane land and efficiency and scale for milling operations’.

Queensland is introducing a new planning system from July 2017, when the Planning Act 2016 comes into effect. The Government expects that the new system will improve:

• transparency and accountability, by imposing new requirements on councils and the state government to publish reasons for decisions
• community consultation
• appeal rights
• the development assessment process, which will be simplified
• environmental, heritage and sustainability outcomes (DILGP 2016).

This imminent and substantial overhaul suggests that it would be premature to comment on urban planning and zoning issues in this inquiry. However, it is good practice to evaluate the impacts of such major policy changes. Impacts on manufacturing should be included in the evaluation.
10.7 Conclusion

Overall, the evidence presented to this inquiry suggests that economy-wide policies affect the sector more than sector-specific policies. Energy policy, procurement policy, investment attraction and facilitation policies, and state taxation policy significantly influence the prospects for Queensland manufacturing. This does not mean that policy settings in these areas should be designed specifically for manufacturing, as doing so could disadvantage other sectors of the economy and reduce overall economic performance. However, good policy design in these four policy areas will help to provide an environment within which competitive manufacturers can build on their advantages, ameliorate weaknesses and take advantage of international opportunities.
Acronyms
<table>
<thead>
<tr>
<th>2D</th>
<th>Two dimensional</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>Three dimensional</td>
</tr>
<tr>
<td>4WD</td>
<td>Four Wheel Drive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AAAA</td>
<td>The Australian Automotive Aftermarket Association</td>
</tr>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>ACCC</td>
<td>Australian Competition and Consumer Commission</td>
</tr>
<tr>
<td>ACE</td>
<td>Assess Costs Everywhere (US analysis tool)</td>
</tr>
<tr>
<td>AEMO</td>
<td>Australian Energy Market Operator</td>
</tr>
<tr>
<td>AER</td>
<td>Australian Energy Regulator</td>
</tr>
<tr>
<td>AISC</td>
<td>Australian Industry and Skills Committee</td>
</tr>
<tr>
<td>AMWU</td>
<td>Australian Manufacturing Workers' Union</td>
</tr>
<tr>
<td>ANZSIC</td>
<td>Australia New Zealand Standard Industrial Classification</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of South East Asian Nations</td>
</tr>
<tr>
<td>ASMC</td>
<td>Australian Sugar Milling Council</td>
</tr>
<tr>
<td>ASQA</td>
<td>Australian Skills Quality Authority</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BERD</td>
<td>Business Expenditure on Research and Development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CCIQ</td>
<td>Chamber of Commerce &amp; Industry Queensland</td>
</tr>
<tr>
<td>CEDA</td>
<td>Committee for Economic Development of Australia</td>
</tr>
<tr>
<td>COAG</td>
<td>Council of Australian Governments</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DET</td>
<td>Department of Education and Training</td>
</tr>
<tr>
<td>DILGP</td>
<td>Department of Infrastructure, Local Government and Planning</td>
</tr>
<tr>
<td>DoE</td>
<td>(Australian) Department of Employment</td>
</tr>
<tr>
<td>DSD</td>
<td>Department of State Development</td>
</tr>
<tr>
<td>DSITI</td>
<td>Queensland Department of Science, Information Technology and Innovation</td>
</tr>
<tr>
<td>DTESB</td>
<td>Department of Tourism, Major Events, Small Business and the Commonwealth Games</td>
</tr>
<tr>
<td>DTMR</td>
<td>Department of Transport and Main Roads</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GFC</td>
<td>Gross Financial Crisis</td>
</tr>
<tr>
<td>GI</td>
<td>Glycemic Index</td>
</tr>
<tr>
<td>GFC</td>
<td>Government Financial Crisis Contracting</td>
</tr>
<tr>
<td>GSP</td>
<td>Gross State Product</td>
</tr>
<tr>
<td>GTMA</td>
<td>Gauge and Toolmakers Association (UK)</td>
</tr>
<tr>
<td>GVA</td>
<td>Gross Value Added</td>
</tr>
<tr>
<td>HERD</td>
<td>Higher Education Expenditure on Research and Development</td>
</tr>
<tr>
<td>ICC</td>
<td>Infrastructure Cabinet Committee</td>
</tr>
<tr>
<td>ICNQ</td>
<td>Industry Capability Network Queensland</td>
</tr>
<tr>
<td>ICT(s)</td>
<td>Information and Communication Technolog(y/ies)</td>
</tr>
<tr>
<td>IMAG</td>
<td>Industry and Manufacturing Advisory Group</td>
</tr>
<tr>
<td>IO</td>
<td>Input Output</td>
</tr>
<tr>
<td>IoT</td>
<td>Internet of things</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>IPO</td>
<td>Infrastructure Portfolio Office</td>
</tr>
<tr>
<td>IRC</td>
<td>Industry Reference Committee</td>
</tr>
<tr>
<td>ISA</td>
<td>Innovation and Science Australia</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>JQ</td>
<td>Jobs Queensland</td>
</tr>
<tr>
<td>LNG</td>
<td>Liquefied Natural Gas</td>
</tr>
<tr>
<td>MACSM</td>
<td>Ministerial Advisory Council on Skilled Migration</td>
</tr>
<tr>
<td>MAS</td>
<td>Manufacturing Advisory Service (UK)</td>
</tr>
<tr>
<td>MEP</td>
<td>Manufacturing Extension Partnership (US)</td>
</tr>
<tr>
<td>METS</td>
<td>Mining Equipment Technology Services</td>
</tr>
<tr>
<td>MFP</td>
<td>Multifactor productivity</td>
</tr>
<tr>
<td>MIQ</td>
<td>Made in Queensland</td>
</tr>
<tr>
<td>MIT</td>
<td>Massachusetts Institute of Technology</td>
</tr>
<tr>
<td>MSA</td>
<td>Manufacturing Skills Australia</td>
</tr>
<tr>
<td>N</td>
<td>NCVER</td>
</tr>
<tr>
<td>----</td>
<td>-------</td>
</tr>
<tr>
<td>N</td>
<td>NEM</td>
</tr>
<tr>
<td>N</td>
<td>NKS</td>
</tr>
<tr>
<td>N</td>
<td>NSI</td>
</tr>
<tr>
<td>N</td>
<td>NSETs</td>
</tr>
<tr>
<td>O</td>
<td>OECD</td>
</tr>
<tr>
<td>O</td>
<td>OPT</td>
</tr>
<tr>
<td>P</td>
<td>PC</td>
</tr>
<tr>
<td>P</td>
<td>PIAAC</td>
</tr>
<tr>
<td>P</td>
<td>PISA</td>
</tr>
<tr>
<td>P</td>
<td>PMI</td>
</tr>
<tr>
<td>Q</td>
<td>QAO</td>
</tr>
<tr>
<td>Q</td>
<td>QCA</td>
</tr>
<tr>
<td>Q</td>
<td>QNSAP</td>
</tr>
<tr>
<td>Q</td>
<td>QPC</td>
</tr>
<tr>
<td>Q</td>
<td>QPP</td>
</tr>
<tr>
<td>Q</td>
<td>QSBAC</td>
</tr>
<tr>
<td>R</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>R</td>
<td>RBA</td>
</tr>
<tr>
<td>R</td>
<td>ROA</td>
</tr>
<tr>
<td>R</td>
<td>ROI</td>
</tr>
<tr>
<td>R</td>
<td>RTO</td>
</tr>
<tr>
<td>R</td>
<td>RTRAC</td>
</tr>
<tr>
<td>S</td>
<td>SME(s)</td>
</tr>
<tr>
<td>S</td>
<td>STEM</td>
</tr>
<tr>
<td>T</td>
<td>TAFE</td>
</tr>
<tr>
<td>T</td>
<td>TCF</td>
</tr>
<tr>
<td>T</td>
<td>TCO</td>
</tr>
<tr>
<td>T</td>
<td>TIQ</td>
</tr>
<tr>
<td>U</td>
<td>UKTI</td>
</tr>
<tr>
<td>U</td>
<td>UNICOR</td>
</tr>
<tr>
<td>V</td>
<td>VCEC</td>
</tr>
<tr>
<td>----</td>
<td>------</td>
</tr>
<tr>
<td>V</td>
<td>VET</td>
</tr>
<tr>
<td>W</td>
<td>WAP</td>
</tr>
<tr>
<td>W</td>
<td>WHS</td>
</tr>
<tr>
<td>W</td>
<td>WHSQ</td>
</tr>
<tr>
<td>W</td>
<td>WTO</td>
</tr>
<tr>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
</tr>
</tbody>
</table>
Appendix A: Terms of reference
Inquiry into Queensland Manufacturing

In accordance with section 23 of the *Queensland Productivity Commission Act 2015*, I hereby direct the Commission to undertake an Inquiry into Queensland Manufacturing, including a review of international reshoring initiatives.

**Background**

Queensland’s manufacturing sector is a significant contributor to employment, as well as regional and economic growth within the State. In 2014-15, the industry contributed over $20 billion to the Queensland economy. Despite this significant contribution, manufacturing’s share of State output declined from around 12 per cent in 1989-90 to around 7 per cent in 2014-15.

While there are significant emerging opportunities, the manufacturing sector is also facing a number of challenges including business costs and regulation, skills shortages and strong emerging international competition. To remain competitive, the manufacturing sector will need to adapt and reposition itself to address these challenges and take advantage of emerging opportunities. This will include building the management and workforce skills and knowledge required to drive productivity and innovation.

Opportunities exist for the manufacturing sector to build on existing competitive advantages and advanced manufacturing niches, gain access to new domestic and international supply chains and other value-adding market opportunities, capitalise on export opportunities, apply advanced technologies, and foster a highly skilled manufacturing workforce. A reinvigorated manufacturing sector, using advanced manufacturing techniques in particular, has the potential to bring significant productivity gains and employment growth.

To achieve this, it is essential that the State’s manufacturing businesses operate within a supportive business environment that encourages innovation, investment and growth.

**Scope**

The objective of the Inquiry is to develop policy options to improve the productivity and competitiveness of the manufacturing sector in Queensland. In this regard, the Inquiry should focus on opportunities to maximise existing advantages, improve weaknesses and take advantage of emerging domestic and international opportunities.

In undertaking the Inquiry, the Commission should investigate and report on:

1. the role of the manufacturing sector in advancing economic growth and productivity in Queensland;
2. the changing nature of Queensland manufacturing, including its composition, location, employment size and structure, and linkages with service industries and international supply chains;
3. the manufacturing sector’s performance and potential, including a focus on employment and exports;
4. the characteristics of a productive and competitive manufacturing sector (noting the diverse nature of manufacturing in Queensland), including a focus on innovation and skills utilisation to promote longer term productivity improvements;
5. opportunities to improve the performance, productivity and competitiveness of the Queensland manufacturing sector;
6. experience from other jurisdictions, including in respect of reshoring initiatives (for example, the reshoring initiative in the United Kingdom);
7. the regulatory framework for manufacturing in Queensland, including changes that would reduce the regulatory burden on the manufacturing sector; and
8. the effectiveness of current policy settings for the manufacturing sector, and changes that would facilitate improved performance, productivity and competitiveness.
Public consultation

In accordance with section 25 of the *Queensland Productivity Commission Act 2015*, the Commission must undertake public consultation in relation to the Inquiry. This should include consultation with a diverse range of stakeholder groups including large and small manufacturers, key interest groups and affected parties, the Industry and Manufacturing Advisory Group, regulatory bodies, employee associations, government agencies, councils and research bodies.

Reporting (Amended Reporting Timeframes)

The Commission is required to publish a Draft Report for consultation by 31 July 2017.

The Final Report must be provided to Government by 31 October 2017.
Appendix B: Consultation
Submissions

<table>
<thead>
<tr>
<th>Individual or organisation</th>
<th>Submission number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Manufacturing Workers’ Union (AMWU)</td>
<td>MI- IP009</td>
</tr>
<tr>
<td>Australian Automotive Aftermarket Association (AAAAA)</td>
<td>MI- IP010</td>
</tr>
<tr>
<td>Australian Sugar Milling Council (ASMC)</td>
<td>MI- IP005</td>
</tr>
<tr>
<td>Chamber of Commerce and Industry Queensland (CCIQ)</td>
<td>MI- IP006</td>
</tr>
<tr>
<td>Cook Medical Australia</td>
<td>MI- IP012</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>MI- IP011</td>
</tr>
<tr>
<td>Northern Iron and Brass Foundry</td>
<td>MI- IP001</td>
</tr>
<tr>
<td>Packer Leather</td>
<td>MI- IP013</td>
</tr>
<tr>
<td>Australian Automotive Aftermarket Association (AAAAA)</td>
<td>MI- IP010</td>
</tr>
<tr>
<td>Australian Sugar Milling Council (ASMC)</td>
<td>MI- IP005</td>
</tr>
<tr>
<td>Chamber of Commerce and Industry Queensland (CCIQ)</td>
<td>MI- IP006</td>
</tr>
<tr>
<td>Cook Medical Australia</td>
<td>MI- IP012</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>MI- IP011</td>
</tr>
<tr>
<td>Northern Iron and Brass Foundry</td>
<td>MI- IP001</td>
</tr>
<tr>
<td>Packer Leather</td>
<td>MI- IP013</td>
</tr>
<tr>
<td>Australian Automotive Aftermarket Association (AAAAA)</td>
<td>MI- IP010</td>
</tr>
<tr>
<td>Australian Sugar Milling Council (ASMC)</td>
<td>MI- IP005</td>
</tr>
<tr>
<td>Chamber of Commerce and Industry Queensland (CCIQ)</td>
<td>MI- IP006</td>
</tr>
<tr>
<td>Cook Medical Australia</td>
<td>MI- IP012</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>MI- IP011</td>
</tr>
<tr>
<td>Northern Iron and Brass Foundry</td>
<td>MI- IP001</td>
</tr>
<tr>
<td>Packer Leather</td>
<td>MI- IP013</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>MI- IP011</td>
</tr>
<tr>
<td>Northern Iron and Brass Foundry</td>
<td>MI- IP001</td>
</tr>
<tr>
<td>Packer Leather</td>
<td>MI- IP013</td>
</tr>
<tr>
<td>Service Trades Council</td>
<td>MI- IP003</td>
</tr>
<tr>
<td>TCF Connect</td>
<td>MI- IP002</td>
</tr>
<tr>
<td>Transit Australia Group (Confidential)</td>
<td>MI - IP007</td>
</tr>
</tbody>
</table>

Consultations

Roundtables

The Commission held two roundtables during its consultations: one on Innovation; and the other on Structural Adjustment.

The Commission also attended an industry-led Roundtable held by the Textiles, Clothing and Footwear (TCF) industry body—Apparel and Textile Industry Group. This meeting was held on 2 February 2017 at TAFE Queensland’s Mt Gravatt Campus and participants are included below in the ‘Consultations and visits’ section.

Innovation Roundtable – 17 February 2017

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland Productivity Commission</td>
<td>Mr Kim Wood, Principal Commissioner</td>
</tr>
<tr>
<td>University of Queensland (UQ)</td>
<td>Professor Matthew Dargusch, School of Mechanical and Mining Engineering</td>
</tr>
<tr>
<td>Queensland University of Technology (QUT)</td>
<td>Dr Henri Burgers, QUT Business School</td>
</tr>
<tr>
<td>University of Technology Sydney (UTS)</td>
<td>Professor Roy Green, Dean of UTS Business School</td>
</tr>
<tr>
<td>Advanced Manufacturing Growth Centre (AMGC)</td>
<td>Mr Michael Grogan, Director</td>
</tr>
<tr>
<td>Australian Industry (Ai Group)</td>
<td>Mr Alex Stanojevic, Manager, Policy and Public Affairs</td>
</tr>
<tr>
<td>Chamber of Commerce and Industry Queensland (CCIQ)</td>
<td>Mr Stephen Tait, Chief Executive Officer</td>
</tr>
<tr>
<td>QMI Solutions</td>
<td>Mr Gary Christian, Managing Director &amp; Chief Executive Officer</td>
</tr>
<tr>
<td>Australian 3D Manufacturing Association</td>
<td>Mr Neil Sharwood, Operations Director</td>
</tr>
<tr>
<td>BlueMount Capital</td>
<td>Dr Mark Rainbird, Managing Director</td>
</tr>
<tr>
<td>Department of Science, Information Technology &amp; Innovation</td>
<td>Dr Jason Olsen</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>Ms Denise Johnston, Director, Regional Economic Programs</td>
</tr>
<tr>
<td>Jobs Queensland</td>
<td>Mr Bill Walker, Director, Advanced Manufacturing</td>
</tr>
<tr>
<td>B&amp;R Enclosures Pty Ltd</td>
<td>Ms Chris Bridges-Taylor, General Manager</td>
</tr>
</tbody>
</table>
Structural Adjustment Roundtable – 24 February 2017

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland Productivity Commission</td>
<td>Mr Kim Wood, Principal Commissioner</td>
</tr>
<tr>
<td>University of Queensland (UQ)</td>
<td>Professor John Quiggin, Australian Laureate Fellow in Economics</td>
</tr>
<tr>
<td>Regional Australia Institute</td>
<td>Mr Jack Archer, Chief Executive Officer</td>
</tr>
<tr>
<td>Australian Industry (Ai Group)</td>
<td>Mr Alex Stanojevic, Manager, Policy and Public Affairs</td>
</tr>
<tr>
<td>Chamber of Commerce and Industry Queensland (CCIQ)</td>
<td>Ms Kate Whittle, State Manger (Advocacy)</td>
</tr>
<tr>
<td>Committee for Economic Development of Australia (CEDA)</td>
<td>Ms Kyl Murphy, State Director</td>
</tr>
<tr>
<td>Queensland Council of Social Services (QCOSS)</td>
<td>Ms Laura Barnes, Senior Manager (Practice, Research &amp; Policy)</td>
</tr>
<tr>
<td>TAFE Queensland</td>
<td>Mr Erik Salonen, Business Manager (Projects)</td>
</tr>
<tr>
<td>Australian Manufacturing Workers’ Union (AMWU)</td>
<td>Mr Rohan Webb, State Secretary</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>Mr Richard Walker, Acting Executive Director (Economic Policy and Research)</td>
</tr>
<tr>
<td>Jobs Queensland</td>
<td>Dr Caroline Smith, Executive Director</td>
</tr>
<tr>
<td>Committee for Economic Development of Australia (CEDA)</td>
<td>Ms Kyl Murphy, State Director</td>
</tr>
<tr>
<td>Queensland Council of Social Services (QCOSS)</td>
<td>Ms Laura Barnes, Senior Manager (Practice, Research &amp; Policy)</td>
</tr>
<tr>
<td>TAFE Queensland</td>
<td>Mr Erik Salonen, Business Manager (Projects)</td>
</tr>
<tr>
<td>Australian Manufacturing Workers’ Union (AMWU)</td>
<td>Mr Rohan Webb, State Secretary</td>
</tr>
<tr>
<td>Department of State Development</td>
<td>Mr Richard Walker, Acting Executive Director (Economic Policy and Research)</td>
</tr>
<tr>
<td>Jobs Queensland</td>
<td>Dr Caroline Smith, Executive Director</td>
</tr>
</tbody>
</table>

Consultations and visits

The Commission also met with a wide range of organisations and representatives, which are listed below. This list also includes representatives that were present at the TCF industry-led roundtable.

- Ai Group
- Alvey Reels
- Apparel and Textile Industry (ATI) Group
- Australian Manufacturers’ Workers Union
- Australian Workers’ Union
- Ayr manufacturers
- B&R Enclosures
- Beaulieu Pacific
- CEA Fashion Incubator
- Cook Medical
- Department of Education and Training
- Department of Energy and Water Supply
- Department of Infrastructure, Local Government and Planning
- Department of Science, Information Technology and Innovation
- Department of State Development
- Department of Tourism, Major Events, Small Business and the Commonwealth Games
- Office of Small Business
- Economic Development Queensland
- Evolve Agencies
- Grove Juice
- HildeHeim Bridal Couture
- Hutchinson Builders
- JBS Australia - Primo
- Jobs Queensland
- KFSU
- LBFR Creative
- METS Ignited
- Packer Leather
- Patheon Biologics
- QMI Solutions
- QMN Manufacturing
- Queensland Government
- Queensland Treasury
- Queensland University of Technology (QUT)
- Raptis
- Sun Metals
- TAFE Queensland
- Technical Fabric Services
- Trade and Investment Queensland
- Watkins Steel
References


2016k. *Labour Force, Australia, Detailed, Quarterly*, cat. no. 6291.0.55.003, at


2017a. *Business Indicators, Australia, Dec 2016*, cat. no. 5676.0, at


2017e. *Input Output Tables*, cat. no. 5209.0.55.001, at

2017f. *Producer Price Indexes*, Australia, cat. no. 6427.0, Canberra, at

2017g. *Consumer Price Index Australia*, cat no. 6401.0, Canberra, at

2017h. *Australian Industry 2015–16*, cat. no. 8155.0, at


Battochi, M 2016, ‘Italy is the second most popular reshoring destination’, San Francisco, Italy, at http://sanfranciscoitaly.com/day/2016/06/15/.


BCA (Business Council of Australia) 2004, Offshoring, global outsourcing and the Australian economy: Continuing Australia’s integration into the world economy, Melbourne.


—— 2017a, Response to Information Request from the QPC, provided 5 January 2017.


— 2017, Response to Information Request from the QPC, provided 10 January 2017.


Downes, P & Stoelckel, A 2006, Drivers of structural change in the Australian economy, Centre for International Economics, December, Canberra and Sydney.


212


DSITI (Department of Science, Information Technology and Innovation) 2017, Response to Information Request from the QPC, provided 25 January 2017.


DTESB (Department of Tourism, Major Events, Small Business and the Commonwealth Games) 2017a, Response to Information Request from the QPC, provided 10 January 2017.


ERA (Economic Regulation Authority) Western Australia 2014, Inquiry into microeconomic reform in Western Australia, final report, Economic Regulation Authority, Perth.


Ernst & Young 2013, Hitting the sweet spot: The growth of the middle class in emerging markets, viewed 1 June 2017, at http://www.ey.com/Publication/vwLUAssets/Hitting_the_sweet_spot/$FILE/Hitting_the_sweet_spot.pdf.

2015, Reshoring manufacturing—time to seize the opportunity, Ernst & Young, London.


Groom, B 2013, ‘One in six UK manufacturers reverse offshoring in growing trend’, Financial Times, 25 November, at www.ft.com/content/7e736f90-539e-11e3-9250-00144feabdc0.


Inklaar, R & Timmer, MP 2008, GGDC productivity level database: international comparison of output, inputs and productivity at the industry level, Groningen Growth and Development Centre, University of Groningen.


DRAFT REPORT: Manufacturing in Queensland

218


OSR (Office of State Revenue) 2017, confidential data provided to the Queensland Productivity Commission, 22 May.


--- 2015a, *Examining barriers to more efficient gas markets*, research paper, Canberra.


--- 2016a, *Digital Disruption: What do governments need to do?*, research paper, Productivity Commission, Canberra.


--- 2016c, *Regulation of Australian Agriculture*, Inquiry report no. 79, Canberra.


— 2016a, ‘Unpublished Queensland Treasury research paper’.


— 2017, Response to information request from QPC, provided 31 December.


Wood, T, Blowers, D & Griffiths, K 2017, Powering through: How to restore confidence in the National Electricity Market, Grattan Institute, Melbourne.


