South East Queensland **Economic Foundations Paper**

January 2018

Queensland Government

Contents

Index of Figures and Tables

Purpose of this paper

This report has been drafted by the Queensland Government's Cities Transformation Taskforce (CTT). The CTT is responsible for the negotiation of City Deals on behalf of the Queensland Government as well as making a contribution to wider cities policy. This document is intended to inform the development of a tri-partite agreement between local, state and Commonwealth governments to progress a South East Queensland (SEQ) City Deal.

It provides the foundation for development of a framework for investment into the region that will support the growth of priority industries, support the expansion, efficiency and connectivity of key corridors and clusters, and ensure the effective connectivity of key labour market areas to centres of employment activity. This framework will then guide the identification and prioritisation of programs and projects to achieve these outcomes.

The SEQ City Deal is the second City Deal proposed to be negotiated for the State of Queensland, following the signing of the Townsville City Deal in December 2016. These City Deals are guided by the Commonwealth Smart Cities Plan as well as the Memorandum of Understanding to establish and implement City Deals signed by the Queensland and Commonwealth Governments in September 2016. The SEQ City Deal builds on a period of two years of collaboration between local governments in the region, the Council of Mayors SEQ (CoM(SEQ)) and the state government to define the parameters and potential scope of such a deal. There has also been active engagement between officers from the Queensland Government, SEQ councils and the Commonwealth Department of Prime Minister and Cabinet Cities Unit.

The economic foundations paper also has broader applicability to a wider range of government policy considerations. Inputs have been drawn from a variety of government agencies and stakeholders to ensure that a robust paper has been developed to guide regional economic development planning activities.

A full list of stakeholders consulted in the development of this report has been provided in Appendix A.

Executive summary

Many of the world's established economies have experienced significant growth in new knowledge intensive service industries at the cost of traditional labour intensive industries, while other emerging economies have benefited from increased traditional industry activity. This creates new opportunities for trade activity, as the demand for new knowledge intensive services increase, and the economies of scale for traditional industries are realised in emerging economies.

For established Western economies such as SEQ, traditional industries are in decline as they move offshore to lower cost competitors or are redefined through technology transformation. This is most notable in industries with a traditional manufacturing base; steel, automotive and textile manufacturing. The increasing use of technology in industry is automating labour intensive processes, improving productivity, and allowing for higher value-adding activities in these industries. Globalisation too, has been driving the geographical relocation of business from higher cost to lower cost locations. Regions such as SEQ, with a wealth of human capital, can benefit from opportunities in new knowledge industries, while also adding value to the supply chains of traditional industries.

Global megatrends and a transitioning economy are shaping the future of SEQ. There is a key opportunity for the leadership of the SEQ region to determine a clear economic growth aspiration for the region. This aspiration should leverage the areas of comparative advantage without jeopardising the unique social and environmental characteristics and values of the region.

SEQ's opportunity

SEQ is in a unique position. It has a unique set of natural assets, established transport infrastructure networks, quality educational institutions, and access to some of the world's fastest growing domestic and international markets. As the state's capital region, it also offers scale, covering 12 local government areas which are home to 3.4 million people, one in seven Australians.

SEQ also has reached collaborative maturity levels in both a political and institutional sense, with strong relationships between its local government areas and a regional land use plan that highlights the critical interplay between economic, spatial and infrastructure perspectives. The *South East Queensland Regional Plan 2017* (*ShapingSEQ*) sets out the economic aspirations for the region as:

> **"...Australia's eastern gateway to international markets. Globally visible and competitive, SEQ will grow its export share of the economy to create new activity and skills. More jobs will be located throughout the region with better and healthier options for accessing them."**

This statement provides a clear aspiration for the economic foundation that the region is seeking. It is seeking high value, globally competitive employment opportunities that are readily accessible by the region's population. The focus on the export share of the economy reflects analysis highlighting that, while the Sydney and Melbourne metropolitan regions have more than half of their economic activity being driven by export oriented activities, this figure is closer to 45 percent in Greater Brisbane.[1]

SEQ needs to consider how it is best leveraging its local advantages through natural resources such as its productive agricultural lands near its metropolitan areas and key trading gateways, as well as its scenic amenity and tourism appeal. Similarly, the region needs to consider how it is leveraging its significant population serving activities and translating these into export oriented activities. Examples include the significant health and education infrastructure across the region that are already engaging in traded activity (international education and health research) but that could provide the foundation for further industry development and innovation.

[1] Greater Brisbane has been used to provide a more precise comparison with Sydney and Melbourne

Identifying priority industries and their spatial distribution in SEQ

This paper identifies industries within the economy that have the greatest potential to lift productive economic output in the future. It applies a robust analytical approach to: firstly, ascertain which industries within the Australian economy are in fact traded (or export-oriented), versus industries that primarily serve the local population; and secondly, identify if there are traded industries within SEQ that exhibit characteristics that may deem them to have comparative advantage.

The analysis identifies key sectoral clusters across the region that are driving economic growth as well as the key corridors that link these clusters with one another and the key labour pools across the region. This builds on the geographies described in *ShapingSEQ* and provides further consideration for place-based initiatives to enable future industry specific economic activity.

Five priority industries

From both the research undertaken and feedback received through engagement with state and local policymakers, there was broad consensus that there are five priority traded industries. These five industries in SEQ have characteristics that were determined to be a comparative advantage and will be a major source of future export and job growth. The five priority industry clusters include:

- **Advanced manufacturing** will bring new products to market, from design through to full scale manufacturing, driven by the integration of digital technologies, 3D printing, and automation.
- **Agribusiness** will feed the growing populations within Queensland, interstate and offshore, underpinned by SEQ's productive agricultural soils, sub-tropical climate, and access markets.
- **Traded health and education** is a strategic priority for SEQ due to its role in growing knowledge, jobs and innovation, and its continued expansion in SEQ supported by demand from the rising middle-class in the Asia-Pacific region.
- **Transport and communications** is underpinned by increasing online business and consumer transactions which require both digital infrastructure and the storage and distribution of goods.
- **Tourism and creative** will continue to expand as the growing middle-class, both domestically and in the Asia-Pacific region, seek out more unique and personalised travel experiences and leisure products.

This paper identifies key enablers to support growth in these priority industry clusters. These include land (and other natural resources), infrastructure, open information, human capital, financial capital, policy and technology.

Spatial distribution placehold of economic activity

The SEQ Economic Foundation Paper identifies key economic corridors that serve as both key inter-regional and cross-regional corridors for passengers and freight. These have been identified on the basis of their capacity to link key economic clusters with one another, urban growth areas and the key export gateways for the region. These include:

- East-West Corridor;
- Capital City Knowledge Corridor;
- South Corridor;
- North Corridor; and
- South-West Corridor

When overlaid against the key economic clusters and growth fronts for the region, these corridors form a critical organising frame for the region's economic geography (Figure A).

Regional initiatives

Sub-regional initiatives

	East-West Corridor	Capital City Knowledge Corridor	South Corridor	South-West Corridor	North Corridor
Regional Economic Clusters	• Australia Trade Coast • South west industrial corridor • Ipswich • Western Gateway	• Capital City	• Pacific Motorway • Meadowbrook–Loganholme • Yatala Stapylton–Beenleigh • Southport–Broadbeach • Robina Varsity Lakes • Southern Gateway	• Bromelton SDA	• Strathpine–Brendale–Petrie • North Lakes–Mango Hill • Kawana • Northern Gateway
Urban Growth Fronts	• Ripley • Springfield • Westbrook • Under-Utilised Urban Footprint		• Southern Redland Bay • Yarrabilba • Coomera • Under-Utilised Urban Footprint	• Greater Flagstone • Beaudesert • Park Ridge • Under-Utilised Urban Footprint	• Caloundra South • Beerwah East • Palmview • Caboolture West • Under-Utilised Urban Footprint

Place making initiatives

Figure A – SEQ clusters, corridors and growth fronts that will underpin regional growth
Source: CTT, Queensland Government

Next steps

The SEQ economic foundations paper has identified both the industry clusters with the potential to drive the economic growth to which the region's leaders aspire, as well as the key spatial locations and enablers that will be critical to realising this growth. These insights will be valuable to both an overarching narrative (Figure B) for the region's economic future, as well as providing the foundations for an investment framework for the region.

This investment framework has been identified as a priority input for the development of an SEQ City Deal for the region. The parameters of the City Deal are currently being negotiated between all three tiers of government (local, state and Commonwealth) and will ultimately culminate in a joint agreement on a series of investments and initiatives for the region.

Figure B – Overview of the SEQ Economic Foundations Paper structure

QUT Gardens Point

Volunteer Surf Life Savers, Noosa Main Beach, Noosa Heads

Introduction

The South East Queensland (SEQ) economic foundations paper has been collaboratively developed between local, Queensland and Commonwealth Government representatives to shape a consistent view on the industries, locations (corridors and clusters) and labour markets that drive the region's economy. Critically, it considers the economic geography of the region independently of local government boundaries, providing a collective view on the way in which industries are locating and growing.

This perspective on the region's economic strengths, opportunities and enablers is complementary to existing strategic frameworks outlining the spatial reality and direction for the region *ShapingSEQ* as well as key infrastructure planning documents (State Infrastructure Plan, SEQ Regional Transport Plan and local government infrastructure strategies). It has been designed to draw through key messages and policy anchors from these documents to provide a foundation on how investment in the region could unlock further economic growth.

ShapingSEQ defines the SEQ region to include the following 12 local governments:

- Brisbane City Council;
- Gold Coast City Council;
- Ipswich City Council;
- Lockyer Valley Regional Council;
- Logan City Council;
- Moreton Bay Regional Council;
- Noosa Shire Council;
- Redland City Council;
- Scenic Rim Regional Council;
- Somerset Regional Council;
- Sunshine Coast Council; and
- Toowoomba Regional Council.

South East Queensland Local Governments

Figure 1 – South East Queensland Local Governments
Source: Regional and Spatial Planning, Queensland Government. September 2017

Global trends that are shaping the economic opportunity for SEQ

This paper recognises the effects that global megatrends are having in rapidly changing the structural makeup of regional economies around the world. Many of the world's established economies have experienced significant growth in new knowledge intensive service industries at the cost of traditional labour-intensive industries, while other emerging economies have benefited from increased traditional industry activity. This creates new opportunities for trade activity, as the demand for new knowledge intensive services increase, and the economies of scale for traditional industries are realised in emerging economies.

For established Western economies, such as SEQ, traditional industries are in decline as they move offshore to lower cost competitors or are redefined through technology transformation. This is most notable in industries with a traditional manufacturing base: steel, automotive and textile manufacturing. The increasing use of technology in industry is automating labour intensive processes, improving productivity, and allowing for higher value-adding activities in these industries. Globalisation, too, has driven the geographical relocation of business from higher cost to lower cost locations. Regions such as SEQ, with a wealth of human capital, can benefit from opportunities in new knowledge industries, while also adding value to the supply chains of traditional industries.

The future success of metropolitan areas such as SEQ will depend on their ability to respond in their decision making to these megatrends. Responding to global megatrends may prompt a rethink of governance models, business processes and social systems. Consequently, the ongoing success of SEQ will depend on the entire economic ecosystem. For the economy to grow, it requires the appropriate environment for the continued generation of new ideas and products, adoption of new technologies and a skilled workforce.

SEQ is well placed to respond to these transformative global megatrends. The region can leverage its existing advantages which include: world-class knowledge and technology precincts with links to high-quality research and development facilities, training and education institutions, its brand as a major tourist destination and its organisations that specialise in commercialising innovation.

Critical global megatrends that will shape the region's economic potential include:[2][3][4]

Increasing urbanisation

The world's population is becoming more urbanised with over half the world's population living in urban areas. This is increasing the demand for diverse forms of infrastructure, goods and services, but also generating new challenges as waste, pollution, congestion, and housing affordability issues compound.[5]

SEQ is already an urbanised but dispersed region, and is expected to experience significant further growth. Accordingly, the region is faced with the challenge of sustainably absorbing this growth, while maintaining liveability, prosperity and competitiveness.

SEQ, through *ShapingSEQ*, is focused on delivering a diverse range of housing, with an emphasis on the 'missing middle' forms of housing (i.e. housing types between detached houses and high-rises). This urbanisation also brings to the region new opportunities in the form of skills and capability.

Technology and digital disruption

Fast paced technological advancements are transforming society, changing the way we work, live and play. The rate of adoption of new technologies has been unprecedented, and current forecasts expect this to continue with the global smart cities market expected to grow from USD$506 billion in 2012, to USD$1.3 trillion in 2019.[6]

New technologies, including automation, 3D printing and digital technologies are appearing, rapidly and simultaneously, across industries as disparate as healthcare and advanced manufacturing.

In SEQ, adapting to the new digital economy will require innovation, early adoption and new thinking on how we plan for jobs, commerce and retailing. It will also accelerate the importance of reskilling, transition support and investment in employment generating enablers that will support growth in key emerging sectors. Technology will also bring new opportunities to overcome some of Australia's historical economic challenges, including distance to global markets.

[2] CSIRO, 2012, Our Future World: Global Megatrends that will change the way we live. Accessed 25 July 2017. https://www.csiro.au
[3] KPMG, 2014, Future State 2030
[4] Department of Infrastructure, Local Government and Planning, 2017, ShapingSEQ – SEQ Regional Plan
[5] United Nations Human Settlements Programme, 2016. World Cities Report 2016 – Chapter 1
[6] United Nations Human Settlements Programme, 2016. World Cities Report 2016 – Chapter 2

Pressure on biodiversity

Around the world, valuable ecosystems are under pressure from urban expansion, agricultural clearing and the effects of climate change.

In SEQ, the environment has intrinsic ecological value, in addition to economic and community benefits. Protecting the ecosystem against new environmental pressures is required to support the future liveability and economic prosperity in the region.

Climate change and disaster resilience

Unpredictable extreme weather events, sea level rises, temperature shifts and changed environmental conditions have the potential to cause significant global disruption, with cities and urban areas among the major contributors to rising carbon dioxide emissions, accounting for more than 70 percent of the global emissions.[7]

SEQ has long experienced the impacts of extreme weather, floods, heatwaves and bushfires. Climate change is expected to amplify the frequency and severity of these events. Limiting the adverse impacts of climate change, improving resilience and reducing recovery time is a priority for government and industry.

A growing Asia-Pacific region

The world is becoming more interconnected and the global economic focus is shifting towards Asia. China, India and Japan will be three of the world's largest economies, forecast to contribute almost 35 percent of total world GDP to 2021.[8]

SEQ is ideally positioned as an international gateway to the Asia-Pacific region, located on the doorstep of the fast-growing economies of Asia. Ensuring the efficiency of gateways to key markets will be critical as well as the way in which SEQ's unique services are globally promoted to meet rising demand.

SEQ's economic growth opportunity

In an environment of economic transition and global megatrends that are shaping the potential for industry growth, there is a key opportunity for the leadership of the SEQ region to determine a clear economic growth aspiration that is consistent with its areas of comparative advantage and that do not jeopardise its unique social and environmental characteristics and values.

An economy underpinned by skilled labour, knowledge sharing and innovation

SEQ is unable to compete globally on a low-cost basis. Distance to global markets, wage levels and the size of domestic demand provide substantial challenges to Australian firms achieving the economies of scale necessary to compete on this basis. Instead, Australian firms have differentiated their offerings based on higher value offerings as well as in the export of services that are not reliant on expensive transportation costs.

These higher value industries and service exports rely on the knowledge base and capabilities of the local workforce as well as their ability to utilise technology to improve productivity and innovate to retain their comparative advantages.[9] Knowledge based economies such as SEQ offer skilled workers attractive jobs with higher wages, however the region needs to be able to attract, retain and train this workforce to ensure that opportunities for economic growth can be realised.

The key characteristics of regions and cities are increasingly being recognised as critical in the attraction and retention of workers. SEQ is a highly liveable region well placed to attract skilled workers, offering a sub-tropical climate, scenic hinterlands and pristine beaches. In an increasingly competitive global economy however, there is a key opportunity for the leadership of the SEQ region to determine how to best attract, train and retain knowledge workers who support its economic growth aspirations. Further, the region's leaders have the opportunity to consider how to encourage innovation and technology adoption that will support the competitiveness of the region's key industries.

[7] United Nations Human Settlements Programme, 2016. World Cities Report 2016 – Chapter 1. Accessed 18 July 2017. http://wcr.unhabitat.org/main-report/
[8] International Monetary Fund, 2016. World Economic Outlook Database. Accessed 18 July 2017. https://www.imf.org
[9] OECD. 2011. Competencies for the knowledge economy. www.oecd.org/innovation/research/1842070.pdf

Growing the traded economy

The region's spatial plan, *ShapingSEQ*, outlines the economic aspirations for the region as:

> **"...Australia's eastern gateway to international markets. Globally visible and competitive, SEQ will grow its export share of the economy to create new activity and skills. More jobs will be located throughout the region with better and healthier options for accessing them."**

This statement provides a clear aspiration for the economic growth that the region is seeking and is a component of the 50-year vision. SEQ is seeking high value, globally competitive employment opportunities that are readily accessible by the region's population.

The focus on the traded industry's output (along with export share) of the economy reflects analysis highlighting that, while the Sydney and Melbourne metropolitan regions have more than half of their economic activity being driven by trade oriented activities, this figure is closer to 48 percent in Greater Brisbane.[10] As highlighted in Figure 2, the predominant share of SEQ's economy is driven by population servicing industries, such as local retail, health or public services. These industries tend to be dependant on population growth and are typically of a lower value than trade oriented activity. By contrast, trade oriented activities are not directly dependant on population growth and present an opportunity for expansion of economic opportunity that is tied to wider national and global demand and are typically of a higher value.

There is an opportunity for the leadership of the SEQ region to determine the pathway that enables the region to grow the export share of its economy. In a global marketplace, traded industries are typically free to choose their location. However, some traded industries have developed in key locations as they are dependent on proximity to natural resources (for example, mining industries that locate near resource and mineral deposits). SEQ needs to consider how it is best leveraging its local advantages through natural resources such as its productive agricultural lands near its metropolitan areas and key trading gateways, as well as its scenic amenity and tourism appeal.

Similarly, the region needs to consider how it is leveraging its significant population serving activities and translating these into trade oriented activities. Examples include the significant health and education infrastructure across the region that are already engaging in traded activity (international education and health research) but that could provide the foundation for further industry development and innovation.

The northern hub of the Eastern Seaboard

As the northern most capital city region on the Eastern Seaboard of Melbourne, Sydney and Brisbane, SEQ is well located to connect South Eastern Australia to the Asia Pacific rim. As the northern destination for Inland Rail, the Port of Brisbane has substantial potential for growth. Paralleling the route for Inland Rail, Wellcamp International Airport will be the northern end of an inland air freight corridor that begins in Shepparton, Bendigo and Deniliquin in Victoria, passes through Parkes and Forbes in New South Wales and finally connects Wellcamp with the Asia Pacific.

These dual air and rail freight corridors run through Australia's East Coast and have the potential to transport goods to SEQ's industrial, logistical and intermodal hubs, where value can be added by a skilled workforce and technology before export. With room to grow in strategically considered ways, SEQ has the potential to further develop well-planned inland ports, intermodal hubs and industrial areas that are co-located with these major freight corridors. There is a clear economic opportunity for the rise of these job centres adjacent to Inland Rail, such as Wellcamp, Bromelton and Ebenezer, which has the potential to significantly build SEQ's share of traded oriented economic activity.

Truck freight movements, Brisbane

[10] Greater Brisbane has been used to provide a more precise comparison with Sydney and Melbourne

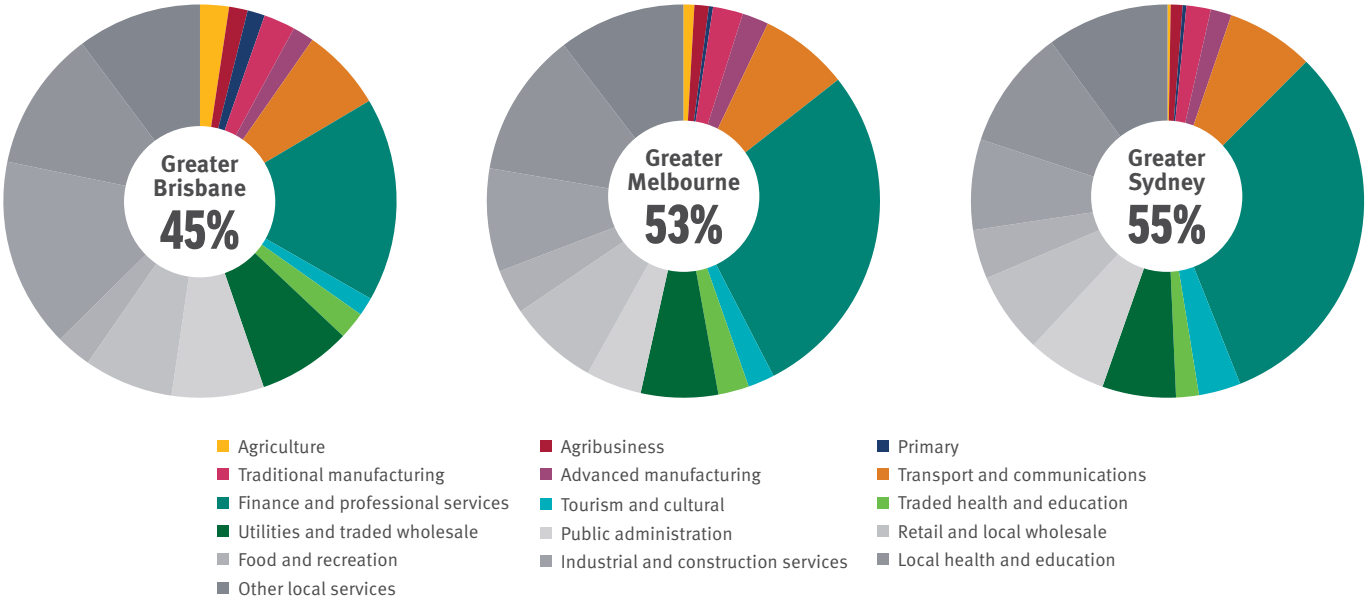


Figure 2 – Trade oriented share of Australia's eastern Greater Capital City economies in terms of gross valued added (GVA), 2016
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note

Redcliffe, Moreton Bay

Structure of this report

The economic foundations paper has been structured to outline the fundamental characteristics of the SEQ economy that will provide a platform to address the economic growth challenges outlined above. It has been developed through consultation with key government and industry stakeholders on three key questions to address these challenges:

- What is it that differentiates the SEQ region?
- What are the opportunities for growth in key trade oriented industries in the region?
- What are the enablers with the potential to drive growth in these industries?

The findings from this engagement have highlighted the key spatial and industry characteristics of the region's potential for economic growth. These findings have been presented in three parts.

Part 1 | SEQ Context

Part 1 highlights the key characteristics of the SEQ region which differentiate it from other metropolitan regions in Australia and globally.

Chapter 2: The SEQ region – highlights the key demographic, economic and infrastructure foundations that comprise the region's economic geography.

Chapter 3: Established leadership – outlines the characteristics of the mature policy platform and governance structures that differentiate the region from other metropolitan capitals.

Chapter 4: Positioning SEQ – outlines the unique characteristic of SEQ in the Queensland, Australian and international context.

Part 2 | Foundation for sustainable prosperity in SEQ

To achieve economic growth which has a sustained positive change – sustainable prosperity – it is necessary to plan and actively implement social and environmental actions facilitated by good governance.

The following sections identify the considerations necessary to achieve sustainable prosperity in the context of SEQ:

Chapter 6: The social environment – outlines the importance of the accessibly, stability, greenspace and civic services characteristics which underpin the liveability of the region and economic development.

Chapter 7: The natural environment – outlines the importance of the environmental consideration and environmental characteristics which underpin the liveability of the region and economic development.

Part 3 | Economic foundation

Part 3 identifies the priority industries with the potential to drive economic growth as well as the key spatial economic foundations that will be critical considerations to unlock this potential.

Chapter 9: Priority industries driving growth – details the five trade oriented (or 'export') industry clusters of the economy that have a high density and value of employment activity in the region. The impact of global trends on these industry clusters, as well as the opportunities and risks that these present for each industry in SEQ, are discussed, in conjunction with the potential enablers that could support the future growth of these industry clusters.

Chapter 10: The economic foundation of SEQ – brings together the region's spatial, infrastructure and economic characteristics to highlight the corridors, clusters and growth fronts that will be critical to the achievement of the region's aspiration to grow its trade oriented economy.

State Disaster Coordination Centre, Brisbane

PART 1 | SEQ context

The following Part 1 sets out the characteristics which make SEQ unique.

It includes information about:

- Key demographic, economic and infrastructure information that comprise the region's economic geography.
- The characteristics of the government and policy structures that differentiate the region from other metropolitan capitals.
- The unique characteristic of SEQ in the Queensland, Australian and international context.

Part 1 highlights the following key characteristics:

A significant regional economy in Queensland and Australia

SEQ is a high value, high demand, diverse economy within Australia. With focused investment on areas of highest impact, SEQ will continue to drive the growth of the Queensland economy.

Strong and continuing population growth

By the standards of other high performing mid-sized regions, SEQ has undergone and is projected to continue a strong cycle of population growth. The growing population provides the necessary human capital to support increased economic activity.

Established infrastructure assets connecting the region

The region has a robust infrastructure network consisting of five international gateways, coordinated industrial land capacity, strategic defence assets, and knowledge and technology precincts. This infrastructure network serves SEQ as a platform for future development and will continue to connect the region to domestic and global markets as a primary enabler of economic activity.

SEQ natural endowments enable unique niche industries

Highly productive agricultural land, picturesque natural landscapes, and coastal location have provided a foundation for development of niche industries. SEQ's natural endowments and technology are enabling innovation in these key industries.

SEQ has a collaborative and coordinated regional leadership dynamic

The region has mature governance structures demonstrating successfully consolidated council objectives and a strong track record of collaboration. SEQ's 11 local governments, along with the State Government, have an aligned vision for the future of the region. Where other regions are focused on trying to align council objectives, SEQ is focused on delivering regional coordinated investment to benefit the region and its councils.

Strong position for growth

SEQ is in a strong position to grow the economy of the region through traded industries. The region has an established foundation to continue the transition of the economy to one which is underpinned by strong use of technology and a highly skilled workforce.

Active lifestyle, Brisbane River

The SEQ region

SEQ is differentiated by its lifestyle, culture, climate and rich natural environment, which underpins the region's diversified traded economy and skilled local workforce. The diverse city-region extends from the Sunshine Coast in the north, to the Gold Coast in the south, is anchored by Brisbane in the east and stretches to Toowoomba in the west.

A growing region

Over the past 70 years, SEQ has experienced significant population growth, driven by the region's enviable lifestyles and economic opportunities. As the third-largest urban region within Australia (34,385 km^2), SEQ is home to one in seven Australians (3.4 million people) and is expected to attract an additional 1.9 million residents by 2041 (Figure 3).[11]

Strong population growth across the region will increase the demand for housing, transport, jobs and services. Accordingly, the balance between outward expansion and urban consolidation is critical to support the more efficient use of existing infrastructure, access to education, employment and services, and reduce the impacts on natural systems and assets.

As detailed in *ShapingSEQ*, SEQ's existing urban areas are projected to accommodate a significant proportion of the region's future growth. Preserving the region's identity and liveability through sustainable growth is paramount, particularly as the region moves towards achieving its target of 60 percent consolidation of dwellings into existing urban areas (consolidation housing).

In alignment with the region's strategic land use planning, there are a number of urban growth fronts that are projected to accommodate SEQ's 40 percent of expansion dwelling supply. These are classified as major expansion areas in the regional plan and are projected to account for over 185,000 new dwellings over the life of *ShapingSEQ* to 2041. These growth fronts are summarised in the table below.

Expansion Area	Expected Dwelling Take-up 2011–2041
Coomera	8,000
Ripley	34,000
Springfield	24,100
Greater Flagstone/ Flinders	27,600
Park Ridge	23,300
Yarrabilba	15,750
Caboolture West	18,000
Southern Redland Bay	1,500
Beaudesert	1,800
Beerwah East	9,500
Caloundra South	16,750
Palmview	6,400
Westbrook	1,200
Total	**187,900**

These 13 growth fronts are highlighted in Figure 4. Together with key urban consolidation sites, they will form a critical consideration for the planning of transport infrastructure to connect the future residents of the region to employment opportunities. This is both vital for the attractiveness of the region as a place to live, as well as ensuring that businesses are able to access deeper labour pools to support their growth.

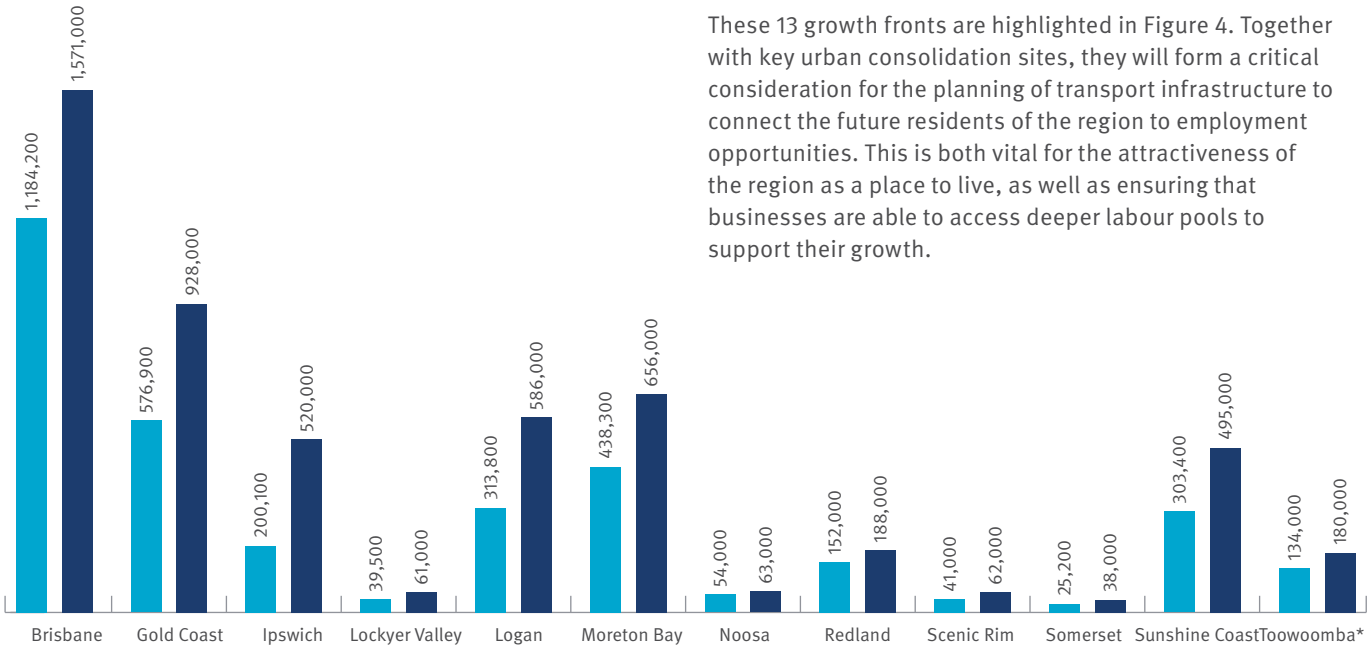


Figure 3 – SEQ's current and projected population 2017–2041

Source: Current population – Australian Bureau of Statistics, Regional Population Growth, Australia (July 2017), Projected population – SEQ total is Queensland Government population projection 2015 edition (medium series); growth distribution by local government area based on *ShapingSEQ* policy.
* Toowoomba is the urban extent only as per *ShapingSEQ*

[11] Australian Bureau of Statistics, 2016, ABS. 3222.0, Population Projections, Australia, 2012 (base) to 2011
* Priority Development Areas identified for accelerated planning and development outcomes

Key urban growth fronts for the SEQ region

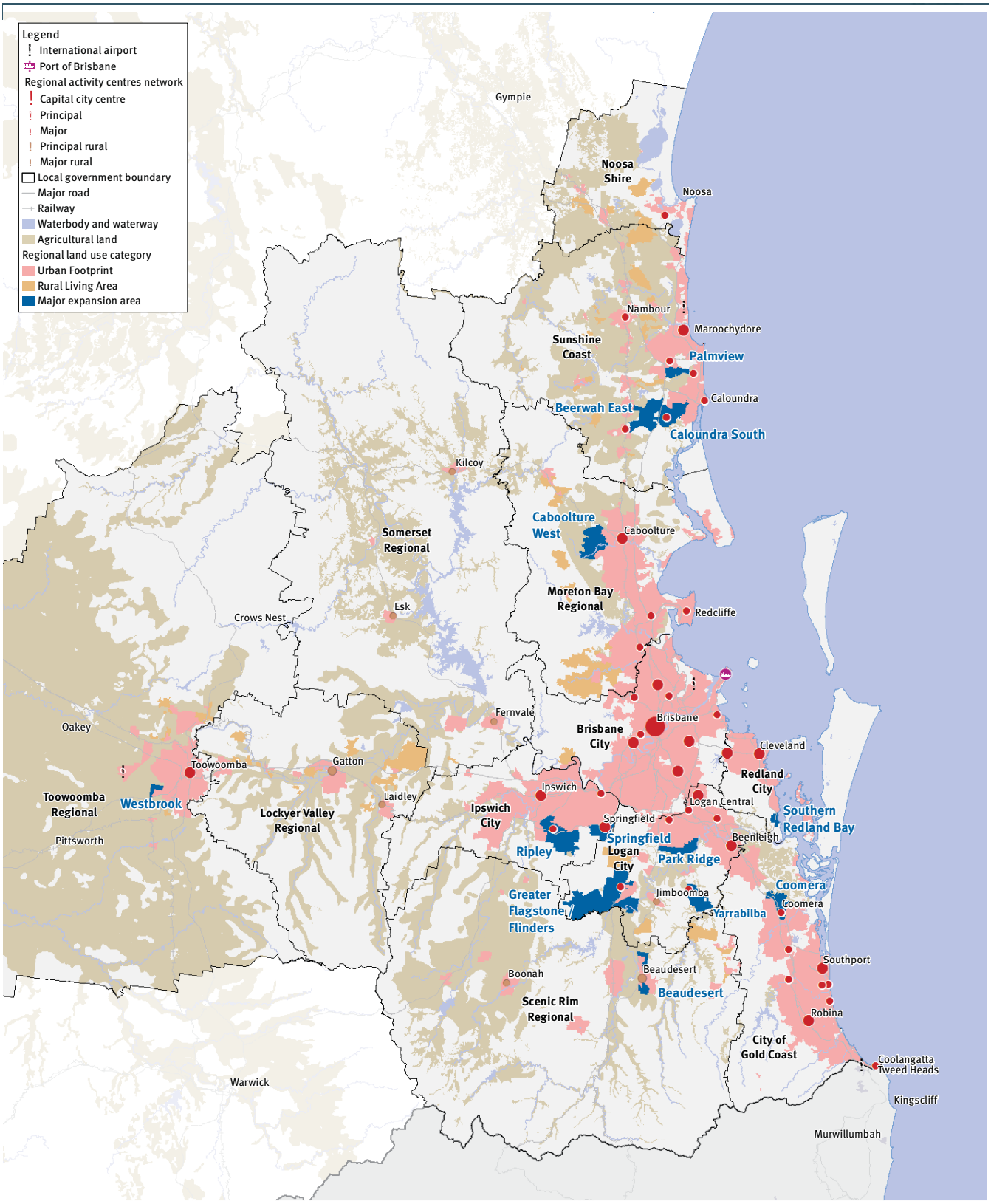


Figure 4 – Key urban growth fronts for the SEQ region

Source: Regional and Spatial Planning, Queensland Government. September 2017

An economy in transition

SEQ is an economy in transition. The first decade of the 21st century saw the region's economic activity grow rapidly off the back of significant mineral and gas exploration and extraction activities across the state. With this activity slowing, the region's economy has returned to a more stable rate of growth that has largely been driven by a rapidly growing population and subsequent demand for services and residential construction. Key exports of agriculture and advanced manufacturing have also experienced recent growth that lends optimism to the potential for the future of these industries. The importance of these industries is reinforced by recent below-trend wage growth and consumption figures that suggest that population growth alone will not provide the foundation for strong economic growth.

SEQ is a critical driver of the SEQ economy

SEQ accounts for the largest share of economic activity in Queensland, generating almost two-thirds of the state's gross regional product.[12] It is also intrinsically linked to supply chains across the state and into New South Wales, offering a critical export and import gateway for goods, as well as a range of professional services and specialised inputs to production that are concentrated in the state's capital city metropolitan region.

Economic growth has stabilised

The Queensland economy has experienced sustained economic growth over the period between 2005–06 and 2015–16. Notable falls in economic output (2009–10) were attributed to significant slowdowns in the mining sector and construction investment – both of which suffered from the sharp fall in investment activity in the wake of the global financial crisis (Figure 5). Recently, the Queensland economy has stablised as it reduces its reliance on resource activities and shifts towards growing its service based economy.

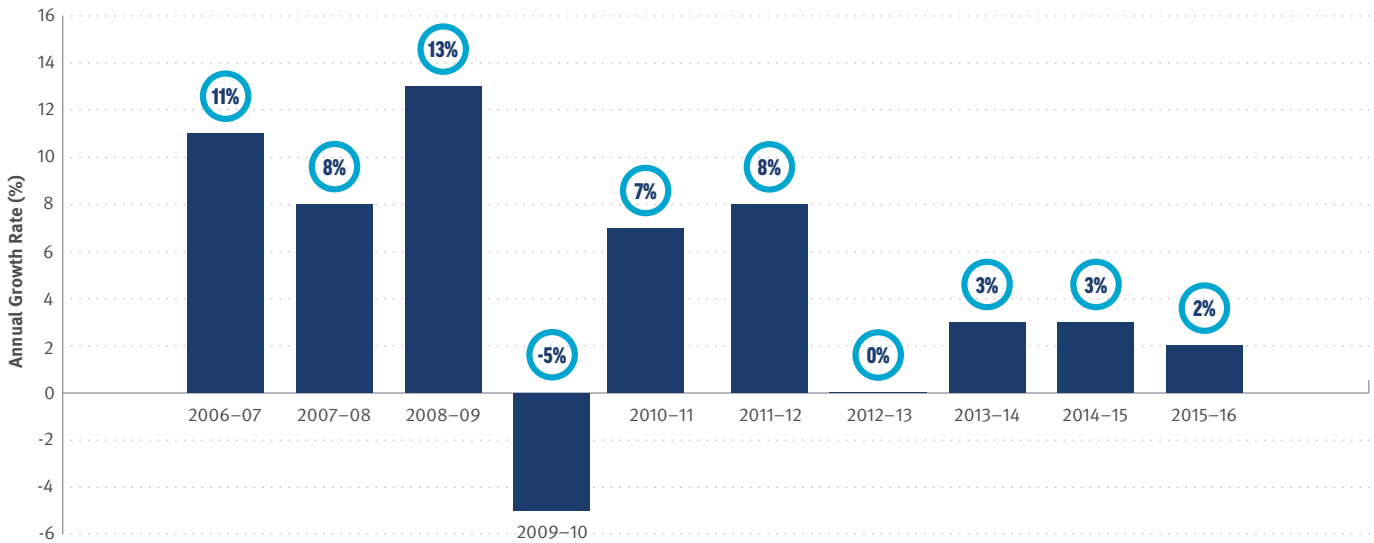


Figure 5 – Queensland gross state product at factor cost, 2005–06 to 2015–16*
Source: ABS 5220.0, Australian National Accounts, State Accounts, 2015–16

[12] Queensland Treasury and Trade, 2011, Experimental Estimates of Gross Regional Product 2000–01, 2006–07 and 2010–11
* Ownership of dwellings excluded from GSP estimates

The services sector is critical to Queensland's growth

The growth of the service based economy is depicted in Figure 6, which illustrates the share of Queensland's GSP by industry in 2005–06, 2010–11 and 2015–16. This change in the make-up of the state's economic activity has been underpinned by significant growth in the health care and social services sector. Between 2005–06 and 2015–16, the sector expanded in terms of GSP output by 123 percent, which grew its contribution to the total Queensland GSP from 6 percent to 9 percent. In contrast, the mining sector grew by only 10 percent, with its share of total Queensland GSP falling from 12 percent to 8 percent over the same period.

Further increases in service based activity have also been prominent in the transport, postal and warehousing sector, as well as the education and training sector. This has seen education and training GSP output grow by 44 percent between 2010–11 and 2015–16, with transport, postal and warehousing growing by 34 percent over the same period.

The region's agricultural sector has also been growing, with GSP from agriculture, forestry and fishing growing by 18 percent between 2010–11 and 2015–16.

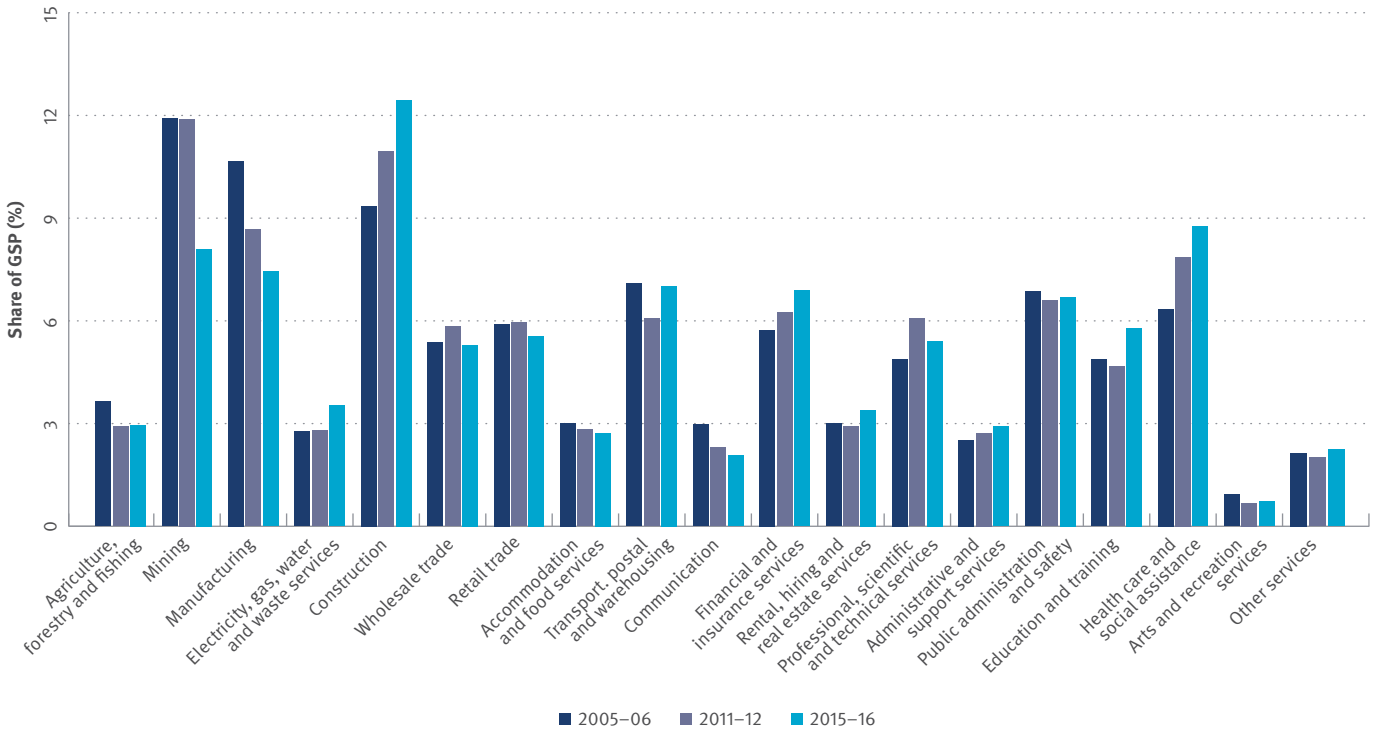


Figure 6 – Share of Queensland's gross state product by industry in 2005–06, 2010–11 and 2015–16
Source: ABS 5220.0, Australian National Accounts, State Accounts, 2015–16

Goods exports are also growing

SEQ is growing as a major trading partner with the Asia-Pacific region. Analysis of trade through the Port of Brisbane indicates that its agribusiness and advanced manufacturing industries have both experienced strong export growth between 2006–07 and 2016–17.[13] This has seen advanced manufacturing exports grow at a faster pace than the Australian benchmark (62 percent for SEQ's port of Brisbane – which includes air and shipping freight – versus 14 percent for Australia)[14]. The gateway is also the state's major agribusiness export hub, with approximately 90 percent of agribusiness related exports leaving via SEQ, often destined for one Queensland's top 5 trading partners (all of which are in the Asia-Pacific: China, Japan, India, Korea, and Taiwan).[15]

The majority of SEQ's workforce engage in population serving activities

SEQ's population serving economic activity captures industries that include: local health and education, retail and wholesale trade, industrial and construction services, food and recreation, and public administration. While these industries do not account for a significant amount of traded economic activity or the majority of value added activity, they do account for the greatest share of employment in the region.

An estimated 900,000 workers are employed in population serving industries throughout SEQ, accounting for approximately 64 percent of the workforce. Activity in these industries directly contributes an estimated $89 billion in GVA to the region's economy per annum.[16]

Modest growth in real wages is weakening household's disposable incomes

Between 2011 and 2016 Queensland's gross household disposable income per capita has grown at a compound annual growth rate of 1.2 percent, currently representing $43,851 per capita.[17] This low growth reflects the modest wage growth currently being experienced throughout the Australian economy. Queensland's real wage growth for 2016–17 was only 1.9 percent, just ahead of inflation at 1.8 percent. This period of supressed wage growth has impacted household expenditure.

Weaker growth has tightened household expenditure

Recent estimates suggest that Queensland's consumption activity is also slowing down. In 2015–16, the Queensland State Final Demand (SFD) fell by 1.3 percent, demonstrating a fall in demand for the total value of goods and services sold in the state. This decline was in part attributed to a slowdown in construction related activity for the state, particularly in the mining sector, and modest real wage growth, all of which contributed to lower household expenditure.[18]

While much of these macro indicators relate to state wide trends, many of the same outcomes are similar in SEQ given the region's significant contribution to the state's economic performance. It follows that lifting the productive economic performance of SEQ, particularly by growing its traded industries, will be critical for Queensland's economic objectives. This will support growth in the state's headline economic indicators by contributing to improved real wage growth and renewing consumer confidence, lifting demand in the region's population serving industries, in turn creating new employment opportunities.

New dwelling approvals are underpinning the construction sector

New dwelling approvals continue to drive construction activity in SEQ. Between June 2015 and June 2016, there were over 48,000 new dwellings commencing construction in Queensland, of which 90 percent were located in SEQ.[19] New dwelling activity has historically been further supported by commercial and public investment in new offices and public assets (hospitals and schools).

In Queensland, total investment in construction activity by both the private and public sector have recently returned to pre-LNG investment norms (Figure 7). In SEQ, this period of soft investment has implications for small businesses which are dependant on construction related activity. Of the 280,000 small businesses operating in the SEQ region during the 2015–16 financial year, the construction sector experienced the greatest degree of cotraction (approximately 18 percent).

[13] Advanced manufacturing exports include SITC 1-digit: 5 Chemicals and related products, and 7 Machinery and transport equipment. Agribusiness products exports include SITC 1-digit: 0 food and live animals, 1 beverages and tobacco, and 4 animal and vegetable oils, fats and waxes
[14] Queensland Government Statistician's Office, 2017, Trade data – exports – port of loading (3-digit SITC revision 3) 2006–07 to 2016–17 (preliminary) pivot table
[15] Queensland Government Statistician's Office, 2017, Exports of Queensland Goods overseas, July 2017
[16] CTT Calcs
[17] ABS, 2016, 522004 – Annual Queensland State Accounts, 2015–16
[18] ABS, 2016, 522004 – Annual Queensland State Accounts, 2015–16
[19] https://www.mbqld.com.au/__data/assets/pdf_file/0007/566980/Building-Industry-Outlook-2017.pdf

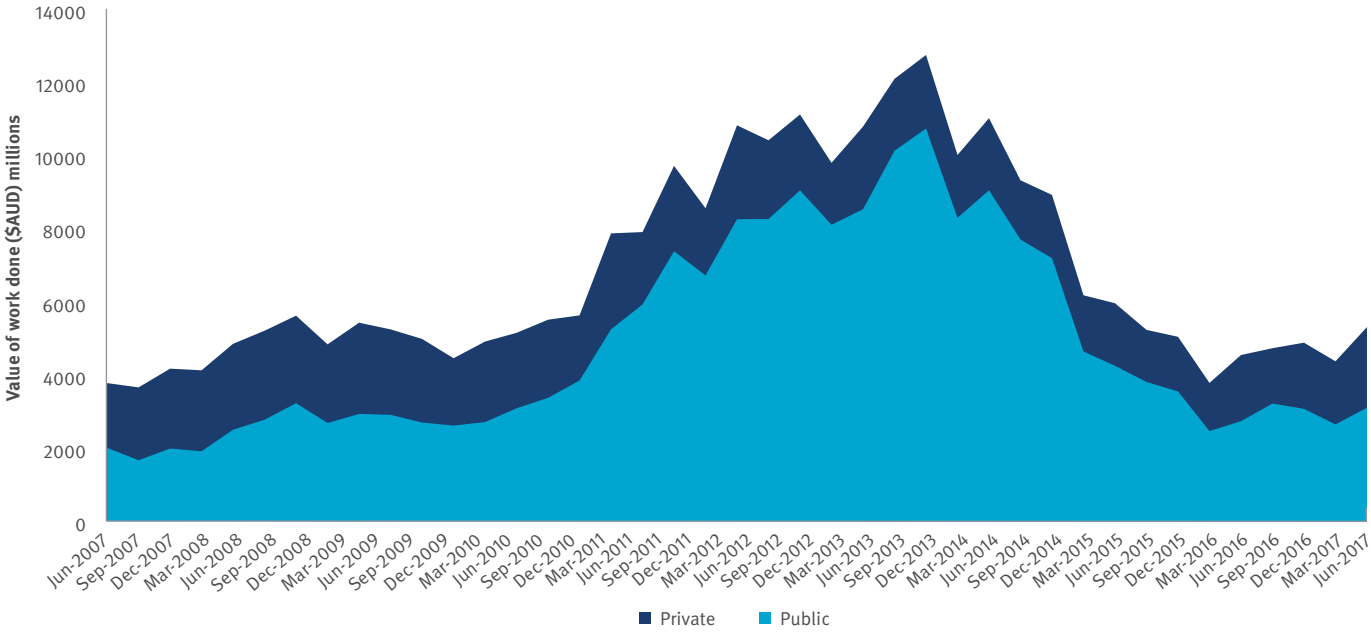


Figure 7 – Value of construction work done by sector, Queensland
Source: ABS 8762.0 – Engineering Construction Activity, Australia, Jun 2017

SEQ's economic assets

The region's economy is underpinned by several rich natural endowments and core infrastructure assets that support economic activity, both within SEQ and across Queensland.

SEQ's 12 local government areas each provide unique natural environments, diverse economies, and lifestyle options. The natural value of these areas underpin a number of SEQ's priority industries and include:

Agricultural land	The region possesses highly productive agricultural land which produces high-quality agriculture for input into export, value-add agriculture and local consumption. SEQ represents 12 percent of Queensland's total agricultural production.[20] [21]
Natural landscapes	SEQ's picturesque natural landscapes and tourism attractions provide a strong foundation for tourism, attracting over 15.8 million international and domestic visitors annually.[22] SEQ ranks among the most visited destinations in Australia, with Sunshine Coast (9th), Gold Coast (5th), and Brisbane (3rd).
Coastal location	The region's coastal location and proximity to the growing markets of Asia, underpins significant trade in SEQ as well as Queensland and Australia. The region's major sea port, the Port of Brisbane, is the closest major container port to Australia's largest export markets in the Asia-Pacific region.

[20] SEQ is defined here to include the following SA4: Brisbane – East, Brisbane – South, Brisbane – West, Brisbane Inner City, Gold Coast, Ipswich, Logan – Beaudesert, Moreton Bay – North, Moreton Bay – South, Sunshine Coast, Toowoomba
[21] As measured by gross total value of production. Australian Bureau of Statistics, 2017, Value of Agricultural Commodities Produced, Australia, 2015–16
[22] Tourism Research Australia, 2017, Tourism Regional Profiles for Brisbane, Gold Coast and Sunshine Coast – year ending March 2017

The region's natural endowments are complemented by a number of key infrastructure assets that further promote and enable economic development. These include:

Core transport infrastructure	SEQ is unique in its concentration of transport assets, including five international gateways that connect the region directly to international markets – the Port of Brisbane, Brisbane Airport, Gold Coast Airport, Sunshine Coast Airport and Wellcamp Airport (Toowoomba). These gateways are serviced by the region's road and heavy rail freight networks providing clear north-south and east-west connections to support economic activity through the efficient and effective movements of goods from industry to market. The region's core transportation infrastructure underpins the efficiency of SEQ's supply chains, which are central to SEQ's ability to compete in international markets, and to compete with imports to the domestic market.
Knowledge and technology precincts	SEQ has a number of world-class health, education and training facilities that contribute to the region's knowledge and technology precincts. These precincts are urban clusters that contain a core high-level health, education, research or similar facility that provides opportunities for complementary and supporting activities. There are four strategically significant health and knowledge precincts within the region – Herston Health Precinct, Princess Alexandra Health & Knowledge Precinct in Woolloongabba, the Gold Coast Health & Knowledge Precinct and the Sunshine Coast University Hospital Precinct. The region is also home to a range of world class tertiary education campuses that have developed as critical precincts to support the region's workforce capacity, research activities and clustering of knowledge sector businesses. The region's high-quality knowledge and technology precincts are critical to support SEQ's well-educated and skilled workforce, and on further maturing SEQ's knowledge intensive activity.
Strategic defence assets and supply chains	Key assets across the region that underpin defence activity include: the Greenbank Training Area in Logan; the Royal Australian Air Force (RAAF) base at Amberley; the Amberley Aerospace and Defence Support Centre in Ipswich; and the Kokoda Barracks (Land Warfare Centre) located in Canungra.
Identified, coordinated industrial land capacity	The Queensland Government has designated the Bromelton SDA as a strategic location for industrial uses and logistics operations with direct access to the national standard gauge network. Adjacent to the corridor for the inland rail project, the SDA will form a critical economic asset for the expansion of industrial and high impact industries in the region as well as providing a valuable intermodal hub for the connection of freight to the Port of Brisbane.

Key assets that reflect the region's built endowments that underpin the region's economic competitiveness are highlighted in Figure 8.

Economic foundations of the SEQ region

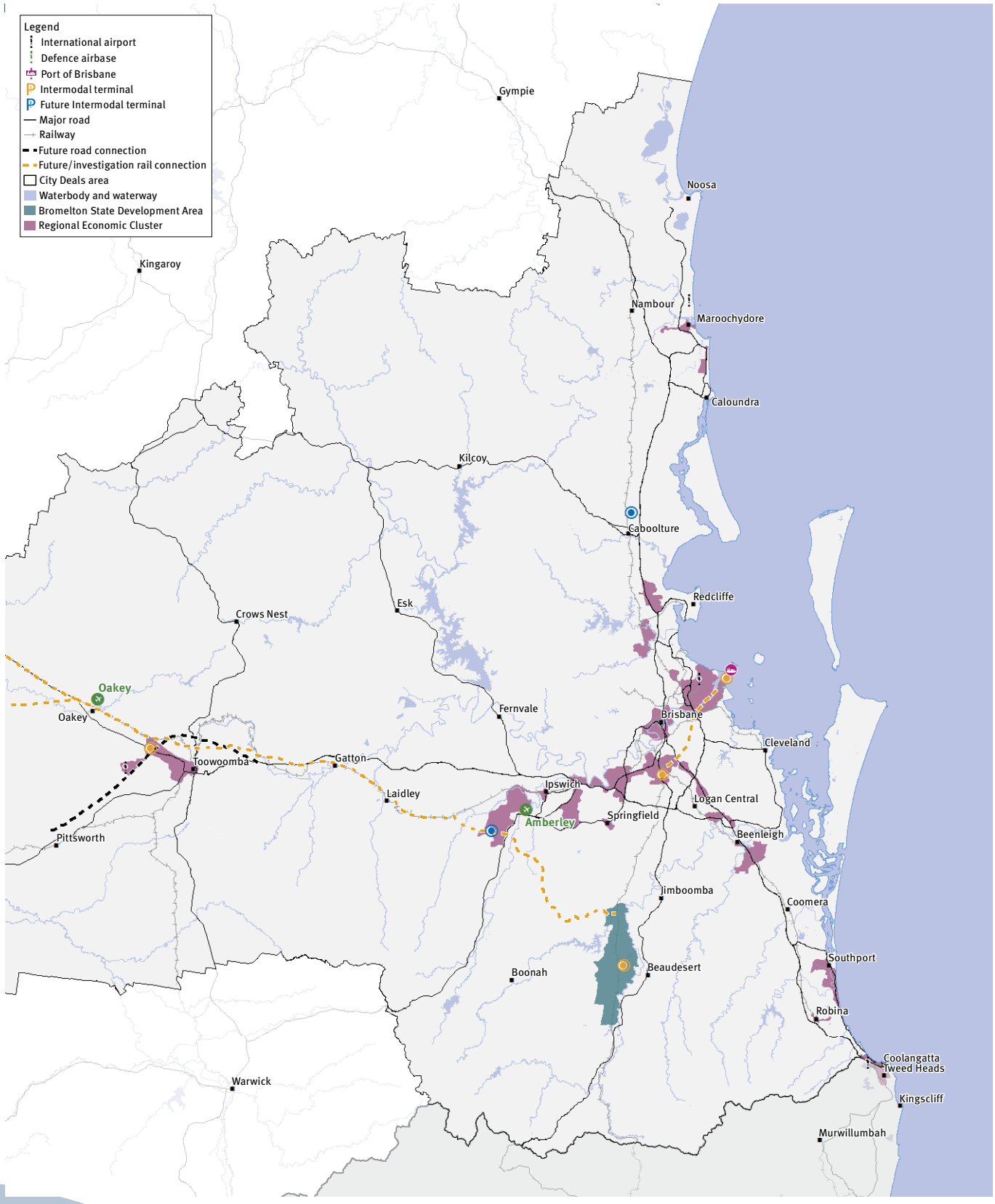


Figure 8 – Economic foundations of the SEQ region
Source: Regional and Spatial Planning, Queensland Government. September 2017

Tourism and technology, Holoverse, Gold Coast

Established foundations for collaboration

The size, capability and capacity of the 12 local governments in SEQ make it a unique metropolitan region in an Australian context. The region is home to the three largest local governments by population size (Brisbane, Gold Coast and Moreton Bay), as well as five of the top 10 (including Sunshine Coast and Logan). The scale and maturity of collaboration between these local governments has provided a strong foundation for partnership on key policy initiatives, the setting of consistent economic aspirations and the collaborative investment in key infrastructure initiatives.

SEQ has local governments with the capacity and capability to establish effective partnerships

In 2007, the region's governance was strengthened with the amalgamation of 29 local government areas (LGAs) to 12.[23] The consolidation of local councils has improved the council's financial sustainability through economies of scale and increased geographic size of most LGAs, thereby reducing fragmentation of governance across the region. The amalgamations have reduced the barriers to regional cooperation by providing a stable platform for regional partnership and investment.

Ten years since the amalgamations, the SEQ region is a model region for local government collaboration. The Council of Mayors (SEQ) has provided a leadership role in bringing 11 of the 12 LGAs across the region to work together around joint advocacy and policy initiatives, including key planning activities, infrastructure coordination, leading environmental initiatives and improved engagement with other tiers of government.

The established collaboration and strong fiscal management across the region's LGAs is further evidenced by the co-investment that its councils have made in key regional transport projects, such as Gold Coast light rail, Moreton Bay rail link and key road projects.

The track record of the region's local governments working collaboratively and partnering with the state on key policy initiatives should provide greater certainty to the Commonwealth Government and industry that there is a stable, reliable platform for partnership on key regionally significant investments and initiatives.

A mature policy platform developed through regional collaboration

Local and Queensland governments have developed a mature policy platform across spatial, infrastructure and economic planning perspectives (Figure 9). Typically each of these three policy areas are mutually interdependent. However, significant investment has been made at both the Local and State levels of Government to ensure that the plans for the region across each of these policy areas are mutually reinforcing.

ShapingSEQ was released by the Queensland Government in August 2017 and provides a central pillar for a number of these strategies. *ShapingSEQ* is the Queensland Government's statutory plan outlining a guide for the development that will shape the future population growth of the SEQ region, and was prepared in collaboration with the region's 12 local governments. The plan also benefited from extensive community engagement as part of its development, which were all included in the *ShapingSEQ* 2017 Consultation Report. *ShapingSEQ* is the region's pre-eminent strategic land use plan made under the *Sustainable Planning Act 2009* and provides a framework to manage growth, change, land use and development in SEQ.

The core themes – grow, live, sustain, prosper and connect – highlight a strong commitment by the state government and the local government partners to delivering improved regional prosperity, liveability and long-term sustainability.

The SEQ City Deal will seek to build on this mature policy platform by drawing together key elements of the spatial, infrastructure and economic planning for the region to deliver a package of transformative investment.

	Strategy	Spatial	Infrastructure	Economic
State		State Planning Policy	State Infrastructure Plan	Advancing Qld Industry Roadmaps
Regional		Shaping SEQ	SEQ Regional Transport Plan	*Committed under State Infrastructure Plan*
Local		Local Planning Schemes	Local Government Infrastructure Plans	Local Economic Development Plans
	Delivery			

Figure 9 – Existing strategic plans guiding the development of the economic foundations paper
Source: CTT, Queensland Government

[23] Including Noosa Shire Council which de-amalgamation in 2013

A consistent regional vision for a 'liveable gateway'

The region has also developed a consistent view around the economic vision for the region. The SEQ City Deal Vision has been prepared separately, and builds on this economic analysis and highlights the region's aspiration to continue to develop as a 'liveable gateway'. This term has been developed to succinctly capture the unique characteristics of the region, relative to other key metropolitan regions in Australia. It reflects two critical differentiators of the region's identity and advantages. Firstly, SEQ is arguably best known for its diversity and various lifestyle choices. With scenic hinterlands, pristine beaches, vast agricultural land and a commercial hub all within an hour of the CBD, SEQ is home to many world class destinations. SEQ has the luxury of a distinct warm sub-tropical climate, affordable housing, safe communities and low sovereign risk for business investment.

Along with diverse lifestyle choices, SEQ is also well positioned to become a trading region to directly connect with the world, primarily its closest neighbours in the Asia Pacific region. Supplemented by significant infrastructure capacity and linked by five international gateways, SEQ holds a strategic advantage of growth in aviation, tourism, leisure and freight. It is these existing differentiating factors that provide SEQ with the unique opportunity to become a globally and domestically recognised trading portal.

The economic foundations paper seeks to build on this aspiration for the region to grow as a 'liveable gateway' and provide greater context around the economic drivers that are shaping the region's potential economic future. It will do this by identifying the key spatial characteristics of the region that will be critical to a step-change in economic development to support greater trade oriented growth.

Kitefest, Redcliffe, Moreton Bay

Sir Leo Hielscher Bridges, Gateway Motorway, Brisbane

Positioning SEQ

SEQ makes a large and unique contribution to the Queensland and Australian economies. As Queensland's capital and the third largest metropolitan region in the county, it is a diverse and rapidly growing economy that is also contributing to Australia's trade growth into the Asia-Pacific region. The relative contribution and performance of the region is summarised below against Queensland, Australia and global benchmarks for similar regions.

SEQ in the Queensland context

Seven out of ten Queenslanders live in the SEQ city region

SEQ is Queensland's growing metropolitan capital city region. It is home to over 3.4 million Australians, 70 percent of the state's population.[24] The region's population growth has been underpinned by a period of sustained net migration inflows from both interstate and overseas. This population growth has been most evident amongst young families seeking out the region's economic opportunities, sub-tropical climate and affordable living.[25]

New populations growing the region's centres

While Brisbane remains the region's largest contributor to total population growth, SEQ's inner local government areas are experiencing high population growth rates facilitated by the development of urban growth fronts. In 2015–16, Ipswich grew by 2.9 percent, Sunshine Coast by 2.5, Gold Coast by 2.4, and Moreton Bay by 2.3 while Brisbane grew at 1.6 percent over the same period.[26]

SEQ's urban growth patterns present a challenge for the region

The continued urban expansion is both a strength and a challenge for SEQ's long term economic performance. SEQ will continue to attract new skilled migrants to the region, as they seek the affordable subtropical lifestyle. The region will require greater investment in key infrastructure assets to ensure that growth can continue to sustainably occur, without significantly impacting commuter congestion, the demand for utilities and the natural environment.

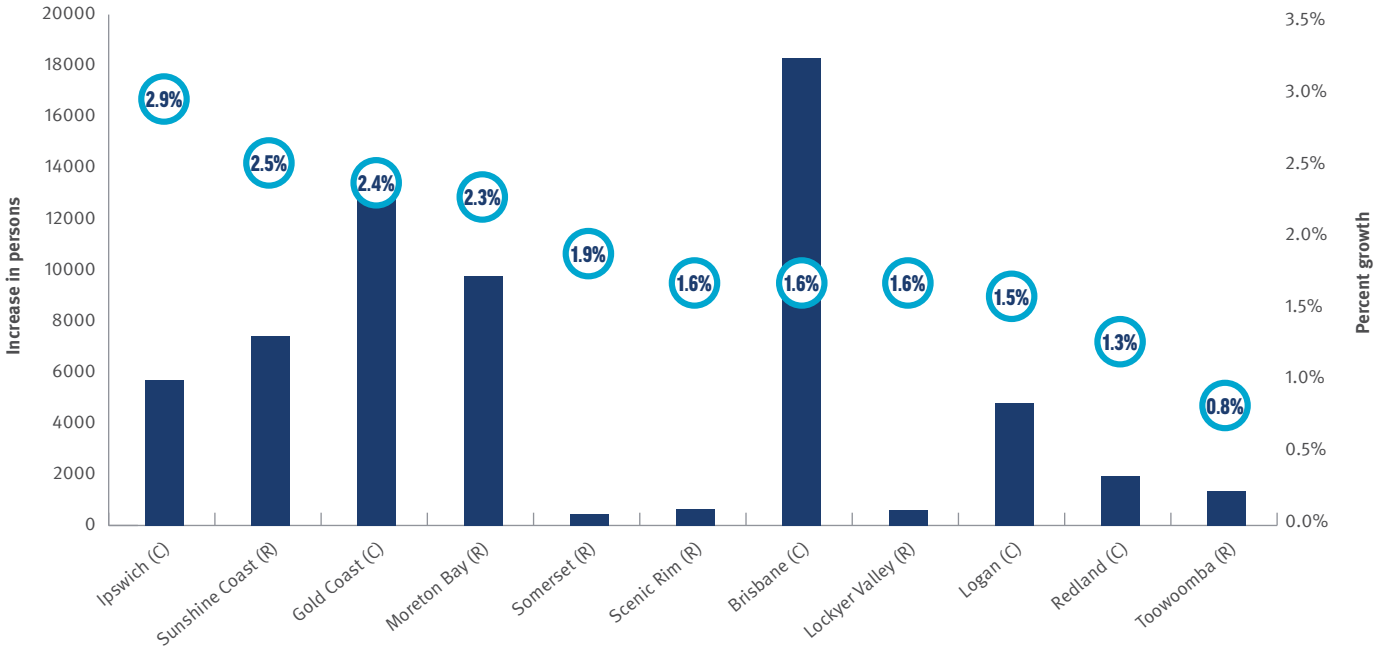


Figure 10 – SEQ local government areas population growth, 2016
Source: 3218.0 – Regional Population Growth, Australia, 2016 (2016), ABS

[24] Australian Bureau of Statistics (2016), 3218.0 Regional Population Growth, Australia 2016
[25] Queensland Government Statistician's Office, 2017, Population Growth Highlights and trends, Queensland, 2017 edition
[26] Population growth highlights and trends, Queensland, 2017 edition (2017) Queensland Government Statistician's Office

SEQ is the economic driver of Queensland

As with its population, SEQ is home to over 70 percent of the state's employment. All industry clusters (excluding the primary and agriculture industry clusters) have more than 50 percent of their employment within the capital region (see Figure 11). This is consistent with the region's economic output indicators with an estimated $170 billion in Gross Regional Product (GRP) recorded in 2011, accounting for 64 percent of the Queensland economy at the time.[27]

Moving from a traditional to a knowledge economy

SEQ's economy has already commenced transitioning from a historical base of agriculture, mining and traditional manufacturing, to a more diverse knowledge economy with increased high value manufacturing and professional service activities.

SEQ has been able to transition the skill base of its workforce to align to emerging industries and add value to the outputs of its historical base industries. This economic shift has materialised in the region growing advanced manufacturing, agribusiness and traded health and education industries.

Encouraging innovation through improved collaboration between research institutions and industry

The region's tertiary education industry has experienced strong growth as a collaborator with the private sector. Queensland universities have experienced a 75 percent increase in revenues associated with consultancy and contract work between 2010 and 2015.[28] This growth demonstrates the region's increased collaboration throughout its industries and institutions, allowing for increased industry specific innovation.

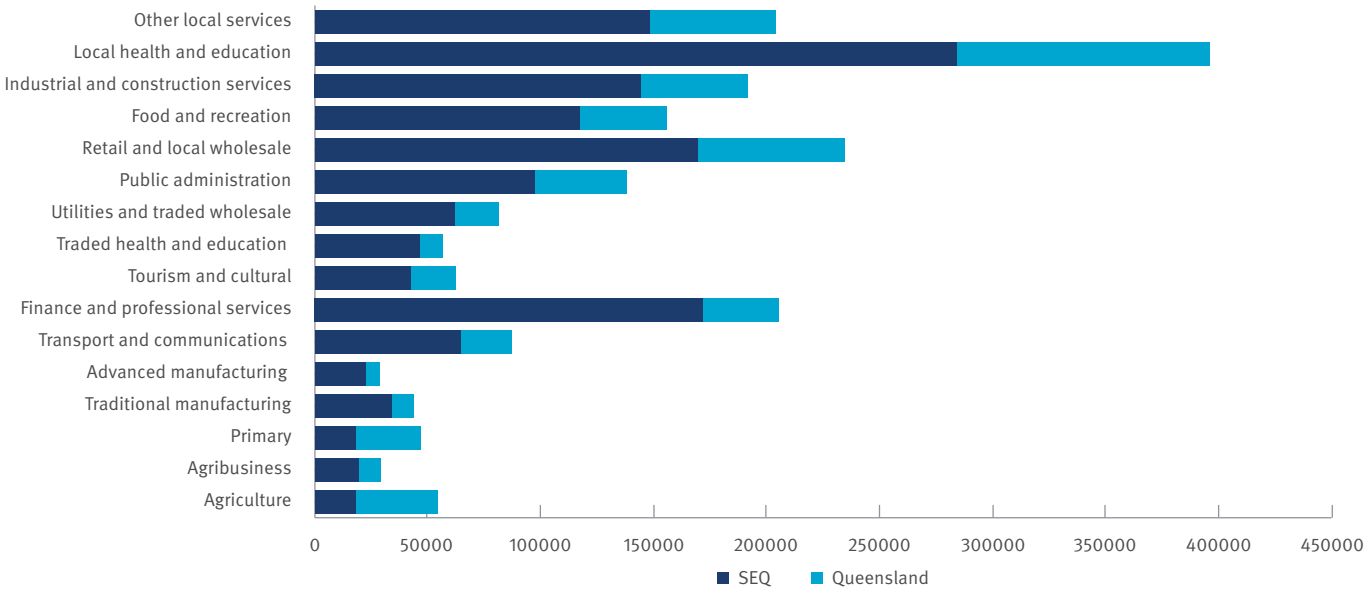


Figure 11 – Queensland and SEQ Employment by Industry Cluster, 2016
Source: CTT, Queensland Government

[27] Experimental Estimates of Gross Regional Product 2000–01, 2006–07 and 2010–11 (2013). Queensland Treasury and Trade
[28] Finance 2015: Financial Reports of Higher Education Providers (2016) Australian Government Department of Education and Training

World class universities, hospitals, and knowledge precincts

As Queensland's capital region, there are a variety of world class institutions that have located and grown with the region's population. These institutions (universities, hospitals and knowledge precincts) provide the knowledge skills and services to SEQ's population along with regional Queensland, the Northern Territory and northern NSW. SEQ has the assets required to attract international students to the region, to grow a strong traded health and education industry.

A gateway to Queensland and northern NSW

SEQ is the key transport hub for Queensland and northern NSW. The region includes four international airports, the port of Brisbane and two major freight corridors (east-west and north-south) which efficiently move people and goods through the region and beyond. The interconnectedness of the region to more remote areas of Australia is demonstrated on a regular basis, with freight movements to and from the port of Brisbane reaching as far as northern and inland Australia. Brisbane's port is key to this activity and, along with the planned Inland Rail project link, will continue to support economic growth throughout SEQ and the surrounding regions.

SEQ in the Australian context

SEQ is Australia's third most populous capital region – home to one in seven Australians

Between 2006 and 2016, the SEQ population grew by over 24 percent, outpacing Queensland, New South Wales and Victoria's total growth over the same period (21, 15, and 22 percent respectively).

Young families are attracted to SEQ's affordable lifestyle

The cost of living in SEQ is more attractive to young families than its southern counterparts. SEQ has seen net inflows of young families migrating to Queensland and SEQ from all around Australia. This has in part been driven by the mean price of residential dwellings in Brisbane being $497k compared to $904k in Sydney and $723k in Melbourne (see Figure 12). These lower average prices make the property market in SEQ significantly more accessible to young families looking to purchase their first home.

Despite affordability young professionals are moving away

Nevertheless, the affordable lifestyle offered in the region does not retain some of Queensland's young professionals (age 25–29) who are moving outside the region, primarily to Victoria.[29]

Third largest region on the eastern seaboard with the potential to grow as a major export gateway

SEQ has a major port and four international airports linked by major road and rail infrastructure. These infrastructure assets have the capacity to increase import and export activity supporting increased economic growth throughout the region.

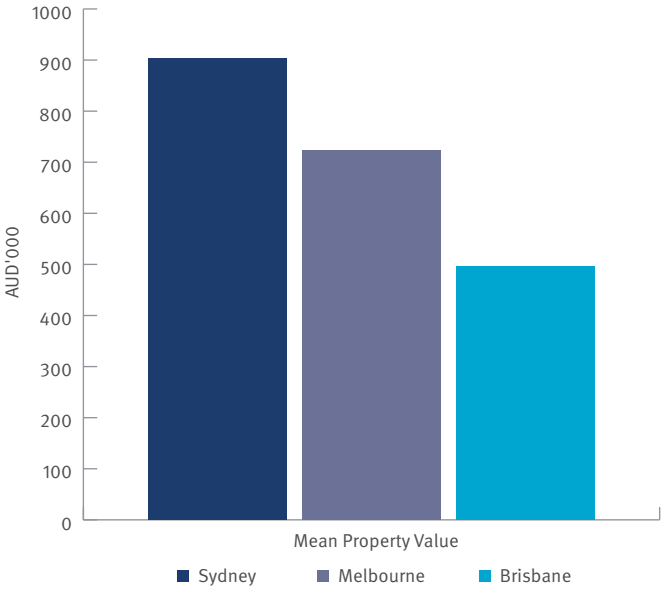


Figure 12 – Mean price of residential dwellings, June 2017

Source: Australian Bureau of Statistics (2017) 6416.0 Residential Property Price Indexes: Eight Capital Cities

[29] Queensland Government Statistician's Office, 2017, Population Growth Highlights and trends, Queensland, 2017 edition

SEQ's growing high value export products

SEQ's major export gateway – the Brisbane port – has the greatest export volume (in terms of gross weight) of the three eastern capital city ports. However, the port has the lowest value (in terms Free On Board (FOB) cost) of exports demonstrating its comparatively lower value commodities (Figure 13). Better leveraging the capacity of SEQ's major export gateway has the potential to yield significant economic returns. The challenge for the region will be increasing the volume of its high value exports, in industries such as advanced manufacturing, to lift the total export value of SEQ.

Primary industry is the highest volume of export but lowest in value

As highlighted in Figure 13-15, SEQ's port is currently utilised moving low value, high volume and weight primary industry goods (including minerals). Sydney and Melbourne's primary industry exports are significantly higher in value per tonne.

SEQ is nationally competitive in agribusiness exports

While Melbourne has the greatest volume and value of agribusiness exports, SEQ has the highest value per tonne exports (Figure 15 and 16). Currently, exports from the agribusiness industry make up the largest value share of the region's exports, over $3 billion. This exceeds the value of Sydney's agribusiness exports, but is comparatively lower than Melbourne. SEQ's large export value of agribusiness has recently been driven by significant increases in demand from the world's largest vegetarian population (India) for the region's chickpea produce.

Advanced manufacturing is SEQ's highest value good per volume

SEQ has the second highest value per tonne of advanced manufacturing exports on the eastern seaboard. However, both Sydney and Melbourne experience higher total volume and value of exports in advanced manufacturing. The high value per tonne of SEQ's advanced manufacturing exports has the potential to become an even more important contributor to the region's economy, with the current total value of SEQ's advanced manufacturing exports reflecting the industry's diverse products: aircraft manufacturing, pharmaceutical manufacturing, and mining and construction machinery manufacturing. Supporting the region's advanced manufacturing activities has the potential to significantly boost the headline value of the region's exports.

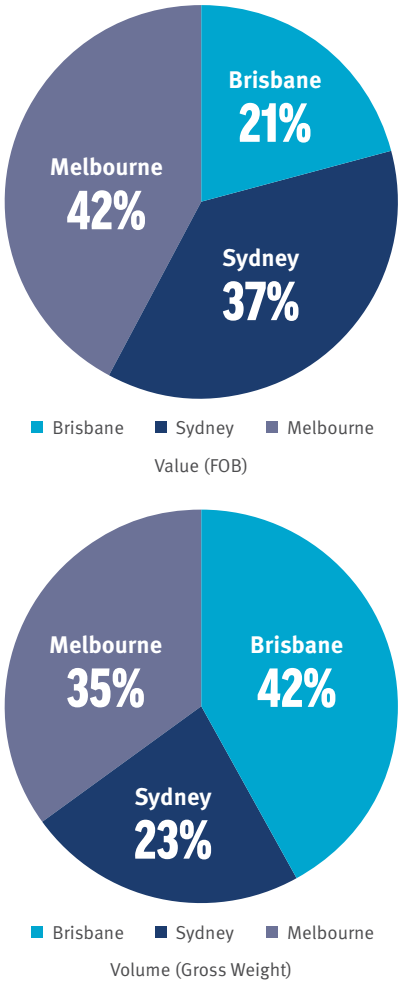


Figure 13 – Export Share of Australia's Eastern Capital City Ports, 2016
Source: ABS, Customised report, 2016

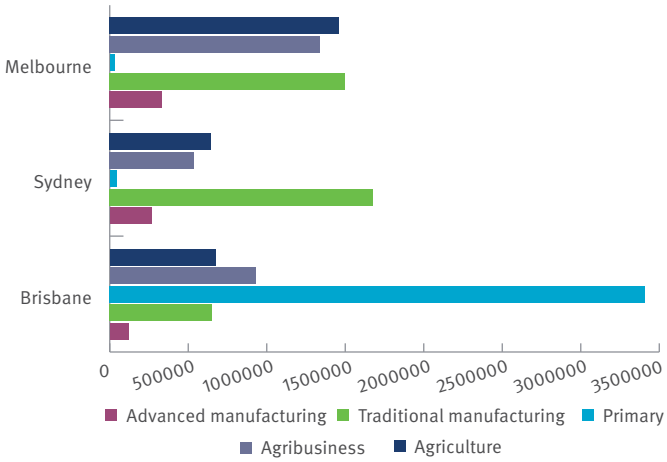


Figure 14 – Total Gross Weight of Australia's Eastern Capital City Industry Cluster Products, 2016

Source: ABS, Customised report, 2016

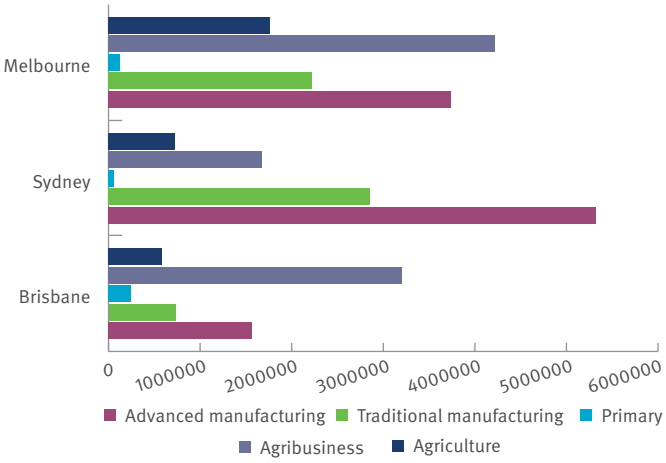


Figure 15 – Total Value of Australia's Eastern Capital City Industry Cluster Products, 2016

Source: ABS, Customised report, 2016

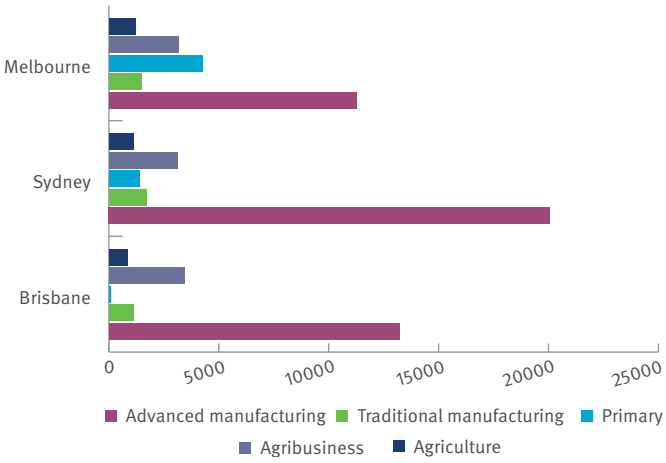


Figure 16 – Value per Tonne of Australia's Eastern Capital City Industry Cluster Products, 2016

Source: ABS, Customised report, 2016

SEQ's growing service exports

In the increasingly connected global economy, SEQ provides high quality services, tertiary education, health services, and unique tourism experiences to the Asia-Pacific region and beyond.

SEQ has high visitor attraction, though is lagging on tourism expenditure

SEQ has some of the highest international visitation numbers in Australia. The region's top three tourist regions (Brisbane, Gold Coast and Sunshine Coast) attracted 33 percent of Australia's total visitations in 2017.[30] This is the result of the existing four internationally connected airports located within each tourist region, along with the unique attractions located throughout SEQ. Nevertheless, the direct connections to some of the fastest growing middle-income areas in the world (including Singapore, Hong Kong, Shanghai, Manila, Guangzhou, among others) has not been able to directly translate into higher tourism expenditure. At present, tourism expenditure in SEQ is lagging behind the other eastern capitals, and accounts for only 13 percent of the total tourism expenditure in Australia. The challenge for SEQ will be to better leverage its four international airports to increase visitation numbers and to demonstrate the value of the region's attractions to improve tourism expenditure.

Opportunity to grow as a key destination for international students

SEQ's higher education sector is growing rapidly, servicing both domestic and international students. The region's reputable higher education providers have seen the direct contribution of international student fees in the Queensland economy exceed $860 million in 2015.[31] This does not account for the flow on benefits of international students studying in the region, which also supports economic outcomes in the tourism and creative industries, as families and friends of international students' visit. This is a market with significant potential to continue to grow and will be critical to the region's economic future.

[30] Table 9A International Visitors, Visitor Nights and Regional Expenditure by Top 50 Tourism Regions, 2017, Tourism Research Australia
[31] Finance 2015: Financial Reports of Higher Education Providers, 2016, Australian Government Department of Education and Training

SEQ in the international context

A recent study benchmarking SEQ against nine international city regions of similar sized economies has identified factors that make SEQ internationally competitive and which are imperative to improve and invest in.[32] These regions form a 'peer group' because they possess most or all of the following attributes:

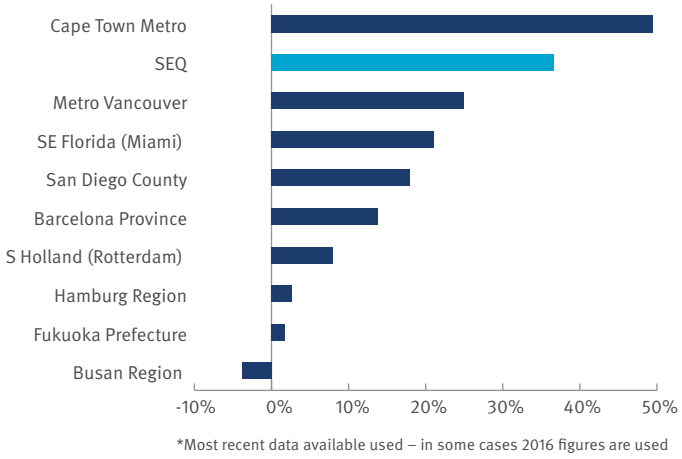
- **Medium-sized** with a functional population of 3 to 5 million.
- **Strategic location within their continent or sub-regions.** These coastal regions act as gateways or hubs for global traffic. In terms of size, they are second tier economies in their (sub-) continental 'system' of cities.
- **An advanced globalised core city.** The main city in the region typically rates among the top 100 for the presence of global firms in advanced services sectors.[33]
- **Trading functions.** By measures of freight, cargo, or distribution functions, these regions are consistently ranked among the top 100 globally.[34]
- **Reputation for a high regional standard of Quality of Life and Public Services.** The cities and regions are on average rated within the Global Top 20 for Health and Education and within the Global Top 30 for Global Admiration and Trust.[35]
- **Emerging centres of Knowledge and Innovation.** All the regions possess Global Top 200 Universities and average in the Top 60 for Innovation production globally.[36]

A snapshot of the benchmarking report for city-regional performance in terms of population and economic growth, trade and logistics platform, tourism and destination flows is outlined below.

[32] The benchmarking report compares SEQ against nine regions: Barcelona Province, Busan Region, Fukuoka Prefecture, Hamburg Region, Metro Vancouver, San Diego Region, South Florida (Miami), South Holland (Rotterdam), Western Cape (Cape Town)
[33] Globalization and World Cities (2017). 'The World According to GaWC 2016', www.gawc.com
[34] World Shipping Council, 2017, top 100 ports in the world in 2015, available at: http://www.worldshipping.org/about-the-industry/global-trade/ports
[35] CityRepTrak, 2017, Annual Ranking of Most Reputable Cities Worldwide, available at: https://www.reputationinstitute.com/city-reptrak; Economic Intelligence Unit, 2017, The Global Liveability Report 2017: A free overview, available at: http://www.eiu.com
[36] QS, 2017, World University Rankings 2018, available at: https://www.topuniversities.com/university-rankings/world-university-rankings/2018; Shanghai Jiao Tong University, 2017, Academic Ranking of World Universities 2017, available at: http://www.shanghairanking.com/ARWU2017.html; Times Higher Education, 2017, World University Rankings 2018, available at: https://www.timeshighereducation.com; 2thinknow Consulting, 2017, Innovation Cities™ Index 2016- 017: Global, available at: http://www.innovation-cities.com/innovation-citiesindex-2016-2017-global/9774

SEQ has undergone a strong cycle of population growth since 2000

SEQs population has grown more than 40 percent over 10 years – more than the international regions and almost twice as much as Vancouver. This population growth has been primarily driven by the inbound migration of Australians and overseas residents. SEQ has acquired a highly diverse population with almost one-quarter of the population born overseas. The region is projected to grow by more than 50 percent over the next 20 years, making it the fastest growth region among its international peers in the benchmarking study.



*Most recent data available used – in some cases 2016 figures are used

Figure 17 – Population growth, 2000–2017*

*Busan Region refers in this case to Busan Metropolitan City
Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

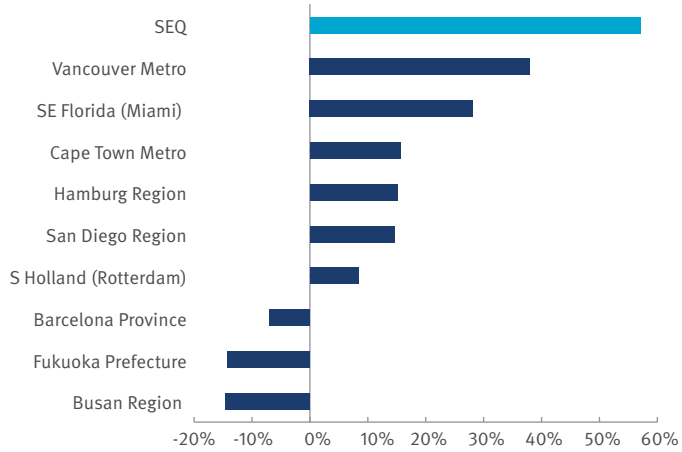


Figure 18 – Projected population growth, most recent available–2040

*Busan Region refers in this case to Busan Metropolitan City.
**Hamburg Region refers in this case to EUROSTAT's Metropolitan Region of Hamburg
Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

Low population density

SEQ has the lowest regional population density out of the similar international city regions. Comparing the centres in each region, Brisbane also had the lowest density by some distance. This urbanisation pattern leads to higher sprawl, a more dispersed infrastructure network and a more weakly connected region than most of its peers. Other regions have made investments in transport infrastructure, digital connectivity, and medium density, high quality urban living promoting multi-centred regions.

Room to grow the economy through increased export oriented industries

The SEQ region also has comparatively low export related industry activity with slightly lower labour productivity than most other Euro-American regions. SEQ has been improving GDP per capita, but is still only moderate when compared to the sample of regions in the benchmarking study.

SEQ has the lowest share of output from export oriented industries in the benchmarking study (Figure 19). When compared to the sample of international regions, SEQ could be considered as emerging, as it has only recently began shifting towards more traded services and expertise.

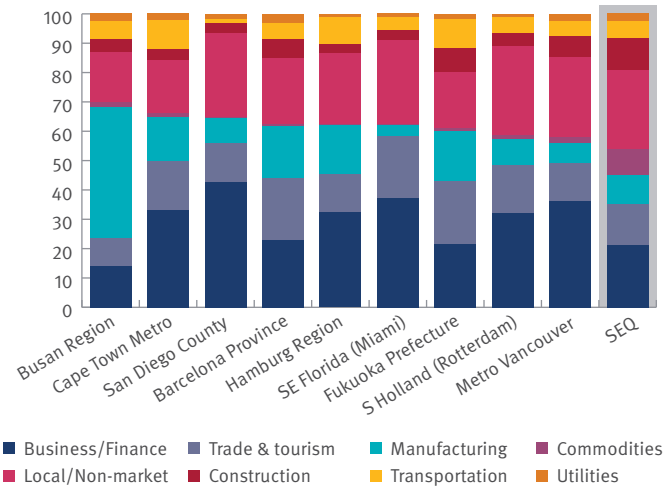


Figure 19 – Share of output by industry

Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context.

SEQ lags behind its peers in trade volumes

Despite SEQ's sizeable trading functions and a strong platform for growth, it is one of the lowest ranking regions for port cargo tonnage. Compared to its peer regions, SEQ's trade throughput via the port and airports is limited. In recent years, the other international regions have implemented port improvement programs; undertaking significant investment initiatives aimed at increasing capacity and competitiveness of ports, particularly the port giants of Busan, Rotterdam and, increasingly Fukuoka.

Increasing numbers of air passengers, but limited international connectivity

SEQ is a moderate performer in terms of the number of air passengers with around 29 million passengers per year. Brisbane's domestic and international airports account for approximately 23 million of these passengers, with Gold Coast Airport accounting for a further 6 million.

The region has fewer direct international flight connections, behind all European and American peer regions (excluding San Diego) (Figure 20). SEQ's relatively limited international connectivity may be partly due to geographical isolation. Noting that San Diego is also relatively geographically isolated and ranks in last place in the study.

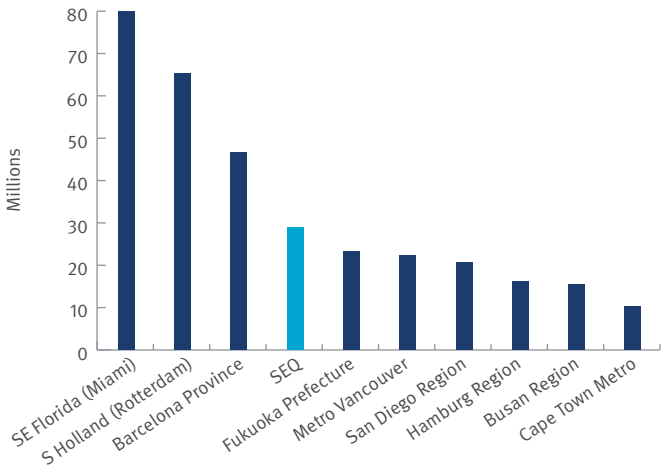


Figure 20 – Annual air passengers (millions)

Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

Successful internationalisation of the higher education sector

The region exports significantly more education than any of its peers based on number of international students enrolled in QS top 1000 universities.[37] SEQ exports about 20 percent more than that of Vancouver, which ranks second, and over double that of Barcelona, which ranks third. The region attracts particularly high numbers of students from China, India, South Korea and Taiwan.

SEQ's internet infrastructure and speed is well below average

SEQ's average upload and download speeds are substantially lower than every other region except for Cape Town metro. Internet speed is one of the weakest areas of comparative performance for SEQ. This deficit is likely due to its lack of access directly or indirectly to the global submarine cable network that connects the world's internet. Other regions have direct access to up to 13 underwater sea cables. Those regions without direct access to a cable generally have up to five cables within a 200km radius.

QUT Robotics, Brisbane

[37] QS Quacquarelli Symonds Limited, 2017. QS World University Rankings. Accessed on 25 October 2017. https://www.topuniversities.com/university-rankings

QIMR Berghofer Medical Research Institute, Brisbane

PART 2 | Foundation for sustainable prosperity in SEQ

Left unchecked, rapid population, urban, and economic growth can impact on environmental areas and adversely impact on a region's prosperity. Impulsive urbanisation and poor management can significantly hamper the potential 'emerging futures' of regions. In particular, when management of regional policy fails to address the sustainability issues of growth, it can lead to visible and devastating impacts on the region's land management, ecosystems, inhabitants' liveability, and the overall long-term sustainability of the region.

Conversely, prosperous regions support the growth of economic activities with infrastructure development, preservation of quality of life, equity and social inclusion, and environmental sustainability. To achieve economic growth which has a sustained positive change and does not impact on a region's core social and environmental values, it is necessary to plan and actively implement social and environmental actions.

"Sustainable prosperity is a result of sustainable development that enables all human beings to live with their basic needs met, with their dignity acknowledged, and with abundant opportunity to pursue lives of satisfaction and happiness, all without risk of denying others in the present and the future the ability to do the same".[38]

The following section identifies the considerations necessary to achieve sustainable prosperity in the SEQ region. This focuses on the quality of life (social) and sustainable ecosystems (environmental) facets of sustainable prosperity.

For the purposes of the remainder of the Economic Foundations Paper, the SEQ region is defined by the 11 Local Governments that are currently engaged in consultation with the State and Commonwealth governments for a SEQ City Deal. These are:

- Brisbane City Council;
- Gold Coast City Council;
- Ipswich City Council;
- Lockyer Valley Regional Council;
- Logan City Council;
- Moreton Bay Regional Council;
- Redland City Council;
- Scenic Rim Regional Council;
- Somerset Regional Council;
- Sunshine Coast Council; and
- Toowoomba Regional Council.

[38] The Worldwatch Institute. (2012). State of the world 2012: Creating sustainable prosperity. Washington, DC: Island Press. www.worldwatch.org/stateoftheworld2012

Kirra Beach, Gold Coast

The social environment

The social environment is an important consideration in the future planning for a city-region. In planning for economic growth, attention must be provided to identify the potential social externalities. These can influence the unique societal factors that shape the social liveability of the city-region.

The consideration of social outcomes in the development of a city-region typically seek to assess factors that determine the quality of the region's living conditions. In this context, where a region is deemed highly liveable, it is likely to experience few, if any, challenges to living standards, whereas if a region has significantly low liveability, most aspects of day-to-day living for the region's population are severely hampered. Indicators that typically provide insight to a region's social performance include:

- **infrastructure** – the quality of the transport network, provision of utilities, availability of quality housing, digital connectivity etc.
- **human capital** – the skills and capabilities of the region's workforce, including level of education attainment
- **stability** – such as prevalence of crime and disadvantage communities, civil unrest, threat of terror
- **civic services** – such as access to quality healthcare and education
- **culture and environment** – such as average temperatures, community, access to public places, sport, social or religious restrictions, food and drink, consumer goods and services.

Improving the social environment of a region can contribute to the overall liveability, economic outcomes, and provide more equitable returns from economic growth for society. The remainder of this section identifies social factors that will be important for the future development outcomes of the SEQ region.

Infrastructure

Provision of infrastructure provides citizens with access to quality services. Future growth will place greater pressure on some of the region's already constrained networks.

Transport and utilities infrastructure has a significant impact on the social outcomes of an area. These services provide the basis for an adequate standard of living, allowing residents to enjoy day-to-day life.

Access to transport

Quality transport infrastructure allows residents to easily move around the region to engage in activities and access services and employment. Poor transport infrastructure hampers the movement of inhabitants – increasing the amount of time required for commuting and decreasing time available for other activities. Transport accessibility to key areas of employment provides an indication to the quality of transport infrastructure in SEQ and its capacity to support employment accessibility.

In order to assess this accessibility, the travel times to and from the Regional Economic Clusters (REC) identified in *ShapingSEQ* have been plotted for the am peak. This analysis has shown that the majority of SEQ has good access to these clusters (‹30min commute) for private vehicles owners, but it is much less accessible for public transport (see Figure 21 and Figure 22). Current modelling using Google Maps (2017) and 2016 Census data highlights that 90 percent of the region's population has access via private vehicle to a REC within 30 minutes, while only 20 percent have access via public transport within 30 minutes.

As evident in the two figures below, SEQ has high quality private vehicle access throughout the majority of the region, but relatively poor public transport accessibility. This mismatch in accessibility creates equity issues throughout the region, particularly to the groups of society where vehicle ownership is not an option (such as children, disabled, and elderly) and those where the cost of vehicle ownership is too high. These groups must rely on the public transport network as their primary mode of transport. As such, where public transport accessibility is particularly poor, it can compound socio-economic issues of disadvantaged communities who are already more likely to experience lower levels of standard of living.

Improving public transport access has the greatest potential to equitably improve overall accessibility throughout the region, allowing greater ease of access to all the region has to offer. In addition to equitable access improvements, it can also reduce the reliance on vehicle ownership and the presence of associated negative externalities on society – such as CO_2 emissions, congestion and fatalities due to car accidents.

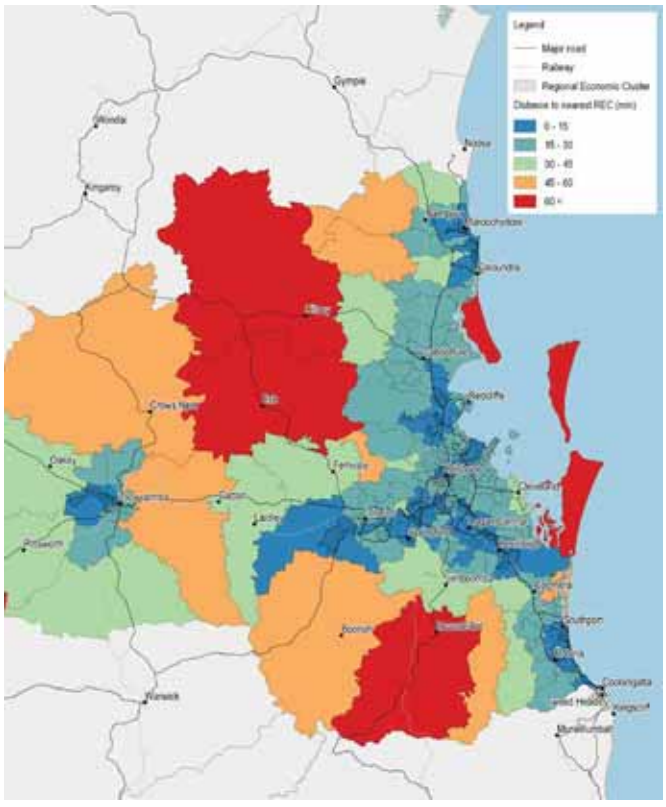


Figure 21 – Private vehicle access to nearest REC in SEQ
Source: Google Maps API (2017)

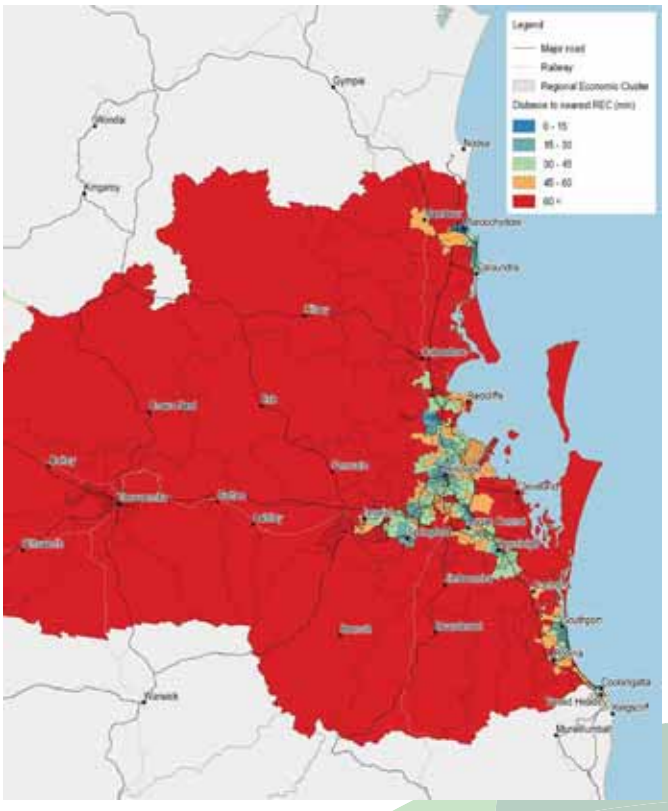


Figure 22 – Public transport access to nearest REC in SEQ
Source: Google Maps API (2017)

Access to energy

SEQ's energy market is currently in a transition period as deregulation is introduced. Deregulation is intended to improve the competition in the energy market, ultimately reducing electricity costs to the community. The current reliability and performance of the energy infrastructure is best assessed by understanding the performance of the region's primary provider and operator of energy utility infrastructure, Energex. In 2015–16, Energex reported that the energy network met the provider's network reliability standards, reporting only 0.032 events of System Average Interruption Frequency Index (SAIFI) for the CBD, 0.747 events for the SEQ urban area, and 1.730 events for short rural areas.[39] This met all of the provisions of energy targets for the provider, and demonstrates that the network is currently able to meet the demand for energy supply in SEQ.

Access to water

The region has continual access to high quality water supply. SEQ's major water supplier, Queensland Urban Utilities, reported that in 2016–17 they met all of their water quality targets with only 0.02 water quality incidents reported per 1000 properties. Similarly, continuity of water supply which measures service interruptions in the region recorded 66 unplanned service interruptions, of which 97 percent were restored within five hours of reporting.[40] These indicators demonstrate the high level of access to quality water that the region currently enjoys.

As the region continues to grow and with population growth intensifying within the region, and industry activity requiring greater use of water to continue expansion, there will be greater pressure on water suppliers to meet the growing demands of the region's water users.

[39] Energex, 2016, Annual Performance Report 2015/16
[40] Queensland Urban Utilites, 2017, Enriching Quality of Life 2016/17 Annual

Transport, Brisbane

Human capital

Higher education and a technical skills underpin SEQ's growing resident workforce.

Tertiary education attainment is a critical indicator of the supply of education labour to support the growth of high value industries. Despite SEQ's high representation of tertiary institutions and significant exports of tertiary education to international students, the highest level of education attainment by SEQ residents remains lower than that of the Sydney and Melbourne metropolitan regions. While this level of attainment has improved over the five years to 2016, this growth has been outperformed by further gains in the education attainment of residents in Sydney and Melbourne.

As a measure of SEQ's human capital, the highest level of education attainment provides insight into the capability of the resident workforce. Between 2011 and 2016, SEQ's residents aged 15 and over with a bachelor degree or higher increased by 117,000 (representing a 26 percent increase). This was outperformed by Sydney and Melbourne which increased by 255,000 and 237,000 representing increases of 30 percent and 31 percent respectively.[41]

The growth in level of education attainment was predominantly driven by the net interstate migration of highly skilled workers moving to SEQ. In 2016, SEQ recorded a net gain of 12,312 residents with a bachelor degree or higher, primarily driven by the 25–44 age group (see Figure 23). Interestingly, this included a net gain of highly qualified residents from NSW, but a net loss to Victoria (see Figures 24). This trend sheds light on the relative attractiveness of SEQ to knowledge workers in NSW, but that the historical trend of losing young, educated residents to Melbourne continues.

Current student enrolments for SEQ has been trending above the region's population growth. Between 2011 and 2016, tertiary students currently enrolled in a bachelor's degree or higher in SEQ grew by 23 percent, while population growth was only 10 percent over the same period. This, however, was lower than Sydney and Melbourne, which grew by 27 percent and 34 percent respectively, demonstrating the greater capacity for student numbers in their universities. SEQ's technical student enrolments (diploma, advanced diploma, and certificate students) grew by 2 percent over the period, while Sydney and Melbourne declined by 13 percent and 9 percent respectively.[42] This demonstrates that SEQ is still maintaining a well diversified skills base at the heart of the economy as its industries continue to grow.

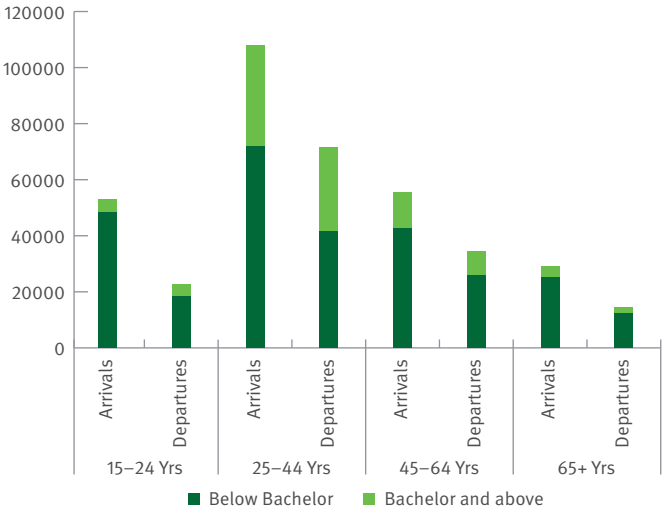


Figure 23 – SEQ's highest education attainment arrivals and departures by age group, 2016

Source: ABS, 2017, Census of Population and Housing, Australia, 2016

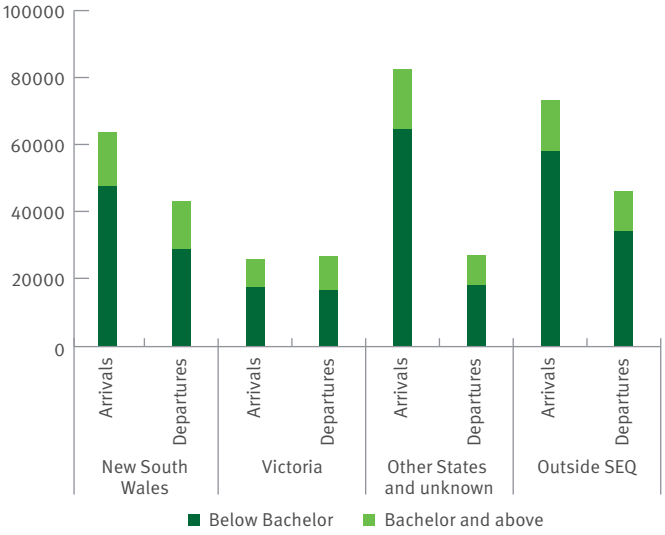


Figure 24 – SEQ's highest education attainment arrivals and departures by location, 2016

Source: ABS, 2017, Census of Population and Housing, Australia, 2016

[41] ABS, 2017, Census of Population and Housing, Australia, 2016
[42] ABS, 2017, Census of Population and Housing, Australia, 2016; Various, 2017, University Annual Reports

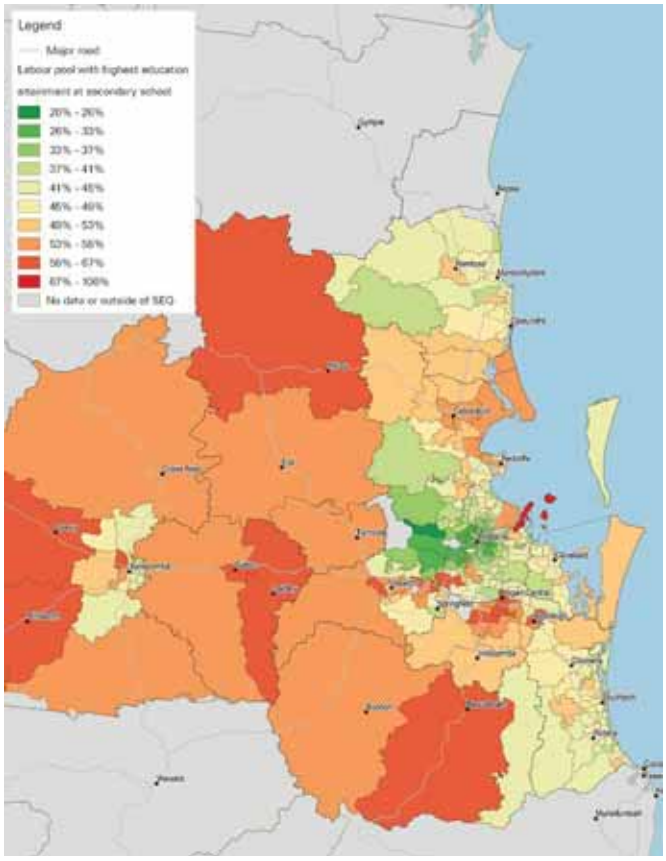


Figure 25 – SEQ highest education attainment by secondary school qualification for SA2s, 2016
ABS, 2017, Census of Population and Housing, Australia, 2016

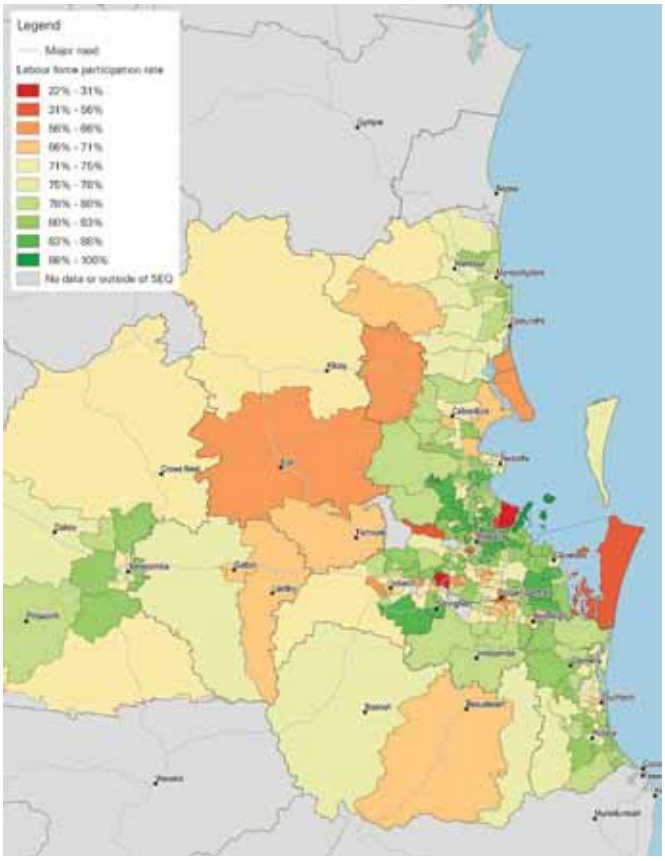


Figure 26 – SEQ labour force participation rates for SA2s, 2016
ABS, 2017, Census of Population and Housing, Australia, 2016

The two maps above (Figure 25 and 26) have been developed to highlight latent capacity in the SEQ labour market. They outline the relative education levels and workforce participation rates across SEQ. In the inner metropolitan areas of SEQ, the data indicates that there is relatively high labour force participation coupled with a relatively low portion of the population with only a secondary school highest education attainment. Comparatively, this trend reverses across the middle-ring out outer regions of SEQ, with a few notable exceptions.

These exceptions include Toowoomba, which has a relatively lower educated workforce, though a very high participation rate. This suggests that local workforce skills meet the demand of local employment opportunities. Similar trends can be observed in Moreton Bay and the Gold Coast.

Key pockets across SEQ where there are both a lower education attainment rate and a lower labour force participation rate include Logan Central, the South-West Industrial Corridor through to Ipswich and areas of the Lockyer Valley and Somerset around Gatton, Laidely, Esk and Fernvale. When overlaid against a backdrop of high population density and forecast growth in Logan and Ipswich, it is clear that there is an opportunity to better connect residents with employment opportunities in these locations, both through economic development and transport connectivity investment.

Stability

Stable institutions and communities contribute positively to the quality of life experienced by residents.

In terms of stability, SEQ enjoys relatively low levels of crime, civil unrest and threat of terror, however the region experiences some rising inequality issues in some disadvantaged communities.

Socio-economic disadvantage

As a measure of socio-economic conditions, the 2011 Socio-Economic Indexes for Areas (SEIFA) provides a measure for disadvantage – the Index of Relative Socio-economic Disadvantage (IRSD). The IRSD measures an areas, level of disadvantage from most disadvantaged (areas with an IRSD score of 1) to least disadvantaged (areas with an IRSD score of 10) by assessing census variables such as: households with low income, number of people with no qualifications, and number of people in low skilled occupations.[43] Figure 27 maps the areas of socio-economic disadvantage from most disadvantaged to least disadvantaged for SEQ.

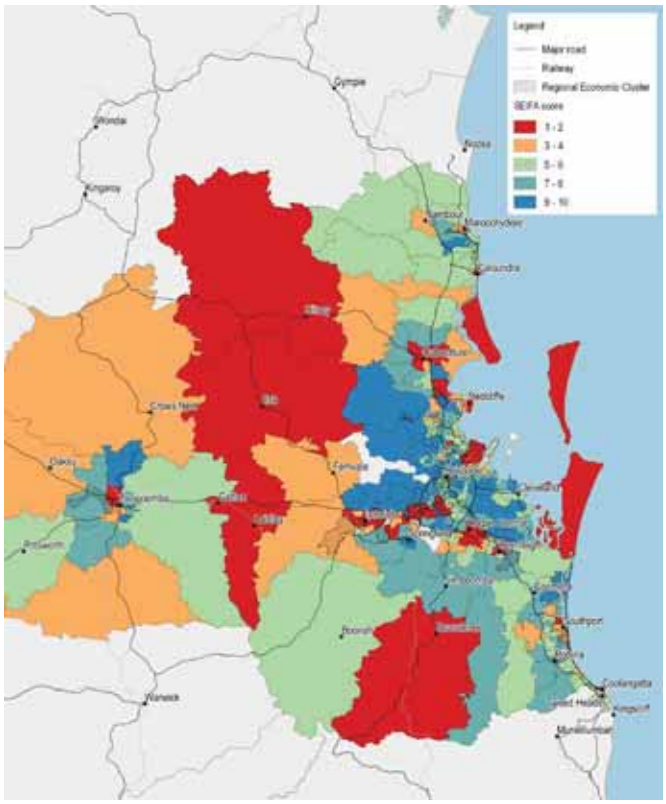


Figure 27 – Areas of socio-economic disadvantage in SEQ
ABS, 2013, Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011

Figure 27 highlights pockets of disadvantage along some of SEQ's major transport corridors. This trend highlights the importance of complementary interventions to support economic participation and economic wellbeing for SEQ's residents. Other areas of disadvantage are located on the outskirts of the region which have poor accessibility to services and employment. These areas of disadvantage include some of the most vulnerable residents in the region which should be considered when undertaking strategic planning for interventions to facilitate economic growth.

[43] ABS, 2013, Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011

Civic services

SEQ has a number of world-class universities throughout the region, however education attainment has been falling.

The SEQ region has a strong tertiary education system, underpinned by five universities in the QS top 500 university rankings.[44] However, when comparing against similar international regions, SEQ's higher education attainment for the region's population is relatively low.[45] This demonstrates that, while SEQ's universities perform strongly, with over 100,000 enrolments, the region has not been able to effectively retain the knowledge, with many graduates leaving the region upon graduation.

The lack of retained knowledge in SEQ may be attributed to a number of factors. These may include international students returning home after studies or a lack of employment opportunities in the region. The second possibility is a more concerning problem for the region, in that its educational institutions are not effectively collaborating with the region's industries to supply the skills required by industry. This can result in knowledge leakage, particularly to places with more established knowledge intensive industries, such as Melbourne and Sydney.

Culture and environment

SEQ's capital city Brisbane has 7 out of 10 of Australia's most liveable suburbs and one-third of the top 50.[46]

The SEQ region benefits from warm sub-tropical climates with average temperatures ranging from 15.7 °C to 25.5 °C. The region's communities are afforded plentiful access to public spaces and world class beaches, with its suburbs ranking highly in Australia for access to parks, schools, and beaches.[47]

Metropolitan revitalisation is competing with the need for green spaces.

Comparing the rate of change in green space available in the Brisbane metropolitan area to other similar areas around the world SEQ ranks poorly with a 30 percent decline in available green space between 2000 and 2014.[48]

The decline in available green space has been in part the result of the region's capital city undergoing rapid transformation. Population growth and consolidation development at the heart of SEQ has seen active vibrant metropolitan communities expand, providing the population with new social experiences in which to engage. This has seen Brisbane ranking highly on a number of livability lists moving up the Economic Intelligence Unit's (EIU) livable cities index, from rank 20 in 2014 to 16 in 2017, and Monocoles's list of top 25 liveable cities, 25 to 23 over the same period.

Future consolidation development and expansion of metropolitan communities should seek to ensure that green space is maintained as a priority. Preservation of green space will contribute to sustainable growth and lifestyle values for the region's current and future generations.

[44] QS Higher Education rankings, 2016
[45] Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context
[46] REA Group Ltd., 2017, Australia's Best Lifestyle Suburbs
[47] REA Group Ltd., 2017, Australia's Best Lifestyle Suburbs
[48] Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

Natural landscape, Scenic Rim

The natural environment

Governments are increasingly faced with policy issues that are multi-disciplinary in nature and require an understanding of the links between socio-economic and environmental factors.

The natural environment provides a myriad of benefits to the SEQ community including fresh air, clean water, pollination, healthy soils, flora and fauna, fish and livestock. These public and private goods underpin lifestyle and economic development and activity across a diverse range of sectors such as agriculture and fisheries, construction and tourism.

Economic growth and development can in turn result in environmental externalities across all stages of industry supply chains that place stress on public works infrastructure and lead to impacts such as land clearing, land degradation and greenhouse gas emissions. The depletion of non-renewable resources or broader residual environmental impacts can undermine the sustainability of economic growth by reducing the quality and quantity of natural resources available to future generations.

This section outlines five prominent environmental issues facing the SEQ community today, each of which are driven by a multitude of economic, environmental and social factors. The section highlights that a coordinated whole-of-government approach is required to address the identified issues and to ensure that the sustainability of the natural environment is not undermined.

Developing resilience to adverse weather events

In the past 15 years, South East Queenslanders have experienced the worst drought in 100 years, followed by the worst flood in 100 years.[49]

SEQ's current climate patterns and coastal population suggest that the region is particularly prone to adverse weather events. Prominent scientific research suggests that the increase in frequency and severity of adverse weather events is set to continue into the future. For example, the Climate Council has recently found that:

- The time spent in drought is projected to increase across Australia. Extreme drought is expected to increase in both frequency and duration.
- The intensity of extreme rainfall events is projected to increase across most of Australia.
- The increase in coastal flooding from high sea level events will become more frequent and more severe as sea levels continue to rise.[50]

Adverse weather events have the potential to significant impact on the region's communities and economic infrastructure. This will disrupt economic activity and threaten the livelihoods (and lives) of the community. For example, beginning in December 2010, a series of floods in Queensland were estimated by the Federal Treasury to reduce coal production by between $4 billion to $5 billion, crop production by $1 billion, and tourism by $300 million to $400 million.[51] Overall, Federal Treasury estimated that the floods led to Queensland Gross Domestic Product (GDP) growth being lower in 2010–11 by between an estimated 1/2 to 3/4 of a percentage point.[52] In addition to the loss of income and activity, reconstruction activities required the utilisation of a significant amount of resources to restore communities and critical economic infrastructure.

Looking forward, design and maintenance of critical infrastructure, as well as mitigation and response systems, that complies with best practice principles of resilience will help to reduce the impacts from more frequent adverse weather events.

Reducing greenhouse gas emissions

SEQs' low pollution is offset by its high levels of CO_2 emissions.

SEQ boasts low overall exposure to pollution relative to international benchmarks due in part to high levels of green space per capita, and comparatively lower population and density. On the other hand, while CO_2 emissions have declined in recent years across many internal cities, emissions per capita in SEQ remain high relative to international benchmarks (Figure 28, Figure 29).[53] Rises in greenhouse gas emissions have been strongly correlated with the growth of SEQ's population and industry activity. The region's dispersed population requires expansive transport and energy related infrastructure, which are both primarily fueled by non-renewable fuel sources.[54]

Looking forward, the Queensland Government has committed to a 30 percent reduction in greenhouse gas emissions by 2030 as part of a Climate Transition Strategy. A coordinated whole-of-government approach will help to achieve the structural change necessary to meet these targets while limiting the level of economic disruption.

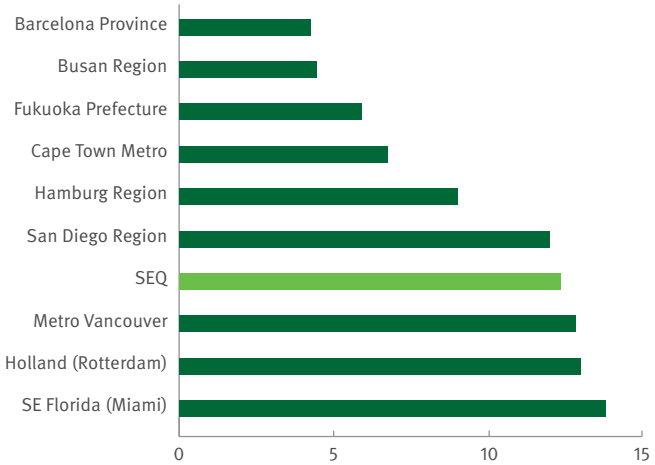


Figure 28 – CO_2 emissions per capita

* All data is at OECD-defined metropolitan scale, except for Cape Town, for which data is presented at the official metropolitan city scale

Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

[49] Seqwater, Water for Life, South East Queensland's Water Security Program, 2015–2045, July 2015
[50] Climate Council, Cranking Up the Intensity: Climate Change and Extreme Weather Events, 2017
[51] Australian Government, Treasury, FOI Disclosures, Economic and fiscal impacts of Queensland floods, available at: https://treasury.gov.au/foi/economic-and-fiscal-impacts-of-the-queensland-floods/
[52] Ibid
[53] Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context
[54] The Nous Group and SKM (Sinclair Knight Mertz) 2008, Queensland Marginal Abatement Cost Curve

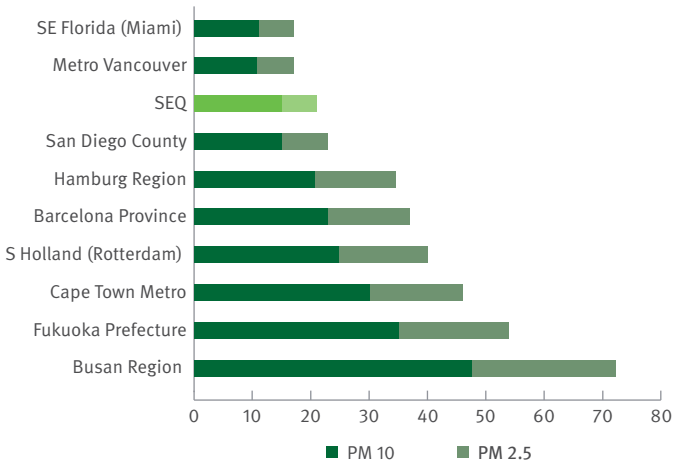


Figure 29 – Exposure to pollution

*Measured manually based on taking weighted averages of key regional centres in each region – see appendix for full details of methodology
Source: Moonen T., Nunleyn J. and Clark G., 2017. Benchmarking SEQ in a Global Context

Waste disposable management

Close to 75 percent of the headline waste generated across Queensland is disposed of in SEQ.[55]

As a product of the region's sustained growth and development, both commercial and residential, increased pressure has been placed on existing waste infrastructure. This pressure is due to the increased levels of municipal, commercial, industrial, construction, and demolition waste. This pressure has been offset to some extent by greater levels of waste recovery, particularly with paper, glass, and plastics.[56]

Continued residential growth will challenge the region's waste management processes; both in terms of water and solid waste. The current absence of a coordinated waste management strategy represents a risk to the region's natural environment, in particular its bay and waterways. Competing land use requirements, such as urbanisation and agriculture, will progressively challenge the region's solid waste disposal programs.

Improving waste water and catchment management has the potential to ensure that natural assets are preserved by, biodiversity is protected, and water quality is maintained. These all contribute to ensuring that the region's natural, tourism and lifestyle values are maintained.

Ensuring water security

While the current level of public works infrastructure is expected to enable the supply of water to meet demand over the next 10 to 15 years, the quality of inland water ways is reported to be variable.

SEQ currently enjoys high levels of water security as a result of ongoing investment in public works infrastructure, the commitment of the community to keep demand at far lower than pre-drought levels, and rainfall that has topped up our water storage dams. Unless the region experiences an extended drought, only small scale capital works are expected to be required to continue to meet demand over the next 15 years.[57] Whilst there is a good level of water security, cost of water for industrial and agriculture uses has been identified as a challenge for the region.

Another critical component of water security is preserving the quality of inland waterways to ensure they deliver the potential suite of social and economic benefits to the community. The Healthy Land and Water Report Card of inland waterways suggest that the conditions of the rivers within SEQ is highly variable, with rivers located in proximity to the coast generally rated as being in 'excellent' or 'good' condition, while rivers further inland generally rated 'poor' or worse.[58] The ongoing work of the Resilient Rivers Initiative is expected to help support the health and vibrancy of the inland river system.

Beyond 2030, new water supply options will be needed to maintain the water security of SEQ which will require a broad range of resilient water supply, demand and system operating options to be identified and assessed.

Wivenhoe Dam, Queensland

[55] Department of Environment and Heritage Protection, 2016 State of Waste and Recycling in Queensland 2015
[56] Queensland Government, 2016 Recycling and waste in Queensland
[57] Seqwater, 2014. South East Queensland's Water Security Program, 2015–2045
[58] Healthy Land and Water, 2017. Report Card, available at: http://hlw.org.au/report-card

Maintaining biodiversity

Of the 154 regional ecosystems that occur in the region over 60 percent are considered vulnerable or extinct. SEQ supports 324 species considered threatened or near threatened.[59]

Healthy levels of land-based biodiversity are underpinned by forests and woodlands, which are vulnerable to the land-clearing required for economic development and growth. The statewide Landcover and Trees Study (SLATS) monitors Queensland's forests and woodlands to assess vegetation extent and clearing activities.[60] The current total woody vegetation clearing rate for SEQ is in line with the highest levels observed since 1988. This has been driven by land clearing for pasture and forestry purposes, which has coincided with changes to the Vegetation Management Act which allows the clearing of native vegetation for high-value agriculture projects (Figure 30).[61]

Looking forward, fine tuning the legislative and regulatory settings within the Vegetation Management Act and the Environment Offset Framework will help to ensure that biodiversity is maintained across the region.

Koala, Queensland

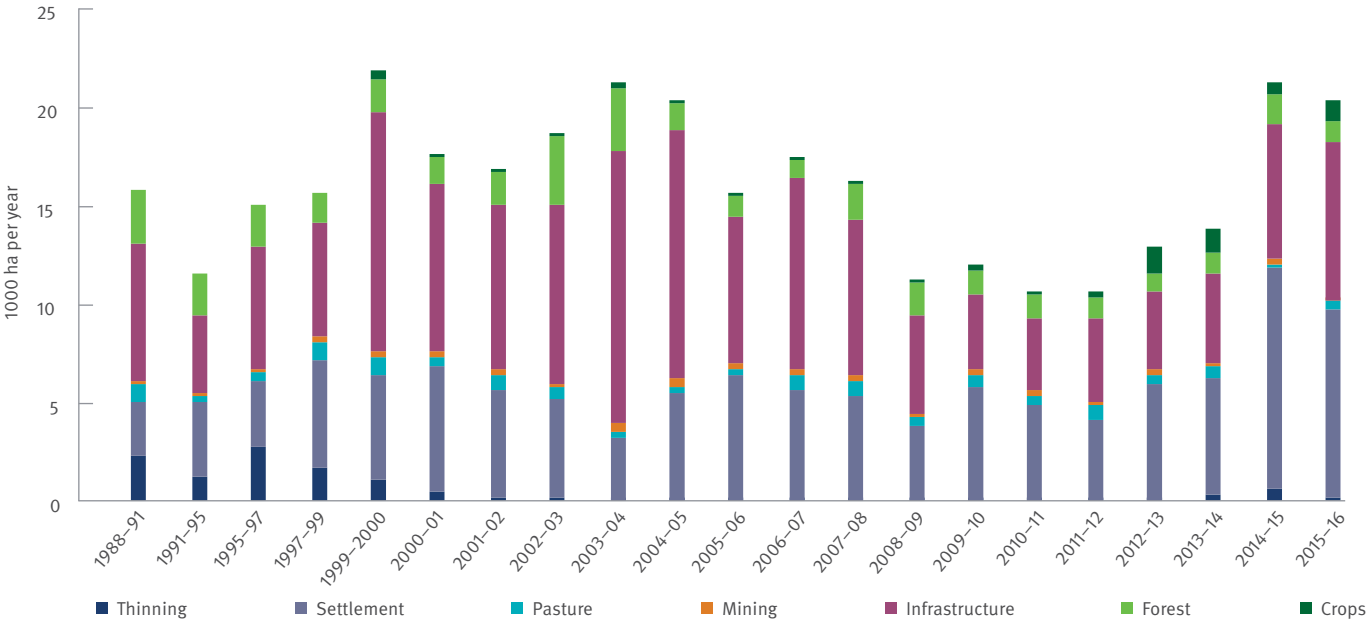


Figure 30 – The historical level and cause of land covering in SEQ

Source: Department of Science, Information Technology and Innovation, Queensland Government. 2017. Land cover change in Queensland 2015–16: a Statewide Landcover and Trees Study (SLATS) report. DSITI, Brisbane.

[59] SEQ Catchments, 2010. Nature Conservation & Biodiversity

[60] All clearing in this text refers to the woody vegetation clearing rate which is measured in hectares per year (ha/yr) for each reporting period. Clearing rates are rounded to the nearest 1000ha/yr and percentages rounded to the nearest whole percentage

[61] A series of self-assessable codes for landholders to manage clearing in certain areas were also introduced

PART 3 | Economic foundations

The following Part 3 identifies the priority industries with the potential to drive economic growth as well as the key spatial economic foundations that will be critical considerations to unlock this potential.

Priority industries driving growth

Details the five trade oriented (or 'export') industry clusters of the economy that have a high density and value of employment activity in the region. These industries include:

- advanced manufacturing;
- agribusiness;
- traded health and education;
- transport and communications; and
- tourism and creative.

The impact of global trends on these industry clusters, as well as the opportunities and risks that these present for each industry in SEQ, are outlined, in conjunction with the potential enablers that could support the future growth of these industry clusters.

The economic foundation of SEQ

Brings together the region's spatial, infrastructure and economic characteristics to highlight the corridors, clusters and growth fronts that will be critical to the achievement of the region's aspiration to grow its trade oriented economy. The investment framework to deliver growth in the traded industry is also identified.

Maintaining our vital rural industries

Priority industries driving growth

A focal point for the economic foundations paper is to identify priority industries that will increase the traded (export) portion of SEQ's economic activity. Traded industries are industries which serve markets beyond the region in which they are located. These industries are typically free to choose their location of operations, unless they are dependent on proximity to natural resources (for example, mining industries that locate in close proximity to resource and mineral deposits), and as a result tend to be highly concentrated in areas that afford them a competitive advantage. These industries compete in cross-regional markets and are consequently exposed to regional competition. Promoting the growth and productivity of a region's strong traded industries is often a driving force behind the prosperity of regional economies.

It is worth noting that while the focus of this report is on traded industries, local industries are also important to the economy as they provide the majority of employment opportunities. However, these industries tend to be 'population serving' and, as a result, will usually occur proportional to population growth throughout the regions. These industries are not directly exposed to cross-regional competition, and, as such, strategic planning and investment will not derive the same level of benefit as traded industries. The remainder of this section will look at the approach undertaken in this economic foundations paper to identify traded industries and the priority industry clusters for SEQ.

Determining priority industry clusters

This section provides an overview of the established works that define the importance of comparative advantages, industry clusters, and regional clusters of economic activity. The following three papers have provided the foundation for developing the approach applied to identify industry clusters of comparative advantage.

- *The Competitive Advantage of Nations* (Porter, 1990) – establishes the importance of competitive advantage for companies in the comparative advantage of nations. It explores the competitive advantage links to broader factors such as government, natural endowments, technical innovation, and regional economic activity.
- *The Economic Performance of Regions* (Porter, 2003) – provides the methodology for identifying comparative advantage through the estimation of location quotients and other employment data.
- *Defining Clusters of Related Industries* (Delgado, Porter, & Stern, 2014) – provides the methodology for clustering groups of related industries.

At its core, the theory of comparative advantage refers to the ability of economic agents (such as firms, regions, nations, etc.) to more productively produce a good or service relative to other economic agents. Importantly, in this context, economic agents tend to export their goods and services where they have comparative advantage and import where they do not.

Evolve Skateboards, Gold Coast

The sources of comparative advantage have been examined at great length, and are influenced by a variety of factors such as consumer preferences, technology, political context, climate, skilled labour, natural resources, economies of scale, etc. These features are generally ascribed to either technologies or factor endowments. For the purpose of this economic narrative, the source of potential comparative advantage has been assessed through the lens of location specific industry clusters[62,63] and supported through engagement with local, state, and federal government stakeholders and industry.

These two means of attaining comparative advantage have implications for the SEQ economic narrative. Firstly, where there are natural endowments occurring, comparative advantage cannot typically be achieved without the supporting business and economic environment. This may include the right policy environment, infrastructure access, access to capital investment, or other environmental factors. This raises the question for the broader deal – how can SEQ leverage the region's natural endowments to develop comparative advantages?

Secondly, given the associated links between cluster economies and technical advancements how can SEQ enable existing or potential industry clusters in SEQ that may support future technical advancement?

To answer these questions in the context of the economic narrative, five priority industry clusters have been selected. The five priority industry cluster were selected as they are either currently exhibiting a comparative advantage, are positioned to achieve a comparative advantage, or have been identified as being instrumental in facilitating technological advancement. These five industries are as follows:

- advanced manufacturing;
- agribusiness;
- traded health and education;
- transport and communications; and
- tourism and creative.

These priority industry clusters were tested and confirmed with SEQ's local, state, and federal government stakeholders on 15 June 2017 for Workshop 1, 20 July for Workshop 2 and over a number of individual meetings.

[62] For more information on the analytical approach undertaken see *Appendix A – Detailed Technical Note*
[63] For SEQ's industry cluster maps see Appendix B – SEQ's Industry Cluster Maps

Determining inter-industry links

To further understand the role of the priority industry clusters in SEQ, and the broader state economy, the inter-industry relationships have been examined for the Queensland economy using the industry cluster definitions. This provides greater visibility on the inter-industry relationships, beyond those contained within the SEQ region's boundaries.

The inter-industry chord diagrams described below are intended to demonstrate these relationships. The diagrams, produced using KPMG-RCGE input-output data, show the interdependencies of the priority industry clusters to each other, and other industries, within the Queensland economy.[64] It is important to note that these input / output flows only capture activity that is occurring between the industry clusters and within the Queensland economy. As such, it does not account for activity, such as imports and exports, outside of this region, and also does not directly capture activity that alights or is destined for consumption within the general population.[65]

The inter-industry interdependencies within the Queensland economy is illustrated in Figure 31 below.

With reference to Figure 31, the coloured industries identify the input / output flows of traded industries, while the grey colour identify the local (population serving) industries. Where an industry's colour flows from another industry, this represents the amount of the supply used from the other industry; an input required to produce the industry's outputs. For example, agribusiness (maroon) uses a significant portion of inputs from agriculture (green) to produce its outputs. This relationship can be seen by the thick maroon line from agriculture to agribusiness; the diagram shows that the agriculture industry's supply (output) is the most significant output used as an input in the production of the agribusiness industry's supply (output).

The diagram demonstrates the heavy interdependencies of SEQ's traded industry clusters, as well as the significant role that finance and professional services, traditional manufacturing and industrial and construction services play in contributing to key supply chains for traded industry clusters.

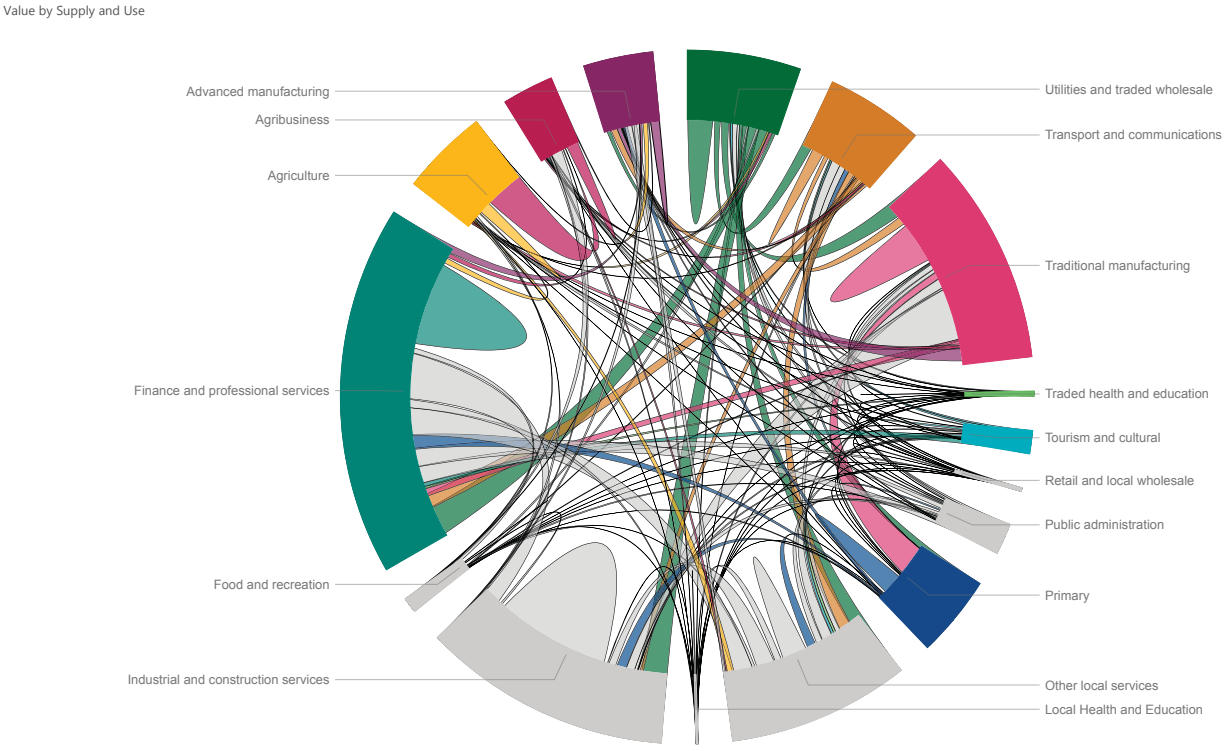


Figure 31 – Queensland inter-industry relationship chord diagram
Source: KPMG's Regional Computable General Equilibrium (KPMG-RCGE).

[64] KPMG's Regional Computable General Equilibrium (KPMG–RCGE) provided current input output data for the Queensland economy to identify the current inter-industry relationships of the economic narrative's industry clusters
[65] For more information refer to Stage 3: Complementary Analysis in Appendix A – Detailed Technical Note

Determining key spatial locations

The choice by inter-dependent industries and businesses to co-locate already occurs across the region. This is a result of a desire to reduce input costs associated with transport, access similar (maximise access to) pools of labour as well as in recognition of the ease of business and innovation benefits that come from proximity. Across SEQ, there are a range of precincts that have emerged through both the choices of business as well as key zoning and investment decisions by governments over the course of the region's development.

These precincts were highlighted in *ShapingSEQ* as regional economic clusters of activity (RECs) which are defined as:

> **"...geographic concentrations of interconnected businesses, suppliers and associated institutions (that) result in greater economic activity and are significant economic drivers."**

ShapingSEQ identifies 16 of these RECs across the region, including key economic geographies, such as the Capital City REC that incorporates the Brisbane CBD and surrounds. The plan also identifies 27 knowledge and technology precincts across the region, which occur at a much smaller scale than the RECs (see Figure 32). These are mostly located within the RECs (e.g. university campuses at Kelvin Grove, St Lucia or Gardens Point) although seven are located independently of broader regional scale clusters (i.e. Chermside health and education precinct, Coomera film and media precinct, or the Gatton animal sciences precinct).

Appreciating how the businesses within five traded industries are choosing to locate themselves and their supply chains across SEQ is important in understanding the role of infrastructure investment and other policy initiatives to support growth. Accordingly, this economic foundations paper highlights the key RECs of greatest significance to each of the five industries.

Additionally, the following analysis seeks to identify the corridors that are of greatest economic significance to the priority industry clusters and the region's economy. These corridors are critical considerations to the extent that they bring key economic activities closer together, as well as efficiently linking productive precincts with key trade gateways (e.g. the Port of Brisbane or key airports across the region).

The figures used in the following industry cluster discussion are focused on the urban areas of SEQ as illustrated in Figure 33. The focus area has been used to enable the industry cluster information to be displayed at a clear and legible scale.

This economic foundations paper seeks to provide an overarching perspective on the spatial clusters and corridors that are of greatest significance to the traded industry clusters with the potential to support the next wave of economic growth in SEQ.

Examples of Regional Economic Clusters and Knowledge and Technology Precincts in SEQ

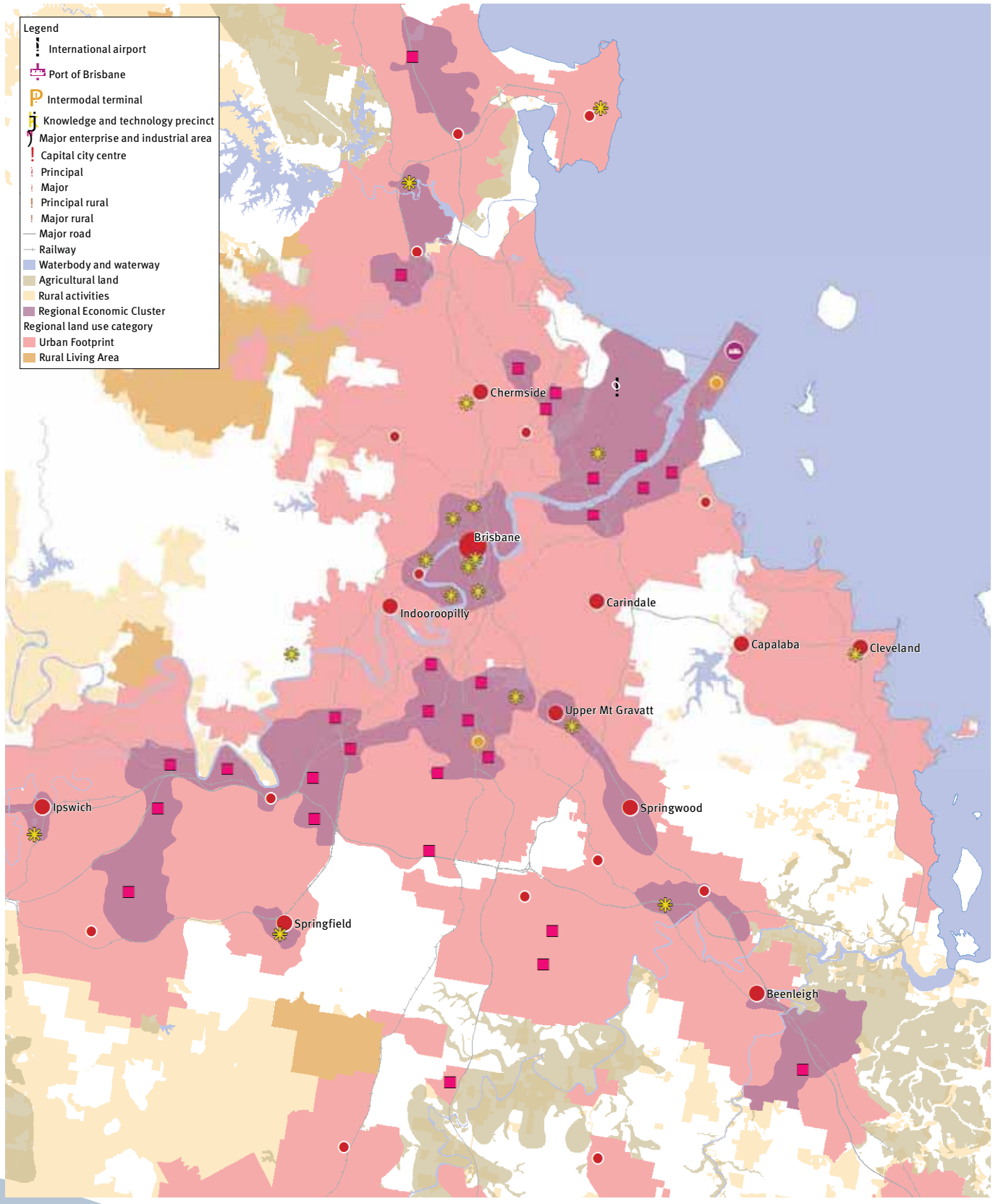


Figure 32 – Examples of Regional Economic Clusters and Knowledge and Technology Precincts in SEQ
Source: Regional and Spatial Planning, Queensland Government. September 2017

Focus area for industry cluster figures

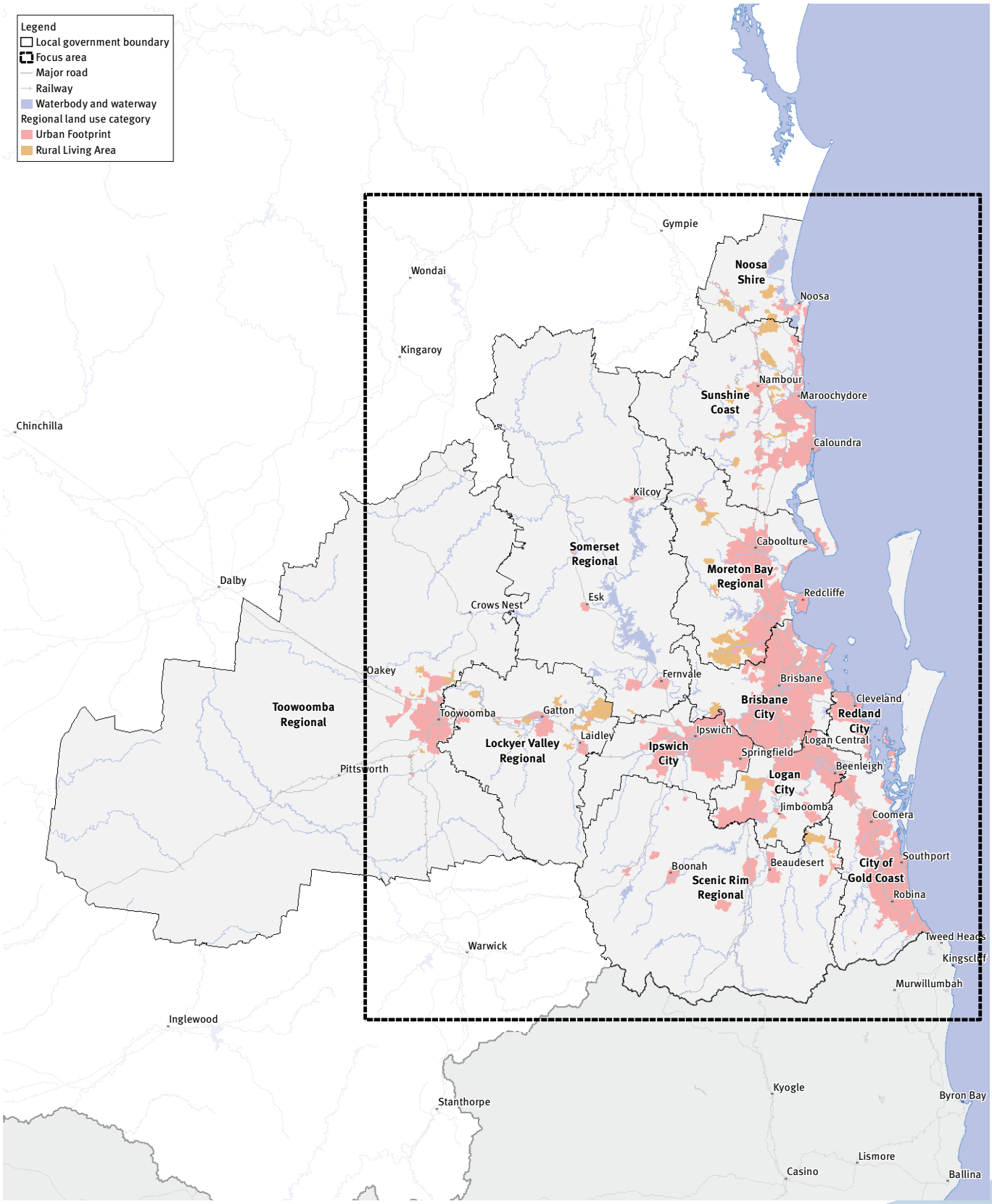


Figure 33 – Focus area for industry cluster figures
Source: Regional and Spatial Planning, Queensland Government. September 2017

Priority industry clusters in SEQ

A detailed analysis of each of the five priority industry clusters is provided below. This analysis provides:

- an overview of the industries which constitute the industry cluster
- articulation of whether the industry cluster is currently exhibiting a comparative advantage, positioned to achieve a comparative advantage, or instrumental in facilitating technical advancement in SEQ
- key locations and assets relevant to the industry cluster
- the inter-industry links (both inputs and outputs) with other industry clusters
- the key opportunities and challenges that have the potential to impact on the future growth of the cluster
- key enablers that have the potential to support the future growth and performance of the cluster.

Solar Farm, Sunshine Coast

Advanced manufacturing

Priority industry overview

Globally, manufacturing markets are being transformed by advances in technology, a shift towards bespoke goods and a drive towards a more efficient and sustainable process and operating models. This change in manufacturing production incorporates the use of 'cutting edge' technology, expertise and innovation in the delivery of a broad range of manufacturing activities, from research and development to full-scale production and distribution. Globalisation and digitalisation are changing the traditional manufacturing landscape causing Australia's historical disadvantages, such as high labour costs, a small domestic market and geographical remoteness, to be less important.

Responding to these global trends and the rise of advanced manufacturing is the focus for both Commonwealth and Queensland Governments. Both governments have identified a range of opportunities to ensure that both the country and state remain competitive in this emerging, high value economy.

Advanced manufacturing has been identified as a priority industry cluster due to its strategic importance in supporting economic growth and advancement, particularly in leveraging advancing technologies for innovation and skill diversification. Figure 34 provides an overview of the advanced manufacturing industry cluster in SEQ. Most of the growth in this industry cluster in SEQ is expected to come from increased global value chain operations in aerospace and defence, transport, biofutures, pharmaceuticals and medical technologies, precision agriculture, renewable energy, scientific instruments, and mining equipment, technology and services.

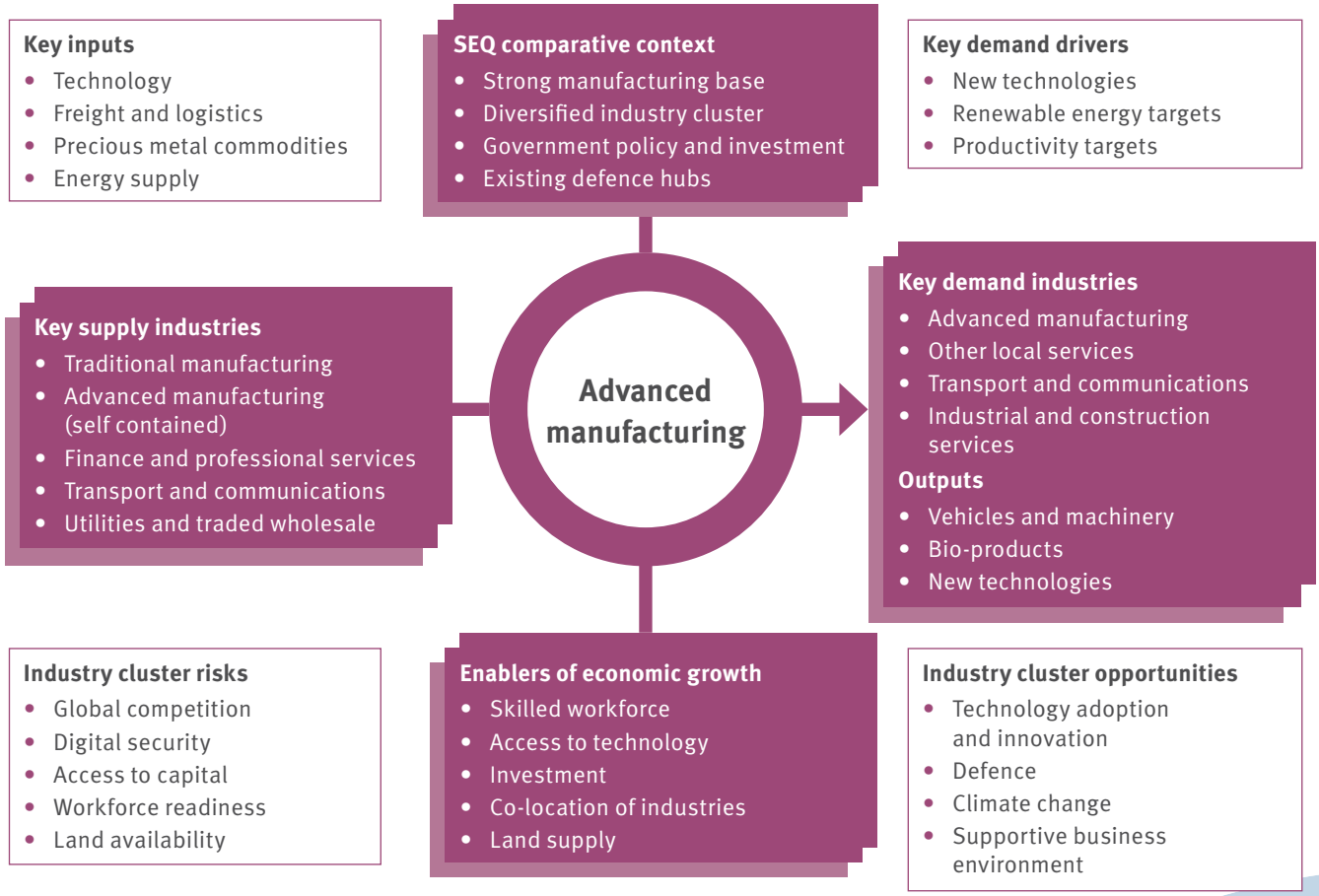


Figure 34 – Advanced manufacturing industry cluster overview
Source: CTT, Queensland Government.

Advanced manufacturing in SEQ

SEQ's historical *traditional manufacturing* base provides the foundation to support the shift to advanced manufacturing providing access to established infrastructure and labour expertise.[66] Where other regions have transitioned to more service based economies, there is typically a notable decline in manufacturing and loss of manufacturing expertise. This loss of expertise can lead to skills gaps in the activities of advanced manufacturing. In contrast, emerging economies tend to have greater activity in traditional manufacturing, due to the relatively lower level of expertise required and lack of a supporting business environment to grow industries such as advanced manufacturing. SEQ is currently in a unique position, where there still remains a strong traditional manufacturing backbone, but also the skilled supporting business environment to grow advanced manufacturing.

At present, advanced manufacturing is estimated to employ approximately 23,000 workers within the region. This represents approximately 1.6 percent of total employment in SEQ. The closely linked traditional manufacturing industry supports a further estimated 34,000 workers in the region, representing approximately 2.3 percent of total employment in SEQ.

While employment in advanced manufacturing is a relatively small proportion of total employment in the region, advanced manufacturing activities generate approximately $134,000 GVA per worker – which is higher compared to the average Australian worker in this industry elsewhere. The industry's relatively higher value activities support its identification as a priority industry cluster.

In addition to infrastructure and labour expertise, advanced manufacturing has a diverse base from which to generate economic activity. The existing business environment supports access to mature markets (both domestically and internationally). For example, there is significant demand for vehicle manufacturing and technology and service development from both the defence and mining industries which have a strong presence in Queensland, interstate and in emerging Southeast Asian markets.

SEQ is a region with an increasing amount of highly innovative small and medium sized enterprises (SMEs). Australia's SMEs are ranked fifth in the OECD for innovation[67], making the SMEs well suited to rapidly adapt to changing and differing customer demands. Practiced at serving the small domestic market, SEQ manufacturers are experienced in profitably manufacturing low volume, niche products.[68] In addition, SEQ has a proximity advantage in supplying advanced manufacturing products to the mining, agriculture and defence industries in the region.

A key anchor for the advanced manufacturing industry cluster in SEQ is the defence industry with bases located at:

- RAAF Base (Amberley);
- Gallipoli Barracks (Enoggera);
- Swartz Barracks (Oakey);
- Kokoda Barracks (Canungra);
- Borneo Barracks (Cabarlah, north of Toowoomba);
- Victoria Barracks (Petrie Terrace, Brisbane); and
- Damascus Barracks (Pinkenba).

Advanced manufacturing for the Australian Defence Force leverages the region's traditional strengths in heavy vehicle, truck and bus manufacturing activities. A demonstration of the region's land defence, heavy vehicle and advanced manufacturing capabilities has recently led to Rheinmetall Defence (one of the world's leading producers of systems and equipment for ground, air and naval forces) selecting Brisbane, along with Townsville, as their preferred locations for its Australia-New Zealand headquarters and an associated Military Vehicle Centre of Excellence (MVCE).[69]

While SEQ has limited energy and resource deposits (e.g. natural gas) compared to other parts of Queensland, it is the service centre which can support these activities. The skilled workers in SEQ support the mining industries by providing technology, equipment and services. Advanced manufacturing for the mining equipment, technology and services (METS) and energy sectors includes the development and commercialisation of new processes, technologies and products. Queensland's unique geography requires locally developed improvements in technology and innovative solutions to support the productivity of the mining industry.

The advanced manufacturing industry cluster is central to unlocking national economic prosperity through its influence on infrastructure development, job creation, research and development, export earnings, and flow on impacts to other industries.

[66] Traditional Manufacturing includes metal, glass, cement, paper and pulp, rubber, polymer, textile, and clothing and footwear manufacturing. Traditional Manufacturing has been defined in line with the methodology in the Technical Note Appendix B
[67] Hendrickson, L. et al (2014). Australian Innovation System Report 2014, Department of Industry, Commonwealth of Australia, Canberra
[68] Future Manufacturing Industry Innovation Council (2011). Trends in manufacturing to 2020: A foresighting discussion paper. Canberra
[69] Rheinmetall Defence. 2017. Rheinmetall selects Queensland for Military Vehicle Centre of Excellence. Accessed 6 September 2017. https://www.rheinmetall-defence.com

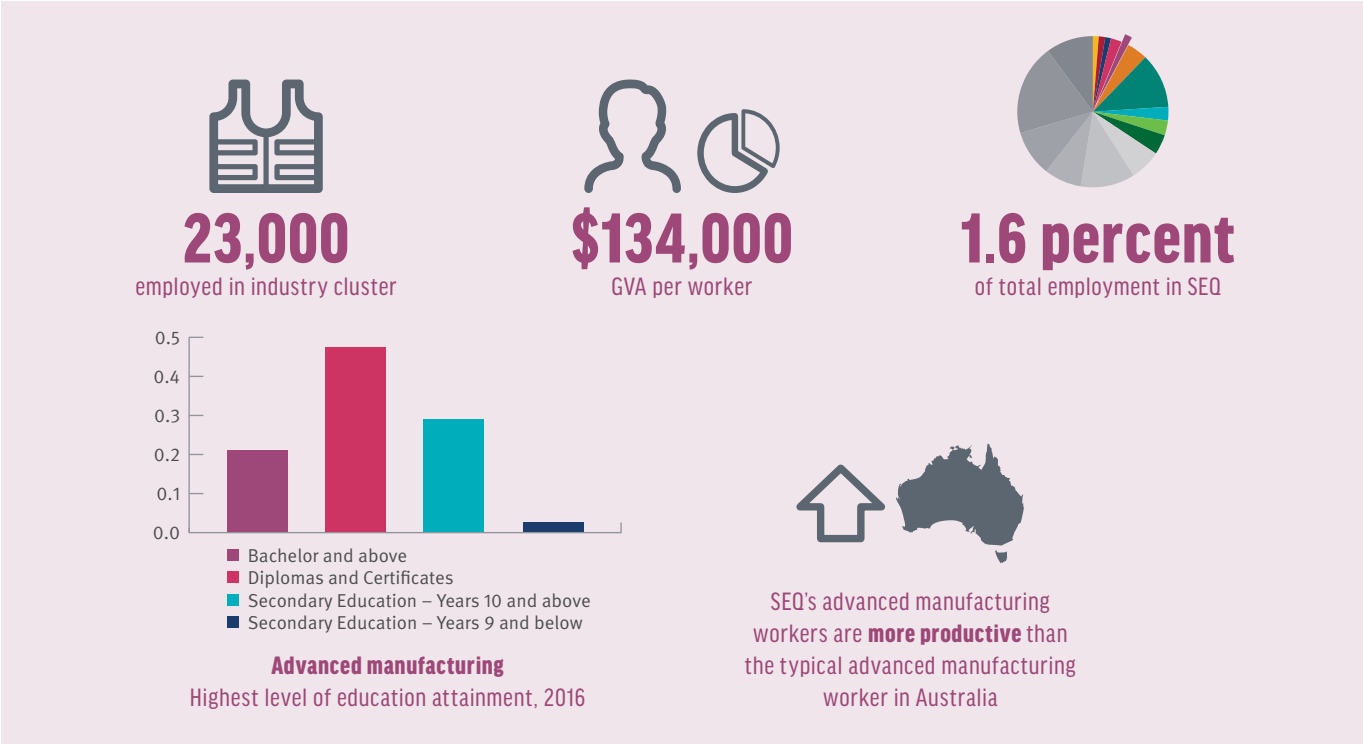


Figure 35 – Key industry cluster characteristics – advanced manufacturing
Source: CTT, Queensland Government. Refer Appendix B – Technical Note; University annual reports, 2016; ABS Census, 2016

Key locations

Advanced manufacturing activities benefit from access to export gateways and co-location with complimentary activities such as traditional manufacturing, including polymer, metal and glass production. Within SEQ, the location of advanced manufacturing activity has been most dominant in large designated industrial zones, which often are well connected to telecommunication and transport infrastructure with access to export gateways.

The Port of Brisbane, located to the east of Brisbane City, in the Australia Trade Coast is a key cluster (Australia Trade Coast REC) which is adjacent to, and well serviced by, the port and airport respectively (Figure 36).

In addition, there is a corridor of advanced manufacturing activity from Riverview, Ipswich to Salisbury, and Brisbane. This area, referred to as the South West Industrial Corridor REC, supports the co-location of manufacturing businesses and other industrial uses in one of the region's most established industrial precincts which is well serviced by key freight routes. There is a concentration of advanced manufacturing activity in the Ipswich REC which is likely due to the location of Amberley defence base, a key driver of demand for advanced manufacturing goods. Within the Western Gateway REC, there is an advanced manufacturing cluster in Toowoomba which is co-located with the Wellcamp Airport and Business Park.

Through access to freight corridors, the Pacific Highway corridor south, which includes the Pacific Motorway and Yatala–Staplyton–Beenleigh, has enabled a corridor of advanced manufacturing activity. There are additional advanced manufacturing clusters along this corridor, particularly Coomera on the Gold Coast.

Aerial of Port of Brisbane

These established industry cluster areas and corridors are supported by pockets of emerging activity in areas including the Lockyer Valley, Sunshine Coast and Moreton Bay (including Strathpine–Brendale–Petrie and North Lakes–Mango Hill). The Bromelton SDA, located near Beaudesert in the Scenic Rim, is an emerging expansion industrial development area. This development area will allow future growth in advanced manufacturing activity within the region, and provide supporting freight and logistics operations.

There are also a number of emerging precincts that will further support advanced manufacturing activities.

Advanced manufacturing in the SEQ Region

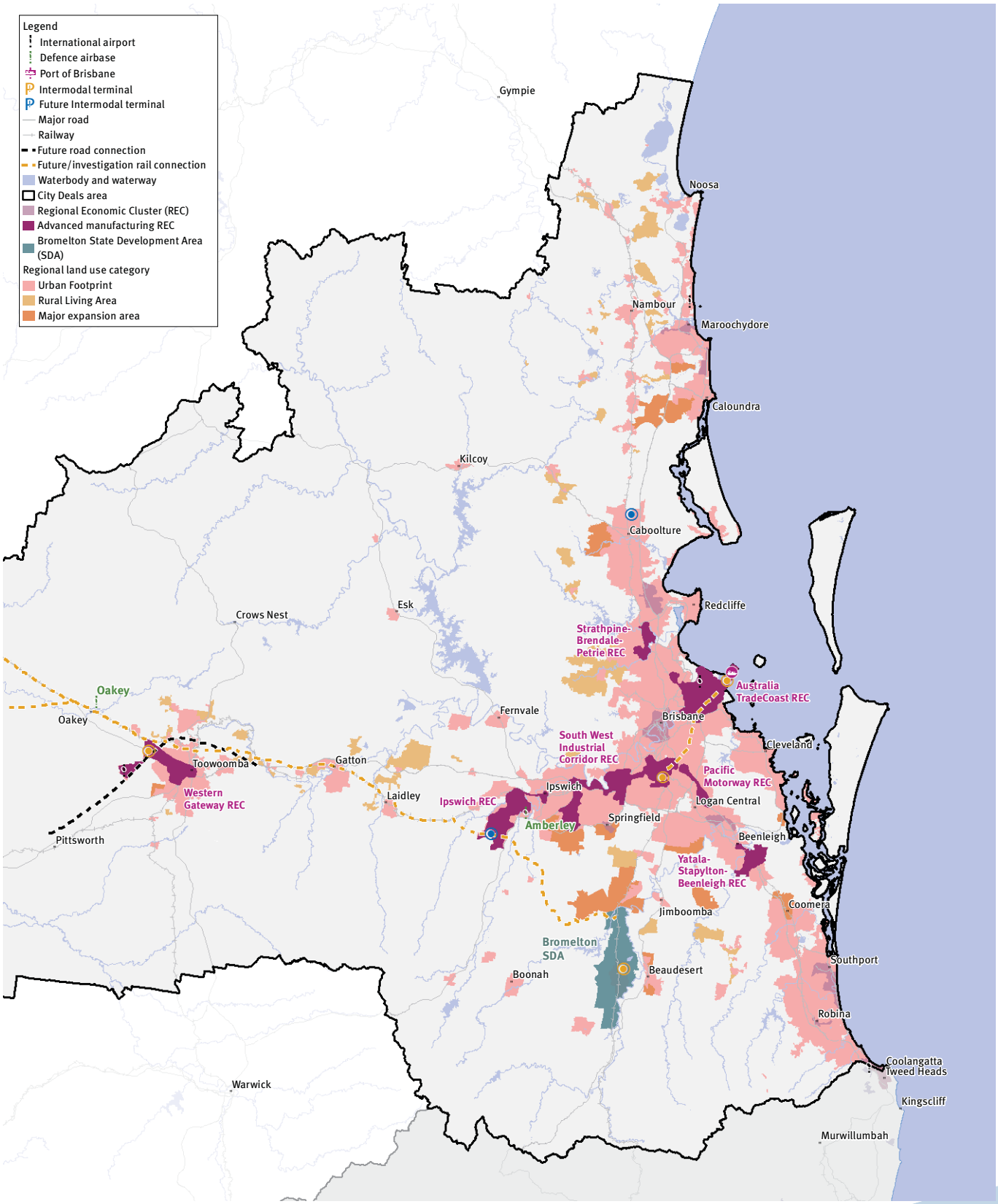


Figure 36 – Advanced manufacturing in the SEQ Region

Source: Regional and Spatial Planning, Queensland Government. September 2017.

Inter-industry links

The interdependency of advanced manufacturing with other industry clusters is varied given the diversity of inputs and outputs of this industry cluster's intermediate supply chains. These interactions highlight the interconnectedness of this industry within the Queensland economy. The key relationships to other industry clusters is illustrated in the inter-industry input-output in Figure 37. The advanced manufacturing industry cluster also significantly supports, and is supported by, activity within its own industry cluster (21 percent of inputs and 17 percent of outputs).

The industry cluster's input activity is further supported by traditional manufacturing (28 percent) and finance and professional services (17 percent). Traditional manufacturing provides a variety of first-stage processing outputs for further processing using advanced manufacturing techniques. For example, metal, polymer and glass (outputs from traditional manufacturing) are further developed into professional and scientific equipment (outputs from advanced manufacturing). Finance and professional services contribute to activities in advanced manufacturing through scientific services, information technology services, legal and accounting services for activities such registering of patents and coordination of medical trails.

The largest users of outputs from the advanced manufacturing industry cluster include other local services (13 percent), transport and communications (11 percent), and industrial and construction services (10 percent). In this context, advanced manufacturing provides products and services that are utilised in automotive repair and maintenance, passenger transport, and heavy engineering and construction (many of which are local industry clusters).

Advanced manufacturing and its growing role in SEQ's economy is also a platform for emerging activities in the defence sector, including aeronautical engineering, specialised parts manufacturing and other high value manufacturing activities. These types of activities are generally observed within the advanced manufacturing cluster, thus supporting the large share of input / output of the cluster to itself.

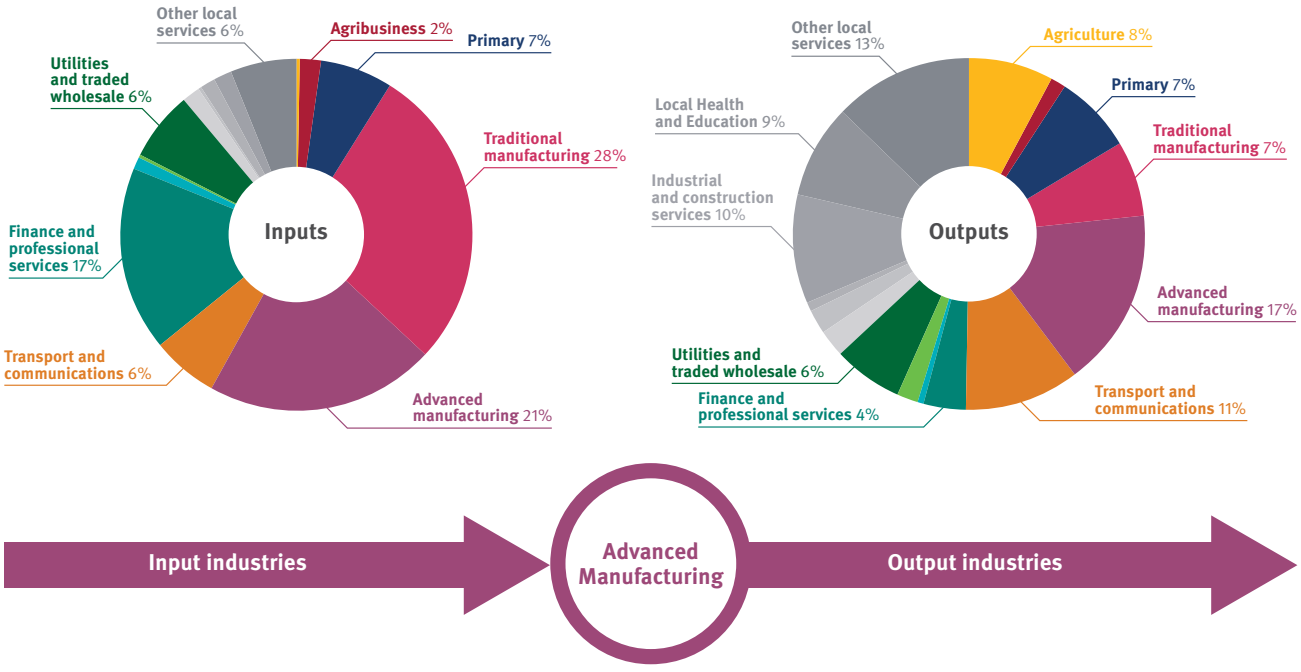


Figure 37 – Advanced manufacturing inter-industry input and output links
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note.

Opportunities

A number of opportunities that have the potential to grow the advanced manufacturing industry cluster in SEQ are listed below.

Technology and skills

Technological change provides a significant opportunity to grow advanced manufacturing. Advances in technology and greater consumer expectations are changing the industry composition and output, including the shift from mass production of goods to bespoke solutions. SEQ is well positioned to leverage and upskill the works force through its very strong higher-education sector, characterised by high education levels and skilled labour. Additionally, SEQ's broader manufacturing sector boasts a talent pool of engineers, technicians and designers who are supported by world-class research capabilities.

Defence

The expansion of defence facilities in SEQ and throughout Australia present a significant opportunity for the advanced manufacturing industry clusters in SEQ, connecting with the defence locations, to provide the capability to develop, manufacture, and maintain the products and systems of the defence sector. Supporting the growth of the already established advanced manufacturing supply chains in SEQ will provide secure job opportunities for the region's workforce as the economy continues to diversify and integrate a greater use of technology into advanced manufacturing processes.

Renewable energy

Climate change has seen demand for renewable energy sources increase significantly. This has supported the need for environmental preservation and is driving the need for sustainable manufacturing production and green technology. Activities in advanced manufacturing have begun to research and develop new products to enable climate change adaptation and mitigation, particularly in the form of biofutures. This advanced manufacturing activity in SEQ will continue to support adaptation and mitigation advancements as a primary opportunity for economic growth more generally.

Strong policy focus

Advanced manufacturing activities in SEQ, and Australia more broadly, benefit from a priority policy focus and commitment by all tiers of government. The Queensland Government supports and enables advanced manufacturing to be a key pillar of the state's economy. Additionally, the federal government has committed significant focus to supporting the creating of 'smart cities' which includes the growth of knowledge jobs, and higher order economic activities – of which, advanced manufacturing is both a fundamental input (for local activities) and output (for traded activities), connecting with established global markets.

Opportunity exists to establish government regulations and policies that support innovation, research and development to enable the rise of "smart specialisation" to support a shift from larger vertically integrated organisations to smaller niche production companies that undertake advanced manufacturing activities.

Risks and challenges

A number of risks and challenges that have the potential to impact on the future growth of the advanced manufacturing industry cluster in SEQ are listed below.

Global competitiveness

As developing economies mature, improving their manufacturing processes and adoption of technology, global competition in advanced manufacturing will intensify. Advanced manufacturing is a well-established driver of economic activities in other cities globally, and ensuring that the advanced manufacturing activities undertaken in an Australian and SEQ context more specifically remains competitive is an ongoing challenge. Some key challenges that will restrict SEQ's competitiveness may include the cost of labour, skills, regulatory environment and other macro factors.

Access to capital

At present, the advanced manufacturing industry cluster is dominated by small-to-medium sized enterprises. Emerging manufacturing technology companies are often considered risky investments given technology risk, market adoption risk, long lead times and often significant capital requirements to establish activities. When there is limited capital investment, it constrains research and development activities and could limit future growth of this industry cluster. Creating a policy environment to support the contribution of venture capital into advanced manufacturing could be one mechanism that would unlock greater innovation and increase the size of the industry cluster.

Workforce adaption

The contribution of advanced manufacturing to the regional economy is underpinned by innovation and advancing technologies. Therefore, the workforce needs to be appropriately skilled to leverage new technologies and adapt to ongoing technological change within the industry cluster. Emerging opportunities for growth in advanced manufacturing may be constrained by a lack of suitably skilled labour.

Land availability

Advanced manufacturing activities require a range of different land footprints and associated infrastructure due to the diverse nature of activities. The availability of fit-for-purpose, large-scale industrial land is a growing challenge in SEQ. Limited land supply in locations with suitable connectivity to freight and logistics corridors, as well as digitally enabling infrastructure, constrains the development of advanced manufacturing.

Digital security

The rapid change in the digital and technology environment of businesses has brought about new risk in digital security. As businesses continue to expand and adopt new technology, and increasingly go more online, for their day to day business, industry stakeholders need to be more careful with their intellectual property. The rise of open source information and other sharing platforms places a higher risk of technology and products losing their value. This becomes an even greater risk when dealing with the products of the defence sector. Any initiatives that seek to improve cyber security would assist in mitigating these risks.

Enablers

Enablers of the advanced manufacturing industry cluster will deliver fit-for-purpose industrial land, and increase research and development activities, fast uptake of new technologies, innovation and advancement of new technologies.

Recent investment in Queensland's advanced manufacturing industry has been directed at industry growth strategies including the Advance Queensland Roadmaps.

To encourage the future growth of the industry cluster, and complement existing initiatives, the key enablers identified for the advanced manufacturing industry cluster include: investment, coordination and collaboration, and promotion and skills. These enablers are further detailed in the table below.

Land	
Appropriate industrial land	Ensuring that there is suitable availability of suitably zoned, flat, large industrial lots is critically important to some areas of the sector, with availability of this land constrained in some parts of the region. Similarly, appropriately located sites close to key demand activities are critical for smaller footprint, technology-driven businesses.
Infrastructure	
Transport connectivity	Ensuring that the workforce can access key advanced manufacturing precincts and other complementary employment opportunities. Effective freight connectivity to markets will be critical.
Human capital	
Digital enablement, capacity and capability	Ensuring that reliable digital infrastructure is in place (including energy and telecommunications), in key locations and that the workforce is suitability skilled to utilise emerging technologies and digital opportunities.
Skills and training	Establishment of training programs and partnerships with key education and training providers, and industry to ensure workforce capability keeps pace with advancing technologies and change.
Financial capital	
Investment and incentivisation	Ensuring that there are frameworks and mechanisms to support alternative funding, financing and investment for advanced manufacturing activities. Establishment of an incentivisation structure that is targeted at attracting investment, as well as encouraging student participation in advanced manufacturing education and training.
Policy	
Ecosystem support	Ensuring that there is a supportive policy framework and investments in a start-up ecosystem will ensure that new businesses can readily be supported to grow.
Fit-for-purpose facilities and co-location of like activities	Establishment of specialised precincts in key locations focused on advanced manufacturing and complementary economic activities. Enabling advanced manufacturing to locate in areas which will encourage increased innovation through interactions, sharing of facilities, and exchange of expertise and knowledge. To enable these outcomes, this industry cluster should be located in industrial areas with access to freight networks and in knowledge precincts to enable co-location with university and medical institutions.

Agribusiness

Priority industry overview

Across Queensland, and within SEQ in particular, the agricultural sector has historically been a major contributor to the region's economic make-up. This sector will continue to be of primary importance, with the Queensland Government's stated vision of a productive and profitable agriculture, fisheries and forestry sector.[70] Leveraging SEQ's natural comparative advantages, this sector offers a key opportunity for future growth, as demand is set to increase in line with population growth, both domestically and abroad. In addition, there is a growing global demand for food and fibre as affluence in emerging economies drives demand for protein foods, niche primary products and agricultural scientific expertise.

Agriculture also provides indirect benefits for communities. Reservation of agricultural land provides green space near areas of urban development and improves the amenity of nearby urban space. There are also opportunities for tourism, farm stays and other non-urban attractions.

The focus of this economic foundations paper is on a narrower range of activities within the broader agricultural sector, referred to as 'agribusiness'. Agribusiness refers to the production and first-stage processing (or "value adding" activities) required to send agricultural goods to market, noting that other publications often include a much broader definition.[71]

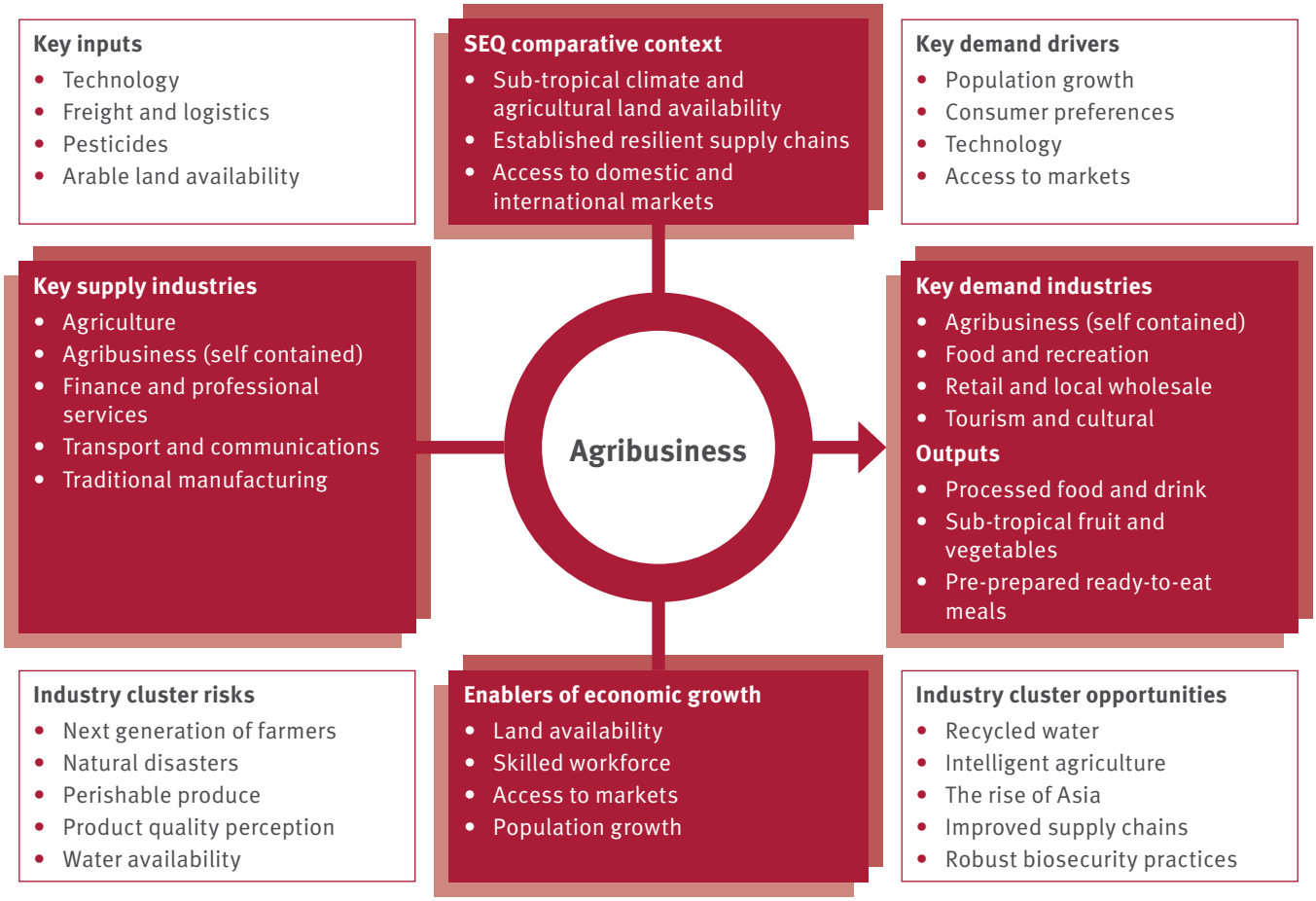


Figure 38 – Agribusiness industry cluster overview
Source: CTT, Queensland Government

[70] Department of Agriculture and Fisheries Strategic Plan 2017 – 2021 https://publications.qld.gov.au
[71] The Australian Government Department of Industry, Innovation and Science (DIIS) definition of agribusiness includes all agriculture activities from on the farm activity, first-stage processing, equipment manufacturing and leasing, and other support services – see *Australia's Food and Agribusiness sector – Data Profile (April, 2016)*. For this economic narrative, analysis of agribusiness refers to the place based first-stage processing, but also considers up and downstream supply chain activity more broadly as agricultural activity

Defining agribusiness in this way helps to identify the specific place-based agricultural activity that is occurring in SEQ. However, given the industry cluster's reliance on the agriculture industry cluster, and the significant contribution of agriculture to SEQ's (and the broader state and national) economy, this section will explore both industry clusters. Figure 38 provides an overview of the agribusiness industry cluster in SEQ.

Agribusiness in SEQ

Agriculture forms the backbone of many of Queensland's regional communities, and feeds the growing population within Queensland, interstate and offshore. This highly productive supply chain is anchored in the south east corner of Queensland, where the majority of the agribusiness (first-stage processing) activities occur at the closest point to final consumption, through export hubs (such as the Port of Brisbane) and within the large SEQ population of over 3.4 million.[72] This spatial pattern is the result of decades of population growth and innovation within the sector.

Currently, agribusiness activity in SEQ is estimated to employ 19,900 workers, or 1.4 percent of the workforce, generating approximately $132,000 GVA per worker in 2016. This activity links with SEQ's regional agricultural activity, which employs a further 18,300 workers, generating approximately $241,600 GVA per worker in 2016. SEQ's agribusiness industry is more productive, as measured by GVA per worker, than the typical agribusiness worker in Australia. The industry cluster's productivity supports the identification of agribusiness as a priority industry cluster for SEQ.

SEQ has high quality sub-tropical agricultural products that meet the demand of domestic and international markets. The characteristics of the region provide significant advantages to the industry, with highly productive soils, sub-tropical climate, agricultural land, recreational and commercial fisheries, access markets, established supply chains, processes and experienced labour. In particular, a strong historical base in agriculture has led to the development of spatial clusters of agribusiness activity throughout SEQ. This established agricultural supply chain provides businesses operating in SEQ's agribusiness industry cluster with a basis for competitive advantage in their target markets, as the mature processes in the supply chains have reached efficient economies of scale.

While agribusiness has been selected as a priority industry cluster for SEQ, it is important to acknowledge the related comparative advantage in agriculture, which is the largest input into agribusiness activity. Queensland's agriculture sector produces $15.54 billion of primary sector commodities at the farm-gate.[73] This is achieved through Queensland's vast 144 million hectares of land dedicated to agriculture, with over 30,000 businesses conducting agricultural business activity.[74] The sector exports $9 billion in rural goods, of which approximately 90 percent of the equivalent trade volume is dispatched from the Port of Brisbane. This reinforces the critical role that SEQ plays in the state's agribusiness supply chains [75,76] the related comparative advantage in agriculture, which is the largest input into agribusiness activity. Queensland's agriculture sector produces $15.54 billion of primary sector commodities at the farm-gate.[77] While agricultural land in SEQ is being depleted for urban development, Queensland has 144 million hectares of land dedicated to agricultural activity, with over 30,000 businesses conducting agricultural business activity.[78] The sector exports $9 billion in rural goods exports, of which approximately 70–80 percent of the equivalent trade volume is dispatched from the Port of Brisbane, demonstrating the size of the SEQ agribusiness supply chain.[79,80]

[72] Australian Bureau of Statistics, 2016, ABS. 3222.0, Population Projections, Australia, 2012 (base) to 2011
[73] Department of Agriculture and Fisheries (2017), *Queensland AgTrends 2016–17 report update April 2017*
[74] Department of Agriculture and Fisheries (2017), *Queensland AgTrends 2016–17 report update April 2017*
[75] Queensland Government Statisticans Office. 2017, "Exports of Queensland goods overseas, June 2017" Accessed September 6,2017 http://www.qgso.qld.gov.au/products/reports/exports-qld-goods-overseas/exports-qld-goods-overseas-201706.pdf
[76] Australia Bureau of Statistics, 2016, ABS 5368.0, *Trade data – exports – port of loading (3-digit SITC revision 3) 2005–06 to 2015–16*
[77] Department of Agriculture and Fisheries (2017), *Queensland AgTrends 2016–17 report*
[78] Department of Agriculture and Fisheries (2017), *Queensland AgTrends 2016–17 report*
[79] Queensland Government Statisticans Office. 2017, "Exports of Queensland goods overseas, June 2017" Accessed September 6,2017 http://www.qgso.qld.gov.au/products/reports/exports-qld-goods-overseas/exports-qld-goods-overseas-201706.pdf
[80] Australia Bureau of Statistics, 2016, ABS 5368.0, *Trade data – exports – port of loading (3-digit SITC revision 3) 2005–06 to 2015–16*

The agribusiness' first-stage processing activity occurring in SEQ is a key component of the agricultural supply chain. SEQ's population size is one of the determining factors in the decision for this agribusiness activity to occur in the region. The local population serves as a major market, with over 3.4 million people to feed. The other key factor is the region's strong links to global markets via access through the Port of Brisbane and the four major airports throughout SEQ. This location-based activity is supported by established agricultural supply chains that link SEQ's agricultural production areas to market.

Technological advancement has increased the efficiency and resilience of SEQ's agribusiness industries. This has been observed with new innovation occurring on the input side (through the use of drones in crop management) through to disaster and flood resistance planning, allowing for a much more flexible supply chain. The historical strengths in this sector have attracted significant investment and led to the development of world-class institutions throughout the SEQ, such as the University of Queensland's Alliance for Agriculture and Food Innovation (QAAFI) research centres[81]. These institutions have brought with them new ways of thinking to address the challenges and opportunities in the region's economy.

Notably, innovation, within both the agribusiness and agriculture industry clusters, has supported the realisation of economies of scale in agricultural production. The introduction of technology, such as the increasing use of drones in monitoring pests and diseases, has reduced production costs and increased agricultural yields. Furthermore, the links between research and agriculture have contributed to the development of an effective treatment for Ebola, using horse antibodies.[82] This demonstrates the benefits of having strong collaboration across industry clusters.

Building on SEQ's longstanding agricultural industry, the opportunities in agribusiness are in abundance.

Agribusiness, Gatton

[81] The University Of Queensland, Queensland Alliance for Agriculture and Food Innovation. 2017. QAAFI research centres. Accessed 18 July 2017. https://qaafi.uq.edu.au/research

[82] The University Of Queensland. 2017. Queensland-led team develops effective economical Ebola treatment. Accessed 18 July 2017. https://www.uq.edu.au/news/

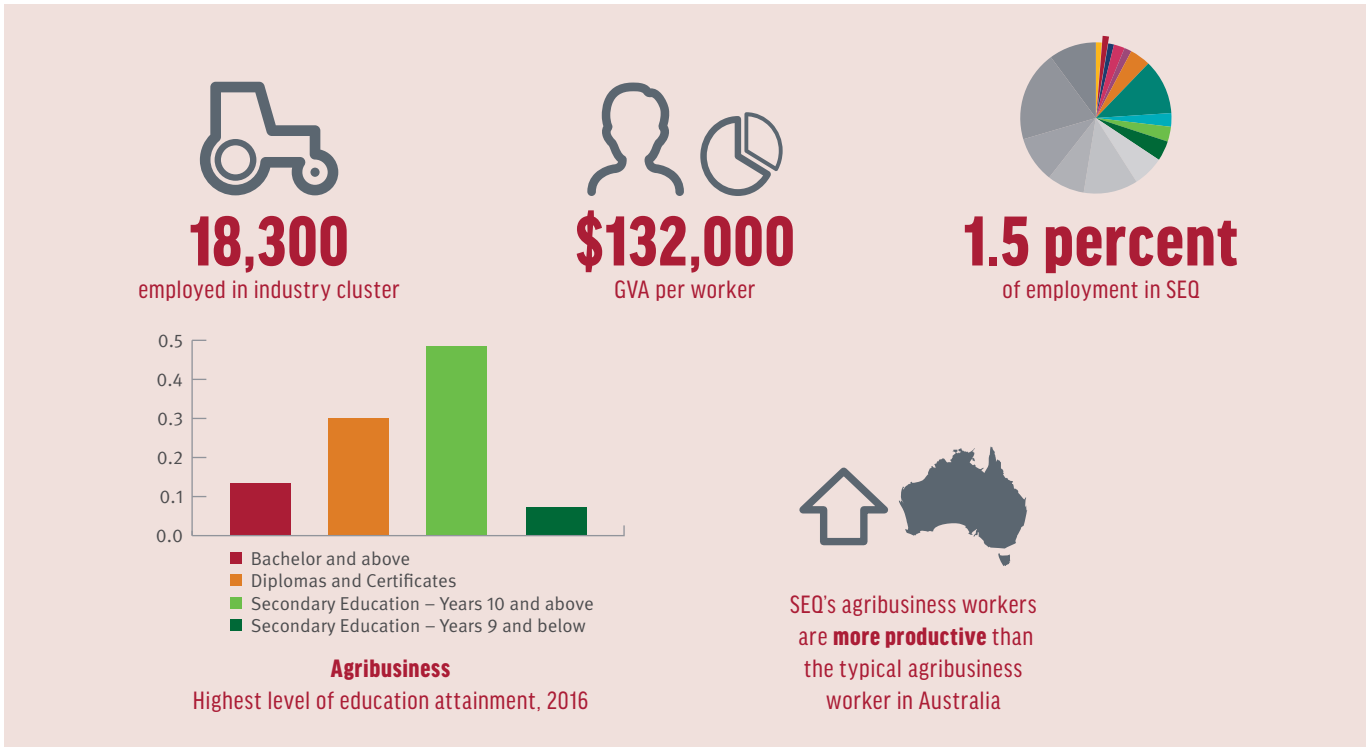


Figure 39 – Key industry cluster characteristics – agribusiness
Source: CTT, Queensland Government. Refer Appendix B – Technical Note; University annual reports, 2016; ABS Census, 2016

Key locations

In SEQ, agribusiness activity has clustered in locations with close proximity to agricultural areas and final markets where there is fit-for-purpose industrial land with access to freight networks. Where the agribusiness clusters in rural areas, it is typical to efficiently move products to final points of consumption through road and rail networks, and export hubs. These rural agribusiness clusters are primarily located around the periphery of SEQ, including Lockyer Valley, Somerset, Toowoomba and Scenic Rim local government areas. These areas draw in inputs from agricultural land within SEQ and outside the region as illustrated in Figure 19. In Lockyer Valley, there is a key cluster of agribusiness associated with the Gatton university campus, which is a result of strategic planning from the QAAFI.

In addition, there are clusters of agribusiness industry activity within SEQ's urban industrial areas. These urban clusters are located within the Ipswich, South West Industrial Corridor, Australia Trade Coast and Western Gateway RECs. These RECs are located centrally to access freight networks, co-located with other industries and consist of fit-for-purpose industrial land. This co-location of activity has occurred as the industries draw from similar labour forces, sharing skills, infrastructure and freight paths to final markets.

Agribusiness in the SEQ region

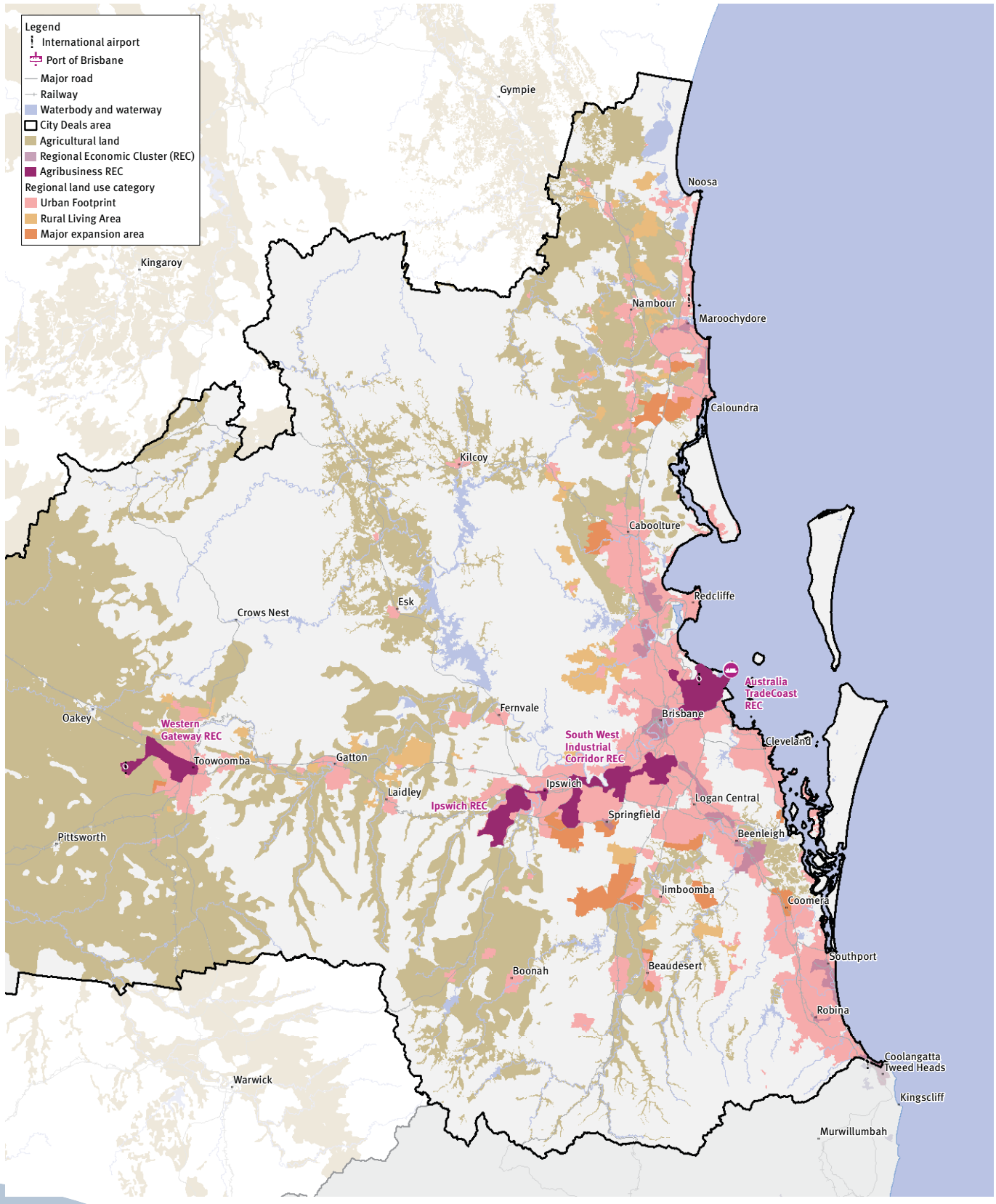


Figure 40 – Agribusiness in the SEQ region

Source: Regional and Spatial Planning, Queensland Government. September 2017

Inter-industry links

The interdependency of agribusiness with other industry clusters is important when considering how to enable future growth. The key relationships to other industry clusters are illustrated in Figure 41. Primarily, the agribusiness industry cluster is supported by the outputs of the agriculture cluster, with over 57 percent of its total inputs sourced from agriculture. This dependency demonstrates the inherent reliance on agriculture in production, and the reliance on the agribusiness industry cluster as the "value add" component of agriculture in its first-stage processing.

Secondly, the agribusiness cluster is supported by activity within the industry cluster itself (agribusiness to agribusiness) with just over 17 percent demonstrating the strong inter-linkages of agribusiness activities. This is again evident in the large amount of outputs destined for agribusiness activity contained in the industry cluster (29 percent of agribusiness output is destined for agribusiness).

The local food and retail industry cluster is the next largest receiver of output from the agribusiness industry cluster (27 percent). This local cluster relies on outputs of agribusiness activity in the production of its retail consumer food products.

The third largest consumer of agribusiness activity is the retail and recreation cluster (12 percent). These two local, population serving, industry clusters demonstrate the link between population and demand for agricultural products. As the population continues to grow, so too will the demand for agricultural products.

Given agriculture's large share of the agribusiness inter-industry input structure, it is valuable to identify the interdependencies of agriculture with other industries. Agriculture relies primarily on activities within its own cluster (32 percent of agriculture's inputs come from agriculture activity), for example, the use of grains in the production of livestock. Furthermore, agriculture is supported by activity in the advanced manufacturing cluster (12 percent), for pesticides and heavy machinery, as well as activities in the finance and professional services cluster (14 percent). The broader agribusiness and agriculture clusters demonstrate how important the agriculture sector is for SEQ, and more broadly, Queensland economy.

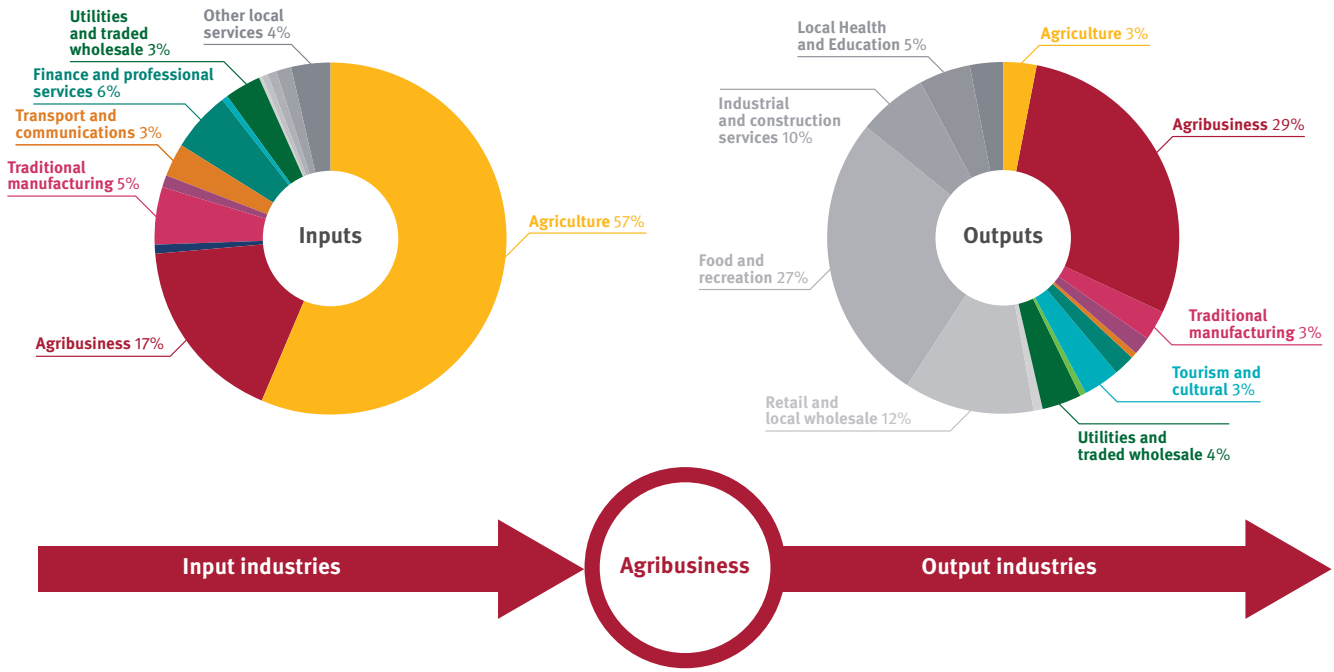


Figure 41 – Agribusiness inter-industry input and output links
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note

Opportunities

Opportunities that have the potential to grow the agribusiness industry cluster in SEQ are listed below.

The rise of the Asia-Pacific region

SEQ is located on the door step of the world's fastest growing region, the Asia-Pacific region.

The increasing affluence of Asia's growing population will drive demand for Queensland's quality agricultural produce. This ongoing demographic trend is driving the shift in consumer preferences towards quality products, and Queensland has established a 'clean and green' brand for its produce that is driving demand in the Asia-Pacific region in particular. These new market conditions will increase demand for a greater variety and supply of quality agricultural produce.

SEQ's sub-tropical climate, proximity to Asia and existing supply chains provide a significant opportunity to the agribusiness industry cluster to meet this demand. This will become increasingly evident as the effects of recent free trade agreements (with China, Japan, Korea and other Trans-Pacific Partnership countries) are realised and historical barriers to trade are reduced.[83]

Intelligent agriculture

SEQ is home to Queensland's agriculture intellectual base in the region's traded health and education clusters and working with agriculture and agribusiness industry clusters. SEQ agricultural producers are linking with researchers, entrepreneurs and other businesses to develop new processes, products, and technologies to support the growth of the agriculture sector. Beyond improving the direct activities of agribusiness, there are opportunities to commercialise some of these developments into broader offerings, such as "agtech" and agricultural education.

Improved supply chains

Improving supply chain efficiencies would significantly improve the productive output of the agribusiness industry cluster. There are opportunities to achieve this through better utilisation of existing assets, last mile links to port by rail and big data analytics (to better manage distribution). These opportunities can contribute to a fully-integrated, transparent and streamlined agricultural supply chain to reduce the industry cluster's total input costs.

Robust biosecurity practices

Australian and Queensland biosecurity laws protect the state's ecosystem. These strict biosecurity practices ensure that agriculture products exported from (and imported into) Queensland are monitored and inspected for compliance with food safety standards. As consumers become better informed about the quality of products they buy, there will likely be greater emphasis placed on the quality of agricultural produce. SEQ is well positioned to meet changing consumer preferences as a result of the region's regulatory environment. However, producers will be challenged as to how best to inform consumers of the region's quality produce.

Water

As SEQ's population continues to grow, so too will the demand for water. As pressure on bulk water supply increases, there will be increasing demand for alternative water sources, such as recycled water. Providing agricultural areas access to recycled water has the potential to support the agriculture and agribusiness industry clusters realise significant economies of scale. In particular, the use of recycled water in agriculture production could significantly improve the productivity of the industry cluster. Using recycled water in agricultural areas would relieve the pressure on bulk water supply, enabling it to be redirected to support emerging residential areas. Currently, realising this opportunity is constrained by the high cost barrier, which if incurred solely by agricultural producers would detrimentally impact the productivity of the industry. It is likely that any significant improvement in productivity through the use of recycled water would require government assistance or subsidies to producers.

[83] Australian Government, Department of Foreign Affairs and Trade. 2017. Status of FTA negotiations. Accessed 18 July 2017.http://dfat.gov.au/trade/agreements/Pages/status-of-fta-negotiations.aspx

Risks and challenges

A number of risks and challenges that have the potential to impact on the future growth of the agribusiness industry cluster in SEQ are listed below.

Competition

Australia's agricultural sector faces competition from other international agricultural producers. Agricultural exporters such as Brazil have established market control in Southeast Asia as a major exporter to China. Queensland's agriculture sector will need to demonstrate its point of difference to the global market to ensure it maintains its market share. Improved access to markets and reduced barriers to trade will also assist in ensuring the sector's long-term performance.

Macro-economic impacts

Geopolitical tensions, supply and demand shocks, technology changes, and exchange rate fluctuations, among other macroeconomic conditions, will impact the demand for SEQ's agricultural products. While the SEQ agribusiness industry cluster has little influence over these macroeconomic and geopolitical events, there are mechanisms that could be put in place to make the cluster more flexible in dealing with such shocks.

The next generation of farmers

Demographic shifts, innovation in farming practices, and the rise of new agriculture industries have transformed the traditional expectation of the "family farm". The next generation of potential farmers are gravitating towards urban centres to attend the university and build their careers away from agriculture, resulting a decline of the "family farm". This trend will put significant pressure on the future performance of regional economies. Putting succession plans in place, along with career pathways to attract the next generation of farmers, will be critical to ensure that generational knowledge is not lost and the sector can maintain its competitiveness.

Urban sprawl

Land availability is one of the primary enablers of agricultural activity, including land associated with fisheries and other aquaculture activities. As densification and urban sprawl in SEQ has already significantly reduced the amount of productive land available to agriculture and aquaculture production and agribusiness activity, retention of agricultural land will become increasingly important. Consideration of further trade-off between agriculture and residential land use will need to be weighed against the value of arable land to the SEQ economy. In addition, protection of natural resources for recreational and commercial fisheries will be needed to protect aquacultural activities. This in turn will help to preserve water resources for urban and agricultural use and add to the amenity of urban areas.

Natural disaster resilience

The agricultural sector's exposure to weather conditions and natural disasters exposes it to volatile market conditions. Drought, cyclones, and other extreme weather events have the potential to wipe out entire crops, significantly impacting the output of the sector, which as a result causes global prices to fluctuate due to changes in supply and demand. The impacts of these events were recently seen in the wake of Tropical Cyclone Debbie. While the local agribusiness industry cluster is one of the most resilient in the broader Asia-Pacific region, improving local resilience mechanisms could make the sector and industry clusters more proactive. There is also potential to bring this capability to the global market as an emergency response and resilience educational offering, linking with the region's traded health and education industry clusters.

Enablers

Enablers of the agribusiness industry cluster are initiatives which encourage growth by reducing input costs, encouraging innovation and improving productivity. Recent initiatives to enable this industry cluster have included better connecting production centres to markets, and negotiating free trade agreements with key Asia-Pacific trading partners.

To encourage future growth of the industry cluster, and complement existing initiatives, the key enablers identified for the agribusiness industry cluster include skills, infrastructure, regulation, and coordination and collaboration. These enablers are further detailed in the table below.

Land	
Land protection	Critical to industry growth is ensuring protection of good quality land for agriculture and aquaculture, as well as maintaining appropriate planning controls to facilitate a balance between value-adding agribusiness activities and urban encroachment.
Infrastructure	
Improved links to export hubs	Prioritising initiatives that improve the industry cluster's access to export hubs will support the ongoing competitiveness of the broader sector. This includes transport and intermodal investments to improve the efficiency of freight movements and reduce costs to the supplier.
Recycled water	Allocating recycled water to agriculture use is a significant potential enabler for agribusiness. The allocation of recycled water to agriculture could support large increases in production capacity for some of SEQ's high value agricultural produce, such as sub-tropical fruits. It is likely that provision of recycled water would require Government funding.
Water infrastructure	Water infrastructure is a key enabler in the production of agricultural produce and directly relates to the sector's output scalability (the more water available, the more agriculture outputs that can be produced). A water solution would require development of a viable solution for government and industry. Prioritising initiatives that support access to, and provide greater quantities of, water to the agriculture sector will enable future growth.
Information	
Central agriculture data source	Improving the visibility of data and reporting in the agriculture sector would greatly assist future planning for growth. This may be achieved through active stakeholder participation (government, producers, and other supply chain agents) to arrive at new and innovative ways to manage the sector's produce and supply chains.
Human capital	
Agriculture career pathways	Working with educational providers to develop modernised career pathways for agribusiness would be beneficial to support innovation and future job growth in the agriculture sector.
A regional hub for agriculture skills and innovation	Connecting regional agricultural skills with a regional knowledge hub would provide a location for agglomeration of skills between these two sectors to occur, for example, establishing a cluster precinct similar to a Brisbane Technology Park or linking business with existing universities, such as the QAAFI, to establish a niche service (University of Queensland Gatton and agricultural water management).
Policy	
Expansion of trade policy	Maintaining and expanding Australia's trade access policies and regulations, as well as strengthening bio-security initiatives, will be critical to the future of regional agribusiness exports.

Traded health and education

Priority industry overview

Traded health and education is one of SEQ's most strategic priority industries due to its links to knowledge intensive industries and spillover benefits. This industry cluster drives innovation, enables collaboration with industry, builds a stronger economy and improves the skills of the workforce. In dollar terms, research from the Australian Bureau of Statistics (ABS) reported that international education and training contributed $3.25 billion in export revenue to the Queensland economy in 2016.[84]

Growing the traded health and education industry cluster enhances SEQ's global relationships, enriches communities, facilitates international linkages, creates global business networks and enhances the region's reputation for research and innovation.

The traded health and education industry cluster encompass activities typically found in knowledge precincts. These include integrated locations for education, research, knowledge creation and the commercialisation of newly developed research and technologies. Tertiary education makes up the greatest portion of this industry cluster, but the health component also includes pathology and diagnostic services, which share skills and other resources with the research of education institutions.

Strong educational institutions are also critical in terms of their ability to create innovation and agglomeration spillovers, typically in the form of knowledge sharing, to companies and related industries, which has the potential to catalyse technological advancement. This unique characteristic of knowledge precincts places it as a key enabler of future economic growth, through the use of research and innovation agendas in achieving sustained economic comparative advantages. Figure 42 provides an overview of the traded health and education industry cluster in SEQ.

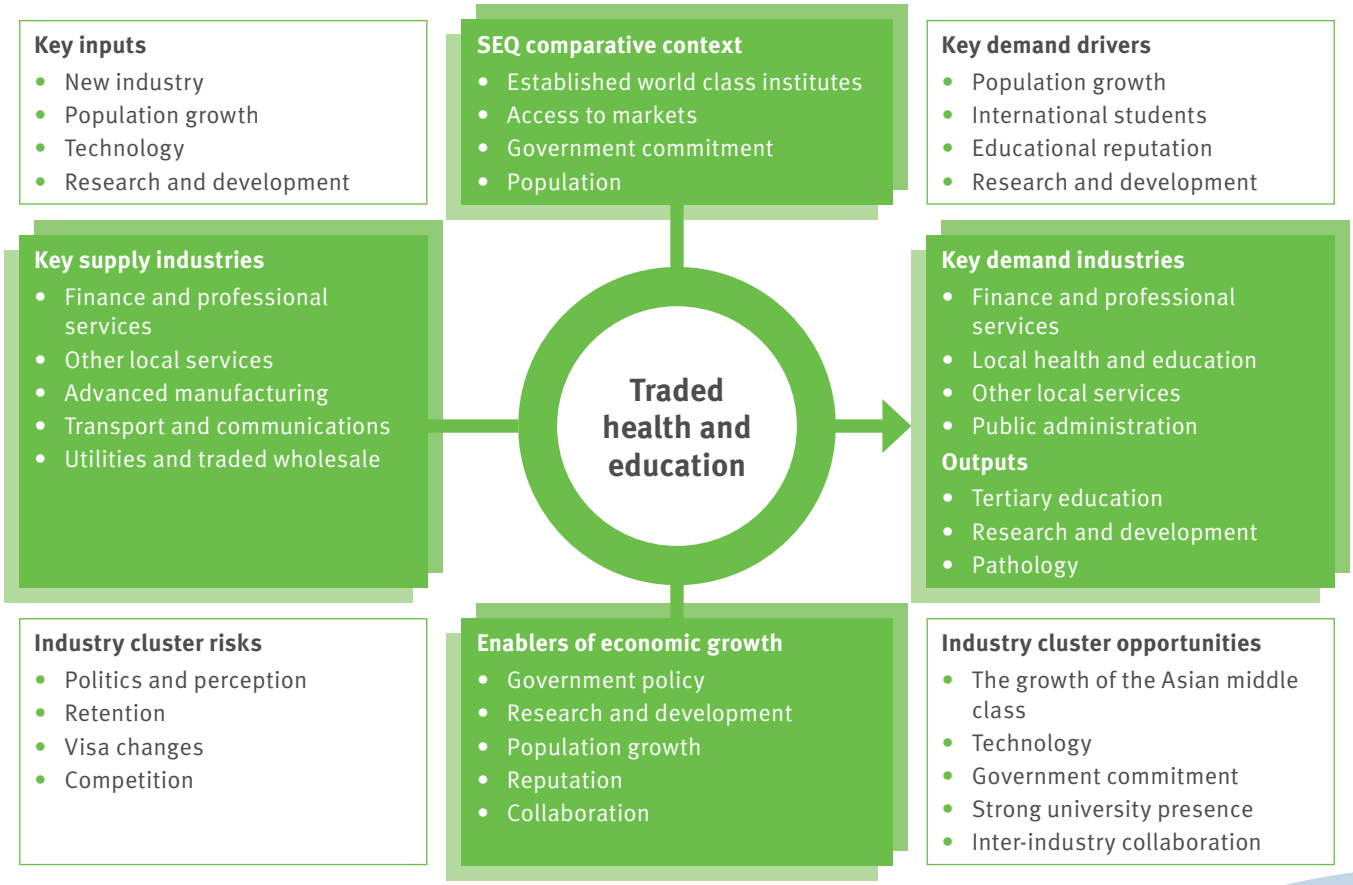


Figure 42 – Traded health and education industry cluster overview
Source: CTT, Queensland Government

[84] Australian Bureau of Statistics' 2016 publication International Trade in Services

Health and education in SEQ

The health and education industry cluster has been identified as a priority industry cluster as it is a key economic enabler. The continued rise of Asia's middle class underpins the increasing demand for SEQ's quality tertiary education. Furthermore, the increase in international education generates indirect benefits in terms of visitor expenditure, as friends and relatives of international students visit the region.

Traded health and education is estimated to employ over 46,500, or 3.2 percent, of workers within SEQ, generating approximately $86,000 of GVA per worker in 2016. This economic activity is driven by clusters of industry activity around SEQ's core knowledge precincts, particularly in the central areas of Brisbane, Toowoomba, Sunshine Coast and Gold Coast. The traded health and education industry cluster has lower GVA per worker compared to the Australian worker in the same industry cluster. Through improvements to productivity, there is opportunity to increase the GVA per worker in SEQ to increase economic output of this industry cluster.

International education and training is projected to maintain strong growth. Population growth in the Asia-Pacific region is expected to drive the current world population of 7.6 billion to reach 8.6 billion in 2030.[85] This population growth, along with the growing affluence of the Asian middle class, provides the opportunity to expand SEQ's international education market share. Currently, forecasts expect SEQ enrolments to grow by 33 percent over the next decade.[86]

As an enabler, the activity within knowledge hubs will continue to provide the capacity to maintain a highly skilled workforce and provide a platform for collaboration, innovation and technological leadership within SEQ's other priority industry clusters.

Providing quality education and training underpins the capability and capacity of the workforce improving the region's human capital. This allows the workforce to engage in more productive, higher value adding, activities within the economy. This type of activity improves the overall economic performance and prosperity of the region, and serves to attract new talent, as the region's universities become more reputable sources of innovative activity. For SEQ, precincts will need to ensure their service offering integrates and collaborates well with local industries, to provide a service offering that is unique to the domestic and international markets.

In addition, the health and education industry clusters are important places for enabling economic activity where education, research, hospital and business activities are all co-located. The close proximity of these activities in a location generates spillover benefits. These benefits occur from social interactions which generate learning opportunities that enhance innovation and productivity.[87] Industry specific research and development can lead to productivity benefits through the commercialisation of research. Therefore, improved linkages between education, research, and business activities is a key enabler in the growth for the region's knowledge base. Importantly, precincts should seek to develop their unique strengths, rather than compete, in order to support local traded industry clusters in bringing the right service offerings to domestic and international markets.

While SEQ already has a wealth of educational anchor institutions, there is scope to improve the translation of research into commercial activities. Many of the region's health and education precincts have made major breakthroughs in research and development, however this does not always translate into new local commercial opportunities. Policy settings that incentivise research, as well as the competitive pressures of international supply chains in international manufacturing, have seen large portions of the developed products produced overseas.

[85] United Nations. 2017. World Population Prospects: The 2017. Accessed 18 July 2017. http://www.un.org/
[86] Australian Bureau of Statistics. 2017. Australian National Accounts: State Accounts, 2015–16, cat. no. 5220.0
[87] Katz, B. and Wagner, J. 2014. The Rise of Innovation Districts. Brookings Institute

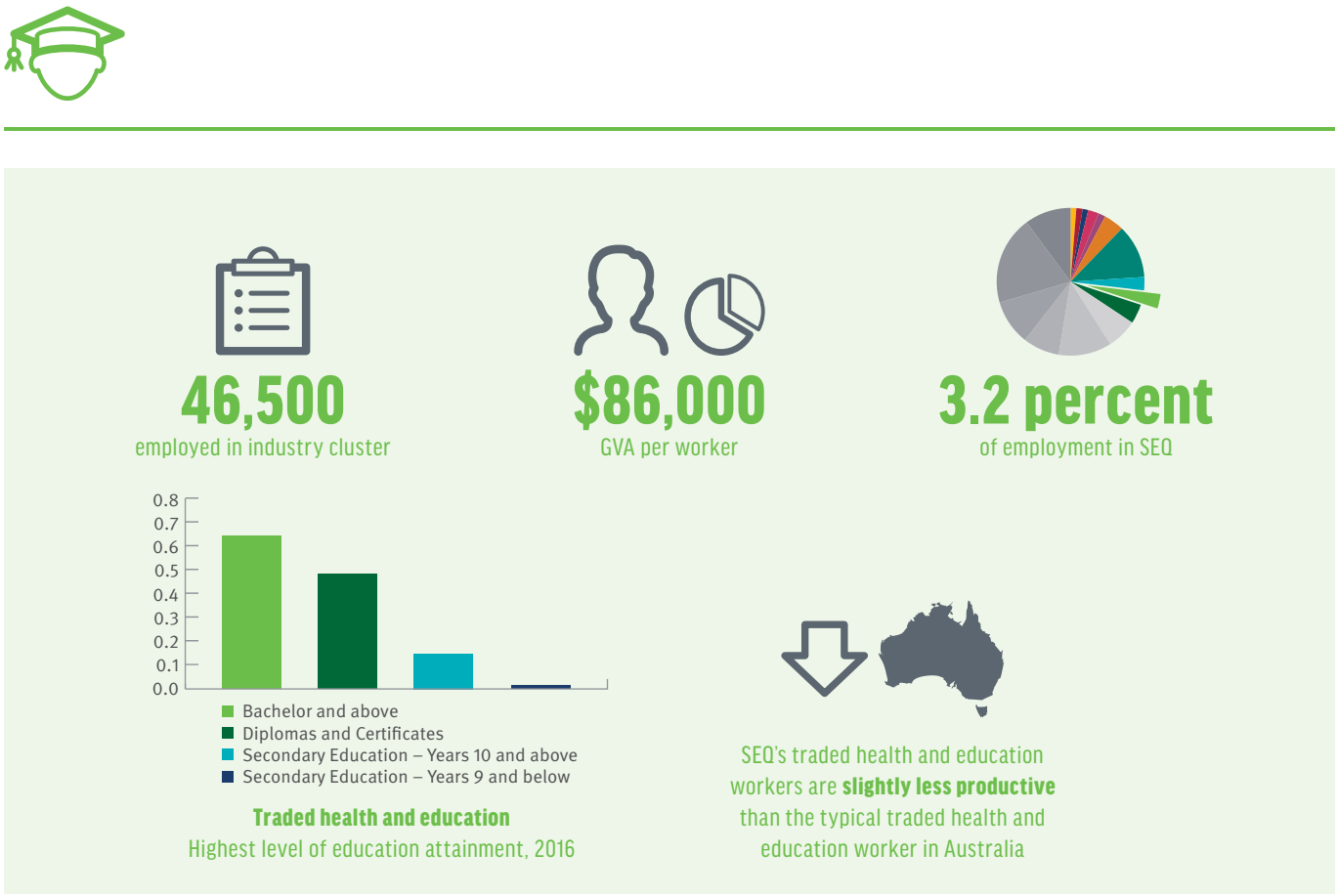


Figure 43 – Key industry cluster characteristics – traded health and education
Source: CTT, Queensland Government. Refer Appendix B – Technical Note; University annual reports, 2016; ABS Census, 2016

Key locations

The health and education industry cluster is located in a number of well-established spatial clusters within SEQ as investment has been intrinsically linked to locations where population growth has occurred. The clusters of education and / or medical institutions in SEQ are identified in *ShapingSEQ*'s knowledge and technology precincts which are identified in Figure 42. The dominant spatial clusters for health and education in the region include Capital City, Southport–Broadbeach, Kawana, and Western Gateway

Emerging clusters of health and education industry activity have been established in more recent urban areas within SEQ, for example, the Springfield Health City which envisions the establishment of a large tradeable health industry development in the expansion site of Springfield (K16 in Figure 44). The Meadowbrook–Loganholme and Strathpine–Brendale–Petrie RECs are emerging traded health and education industry clusters (K19 and K11 in Figure 44). Meadowbrook–Loganholme has the opportunity to mature the existing health and education industries in this precinct.

This trend demonstrates that strong population growth around strategic centres continues to be the focus of investment into established and emerging health and educational institutions. These existing investments will continue to support population growth, and serve to attract new talent into the fields of health and education, but with a more strategic approach to integrating with cluster activities.

Overall, the distribution of clusters across SEQ illustrates the concentration of related activity occurring around the nine universities, hospitals and co-located businesses with good access to transport networks.

Traded health and education in SEQ

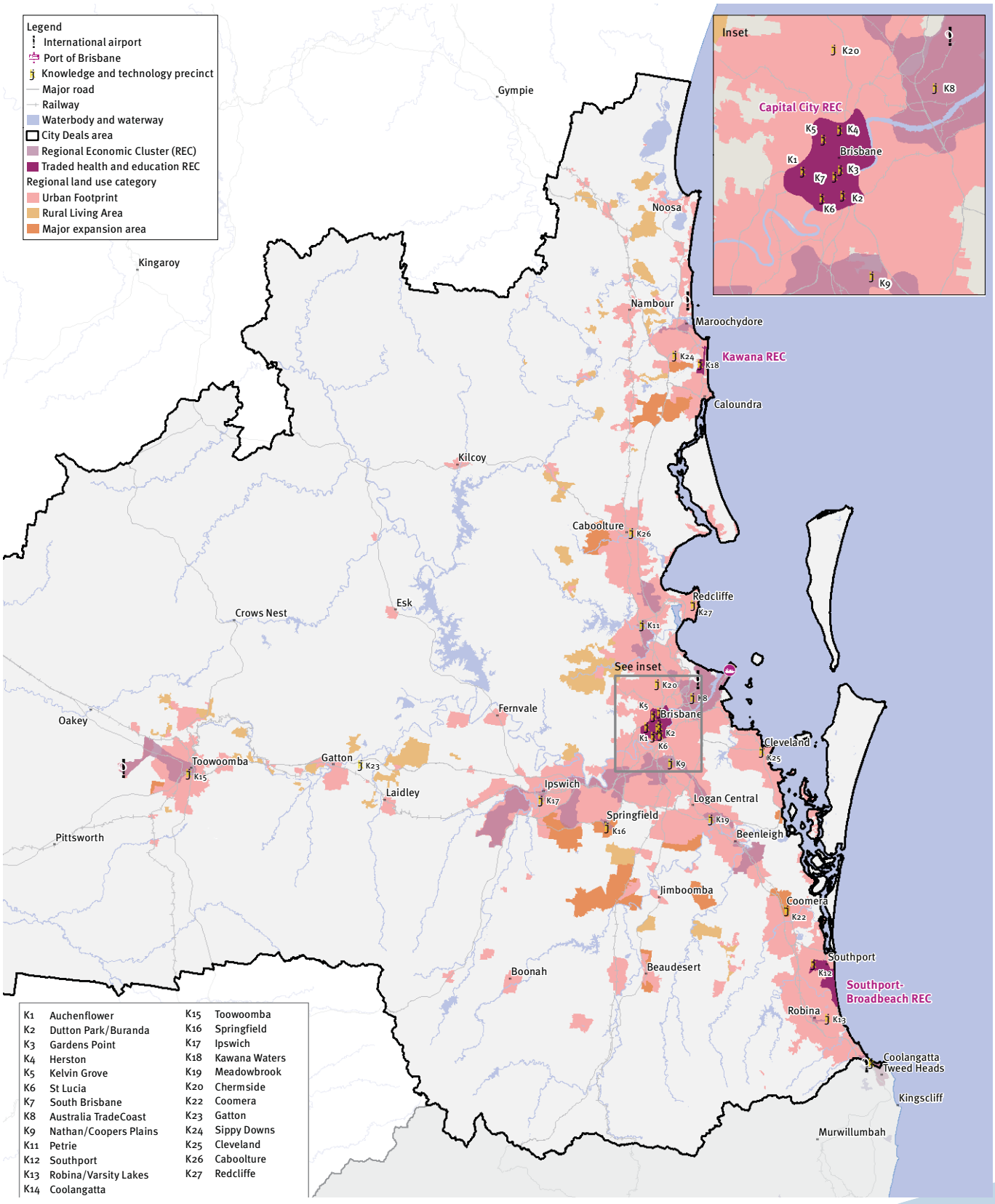


Figure 44 – Traded health and education in SEQ

Source: Regional and Spatial Planning, Queensland Government. September 2017

Inter-industry links

Traded health and education is a key intermediary in facilitating business-to-business research and collaboration. This type of activity improves businesses' access to research facilities and new technologies, providing a place for cross-coordination and new development and innovation. In this situation, the inter-dependencies of this activity are observed through the co-location of businesses, research institutes and education providers. The inter-industry links of traded health and education are demonstrated in Figure 45.

The health and education industry cluster has significant input from the financial and professional services industry cluster (26 percent of total inter-industry input), including business administration, legal and financial, and insurance. This relationship between the two industry clusters is spatially visible in the co-location of these industries in Brisbane, Gold Coast and Sunshine Coast CBDs.

The industry also has significant inputs from various other clusters, including other local services (18 percent) and advanced manufacturing (11 percent) which includes activities such as biomedical, pre-clinical and early phase clinical trials, pharmaceuticals, medical devices, vaccines, in vitro diagnostics, and biopharmaceuticals. Other large inputs are provided by transport and communications (10 percent), and utilities and traded wholesale (9 percent).

The health and education industry cluster has the opportunity to grow by increasing productivity in these key input industry clusters. This productivity can be achieved by improving the connections between health and education and financial and professional services, other local services and advanced manufacturing. Agglomeration of these industries in knowledge precincts is a means of creating physical connectedness which improves the transfer of information, improving products and productivity of traded health and education.

The traded health and education priority industry clusters also support the finance and professional services cluster (25 percent of total inter-industry outputs). This is followed by local health and education industry cluster (15 percent) through shared service offerings, such as school education, hospitals, and residential care services. The other major users of traded health and education activities include other local services (10 percent), public administration (8 percent), utilities and traded wholesale (7 percent), and traded health and education (7 percent).

The below diagram highlights the importance of co-location of traded education and health industry cluster activities with finance and professional services, as well as advanced manufacturing and transport. The diversity of inputs and outputs also highlights the significance of cross-sectoral collaboration through co-location.

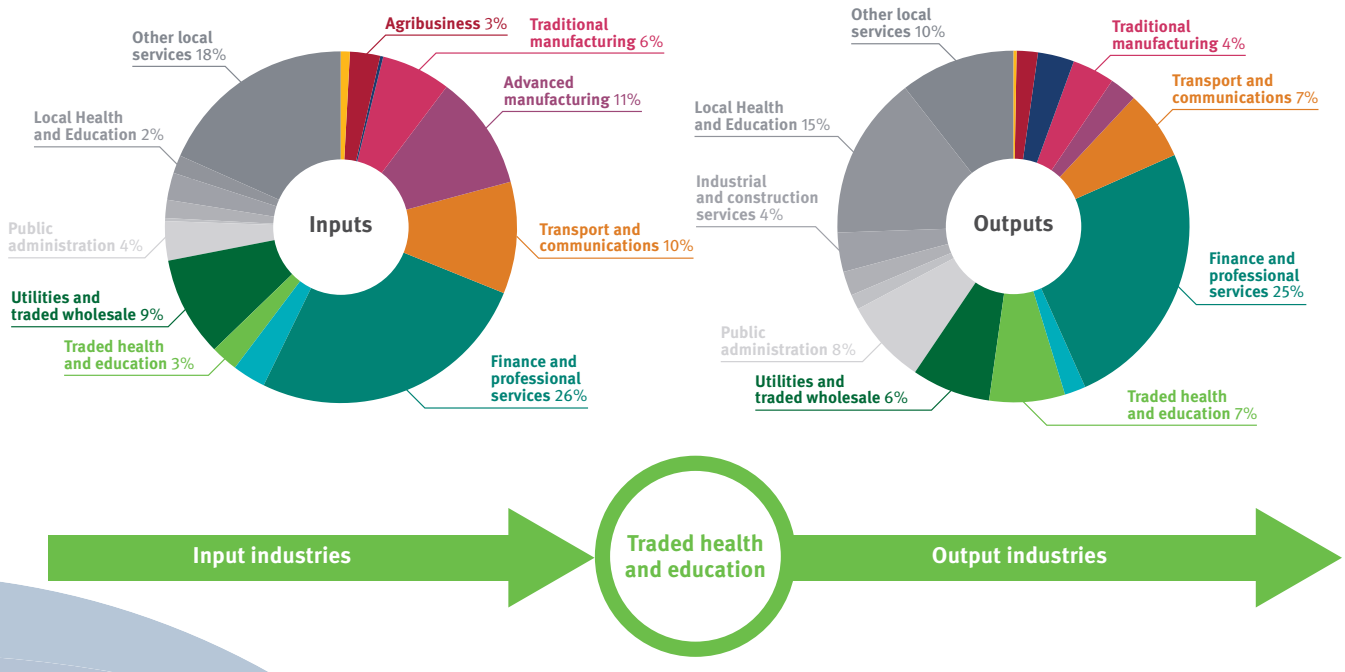


Figure 45 – Traded health and education inter-industry input and output links
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note

Opportunities

A number of opportunities that have the potential to grow the traded health and education industry cluster in SEQ are listed below.

The growth of the Asian middle class

Rapid population and economic growth in India and the Asia-Pacific region is anticipated to increase demand for Australian onshore international student enrolments. Ensuring that SEQ's educational offer meets the expectations of this market can generate significant economic benefits, beyond those directly observed in the traded health and education cluster (such as tourism).

Technology

Technological advances will enable remote or online education and research (a supply-side shift). This will provide the localised SEQ industry cluster with greater access to a much larger, and relatively untapped, market via online education and training.

A demonstrated government commitment to innovation

Governments are committed to enabling and enhancing SEQ's health and education industries, including targeted infrastructure and investment, to support collaboration in multi disciplinary health research and innovation.

World class universities and training institutions

SEQ is home to a number of world class universities with major campuses located in Brisbane, the Gold Coast, and the Sunshine Coast. The universities in SEQ include Queensland University of Technology, the University of Queensland, Griffith University, Bond University, Southern Cross University, University of Southern Queensland and the University of Sunshine Coast. Curriculum strengths include agriculture, biological and environmental sciences, psychology, and health care.[88]

Inter-industry collaboration

Better linking the research and development activities with SEQ's other priority industry clusters can enable future economic growth. This can be achieved through new innovations leading to productivity benefits, through knowledge spillover activities between industry and educational institutions.

[88] Queensland Government. 2017. 'Study Queensland'. Accessed 18 July 2017. http://www.studyqueensland.qld.gov.au/

Risks and challenges

A number of risks and challenges that have the potential to impact on the future growth of the traded health and education industry cluster in SEQ are listed below.

Politics and perception

Political stability and community acceptance of international students impacts on a prospective student's decision to choose a particular location. An observed drop in international student numbers has been seen when there is poor community acceptance.[89] It is therefore important to ensure there are positive perceptions of international students.

Visa changes impacting attraction and retention.

Changes to the Australian visa system creates uncertainty for international students and skilled labour when choosing to come to Australia to study or work. The recent cut-backs to the visa system will limit the ability of skilled workers in health and education to enter and / or gain permanent residency. This could compound a shortage of academic staff (researchers, teachers and lecturers), doctors and nurses.

This uncertainty impacts international students when considering to study abroad can result in a decline in enrolments. Whilst changes may not relate to student visas, international students may consider future visa options as part of their decision making when choosing an international location.

Competition

University competition for students will be unrelenting, and health and innovation precincts that are on the rise internationally and nationally, particularly can be seen in:

- Westmead Health & Medical Research Precinct (Sydney);
- Melbourne Biomedical Precinct; Carlton Connect (Melbourne); and
- South Australian Health and Biomedical Precinct (Adelaide).

Increasing competition from other parts of Australia may threaten the future growth projected for this traded industry in SEQ.

Changing nature of service delivery

The increasing pace of technological development is changing the way the international education services are being demanded and delivered. Increasingly, education is being delivered through online delivery methods, either as a primary or complementary training approach. This is causing the need for precincts to reconsider the best use of key physical assets.

[89] https://theconversation.com/lost-international-student-enrolments-may-cost-australia-billions-2199

Sunshine Coast University

Enablers

Enablers of the traded health and education industry cluster are initiatives which encourage growth by attracting international students, enhancing the student experience, enabling transfer of knowledge and the commercialisation of ideas.

Recent investments to enable growth in international education have focused on state-wide initiatives which include industry strategy, collective marketing and promotional effort, and partnership funding to support collaborative initiatives. SEQ has focused on improving the connectivity between key spatial clusters of industry activity through improvements to public transport networks.

To encourage the future growth of this industry cluster, and complement existing initiatives, the key enablers identified for the traded health and education industry cluster include transport, investment, government regulation, and coordination and collaboration. These enablers are further detailed in the table below.

Infrastructure	
Transport connections to and from health and education clusters	Ensure the transport network provides efficient connections to existing and potential clusters.
Financial capital	
Investment under existing strategies	Existing strategies have identified opportunities for investment including Queensland's biomedical road map and the Queensland Trade and Investment Strategy.
Translation and commercial focus	Development of investment funding and performance measures to focus on increasing economic outcomes. Venture capital is also critical.
Policy	
Grow niche industries	SEQ has five established and emerging clusters in which to focus refinement to service delivery and further develop precinct level governance and collaboration.
Integration	With the local health service promotes service improvement, strong workforce development and translational synergies (transfer of research outcomes to practice).
Industry partnerships	Industry engagement enables faster commercialisation, a stable workforce and professional development.
Co-location	Enables co-location of education and health industries to stimulate innovative activity through interactions, sharing of facilities and exchange of expertise and knowledge. Clustering of activities contributes to technology transfer, networking and information circulation.

Transport and communications

Priority industry overview

Transport and communications is a core enabler of economic activity in SEQ. In the context of the economic narrative, the transport and communications industry cluster broadly captures key traded industries within the freight and logistics, telecommunications, and warehousing and storage (physical or online) industries. Figure 46 provides an overview of the transport and communications industry cluster in SEQ.

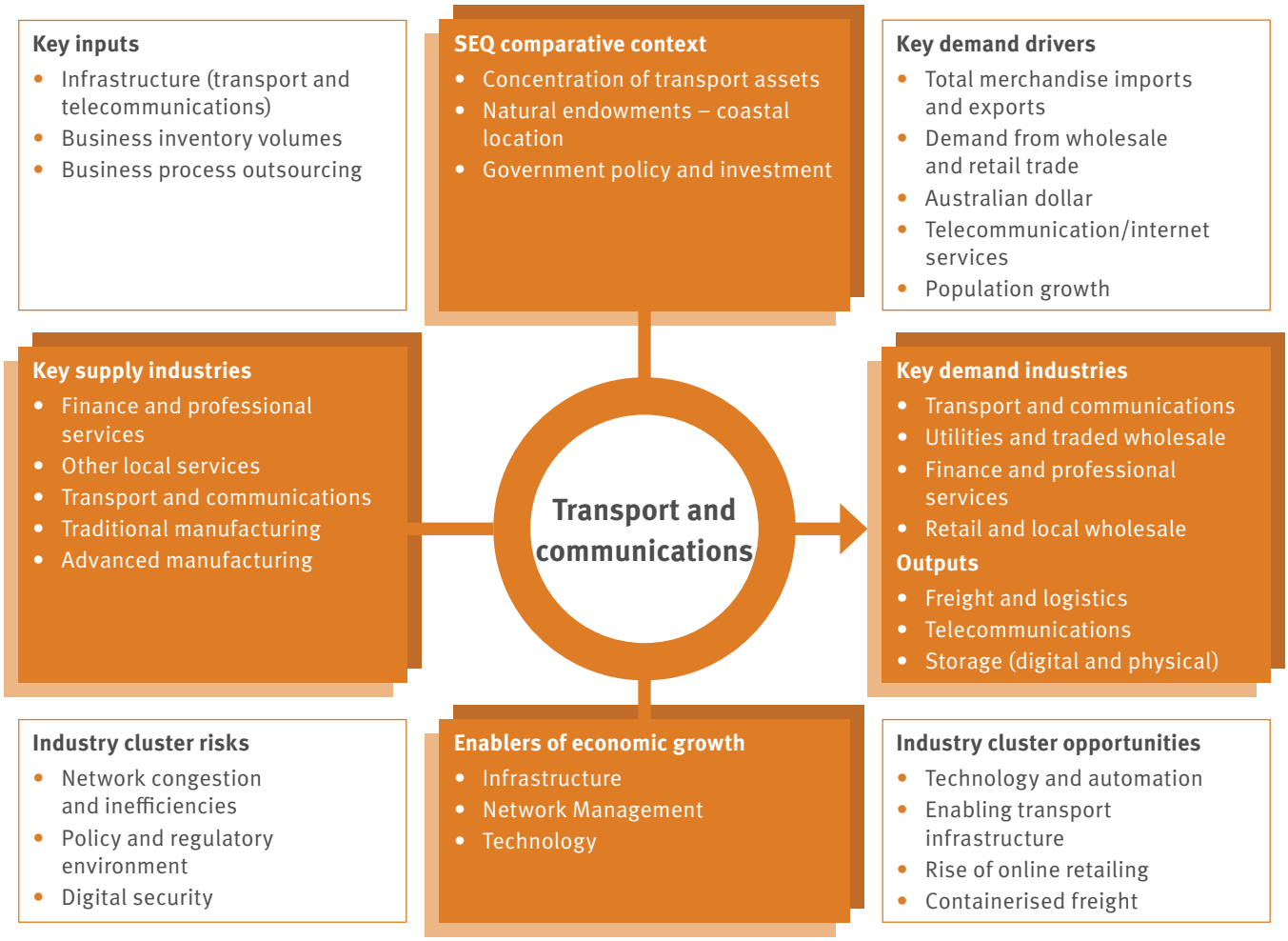


Figure 46 – Transport and communications industry cluster overview
Source: CTT, Queensland Government

Transport and communications in SEQ

The transport and communications industry cluster has been identified as a priority industry cluster due to its strategic importance in enabling and supporting economic growth. Specifically, the industry cluster facilitates the efficient movement and transfer of goods and information to, from, and within SEQ. Accordingly, the industry cluster underpins the efficiency of SEQ's supply chains, which are central to SEQ's ability to compete in interstate and international markets.

SEQ is unique in its concentration of transport assets, including five international gateways that connect the region directly to international markets – the Port of Brisbane, Brisbane Airport, Gold Coast Airport, Sunshine Coast Airport and Wellcamp Airport (Toowoomba). This infrastructure supports the industry cluster, enabling a number of freight, logistics, warehousing and storage industry functions.

SEQ's communications network provides essential connections between the region's key infrastructure assets to enable the transfer of information, support research and enable digital efficiencies. Specifically, the communications network provides connections between SEQ's health, knowledge and technology precincts, regional activity centres, and major enterprise and industrial areas.

The transport and communications industry cluster is estimated to employ close to 64,700, or 4.4 percent, of workers within SEQ, generating approximately $171,400 GVA per worker in 2016. Economic output per worker in SEQ's transport and communications industry cluster is comparative to the economic output of an Australian worker in the same industry cluster. This economic activity is driven by clusters of industry activity in close proximity to SEQ's core transport infrastructure assets and industrial areas such as the Port of Brisbane, Brisbane Airport, and Rocklea.

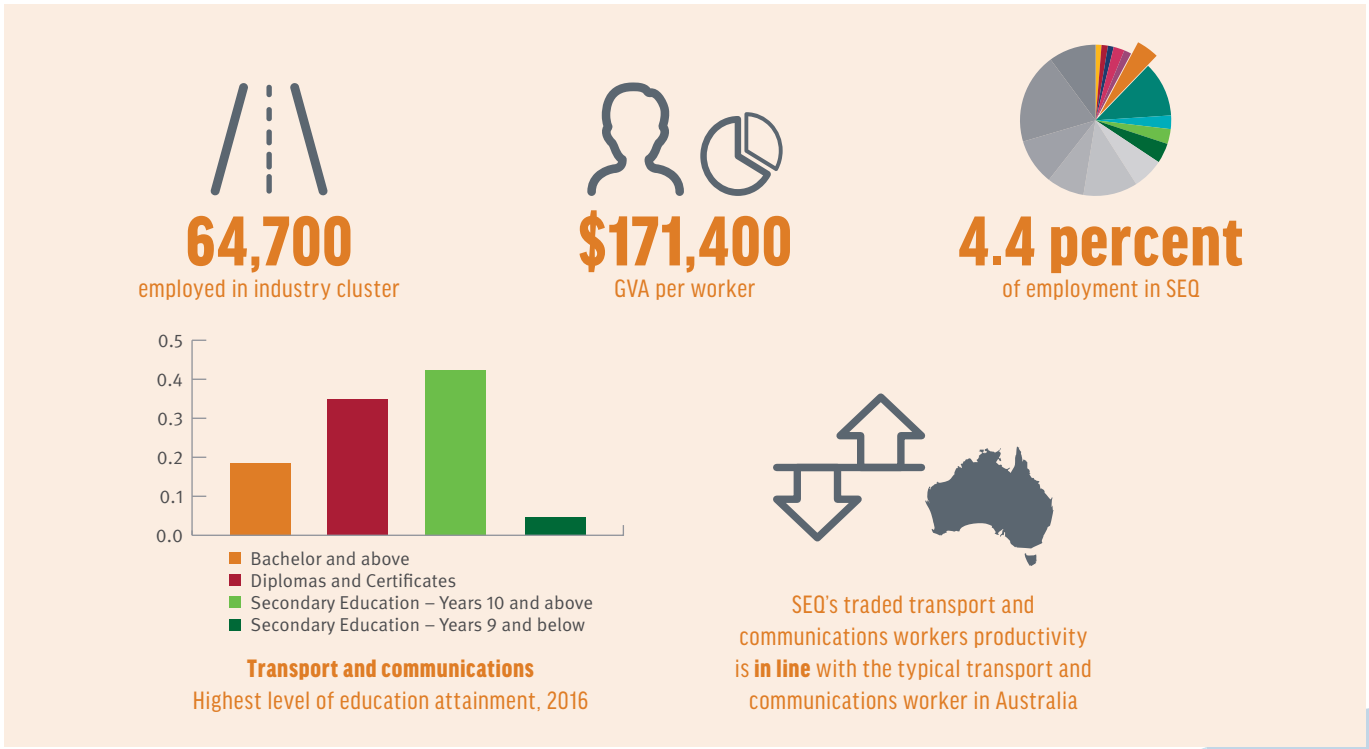


Figure 47 – Key industry cluster characteristics – transport and communications
Source: CTT, Queensland Government. Refer Appendix B – Technical Note; University annual reports, 2016; ABS Census, 2016

Key locations

The transport and communications industry cluster is located in a number of significant spatial clusters across the region, particularly on the Australia Trade Coast REC, and in pockets of industrial land across the region, such as Rocklea, Jimboomba, Caboolture and Southport. The Western Gateway is an emerging cluster of transport and communications enabled by the airport, inland rail and intermodal terminal. Overall, the industry cluster is established in key locations that leverage and support the region's core trading functions, industrial activity and network coverage.

The SEQ freight network is well connected to the national freight network. The import-export gateways located in SEQ connect directly to central Queensland, Darwin and Melbourne through the Western gateway, northern Queensland through the northern corridor, and northern NSW and Sydney through the south and south-western corridors (see Figure 48).

As shown in Figure 49, SEQ's distribution of transport and communication infrastructure assets delineates clear transport corridors within the region, which connect the spatial clusters of transport and communication industry activity. The Port of Brisbane and the region's four international airports located in Brisbane, Sunshine Coast, Gold Coast and Toowoomba are serviced by the region's road and heavy rail freight networks providing clear north-south and east-west connections. Intermodal facilities within the region align to these corridors with facilities in the Port of Brisbane, Acacia Ridge and Toowoomba. The operation of the Bromelton SDA's intermodal facility and construction of Inland Rail will strengthen the freight corridor south-west of Brisbane.

Ongoing investment into strategic transport and communications infrastructure will influence the location and spatial clustering of future industry activity. The roll-out of the National Broadband Network (NBN) has the potential to promote further transport and communications industry development within areas including Western Gateway REC, South West Industrial Corridor REC, Ipswich REC and Bromelton SDA.

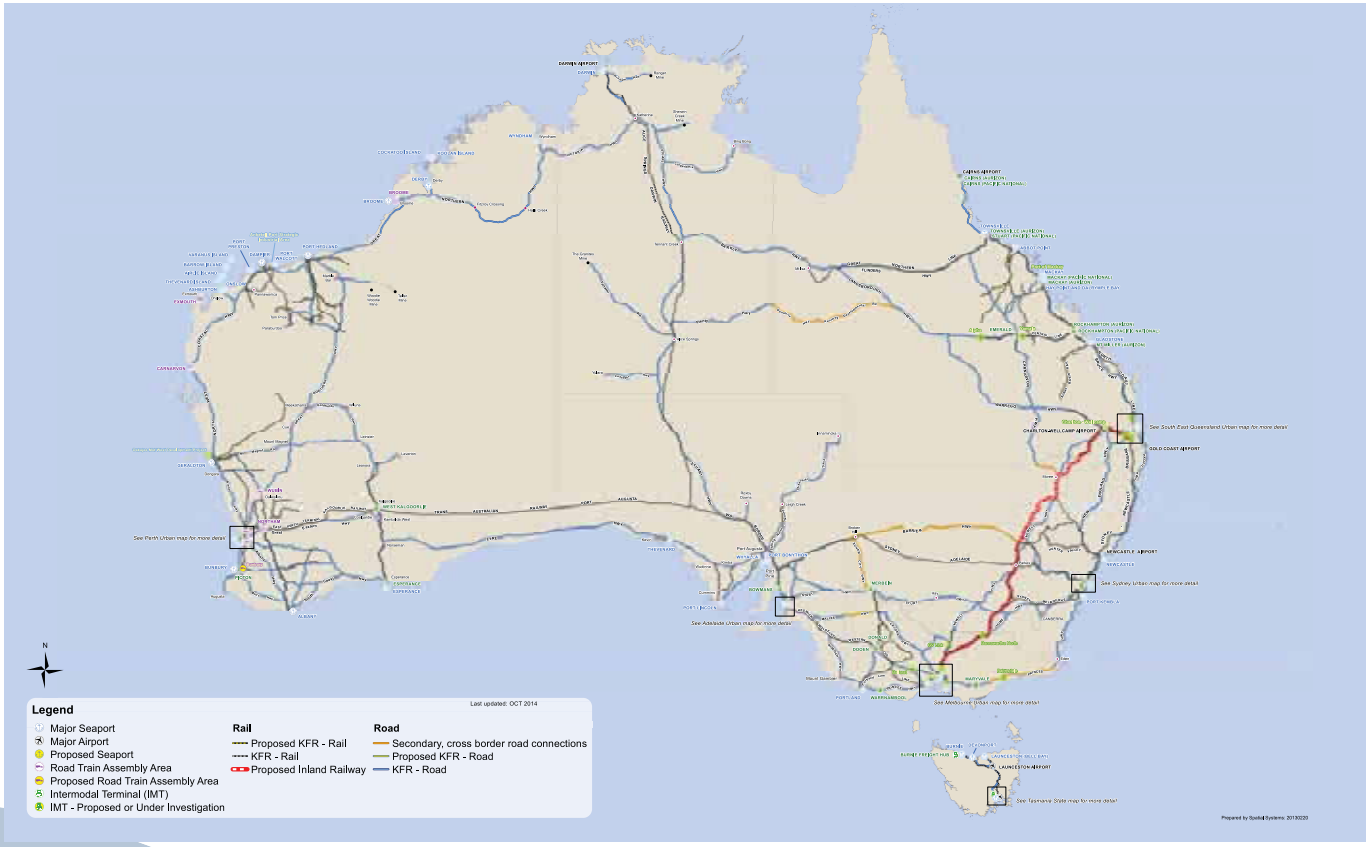


Figure 48 – Infrastructure Australia's indicative map of a national land freight network
Source: Australian Government Department of Infrastructure and Regional Development, 2017, National Key Freight Route Map

Transport and communications in the SEQ region

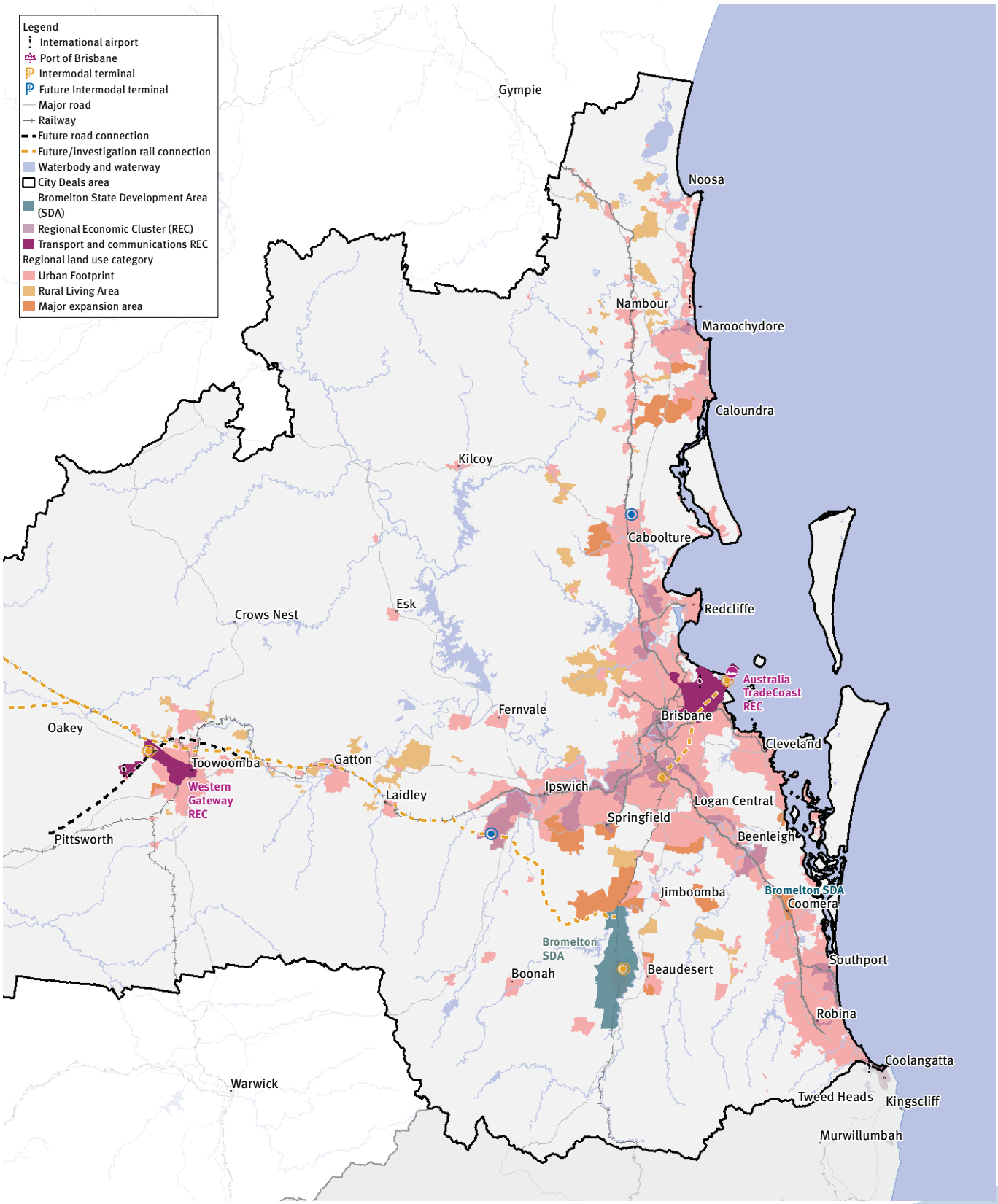


Figure 49 – Transport and communications in the SEQ region

Source: Regional and Spatial Planning, Queensland Government. September 2017

Inter-industry links

From an industry perspective, the transport and communications industry cluster has direct and indirect links with all industries of the economy. Specifically, as per the Input-Output industry analysis, there are a number of key industry interdependencies. These are illustrated in Figure 50 below.

Primarily, the priority industry cluster supports (15 percent), and is supported by (17 percent), activity within its own industry cluster. For example, the movement of freight demonstrates this inter-industry relationship as goods move from warehousing and storage through the region on the transport network for export through the region's export gateways.

The transport and communications industry cluster has significant input from the financial and professional services industry cluster (21 percent). In addition to being a consumer of freight services, the financial and professional services are a user of digital storage, software publishing, data process, web hosting and other internet related services.

Other local services (18 percent) and traditional manufacturing (12 percent) also support the transport and communications industry cluster. Other local services include rail and road passenger transport which are likely linked to various freight networks (rail, road, air). Growth in the demand for these industries is closely linked to the subsequent growth of the transport and communications industry cluster.

The transport and communications priority industry cluster supports utilities and traded wholesale (13 percent), the finance and professional services cluster (11 percent), retail and local wholesale (11 percent). The output into the financial and professional services includes telecommunication and internet services that support businesses' services such as administration, legal and financial, and insurance.

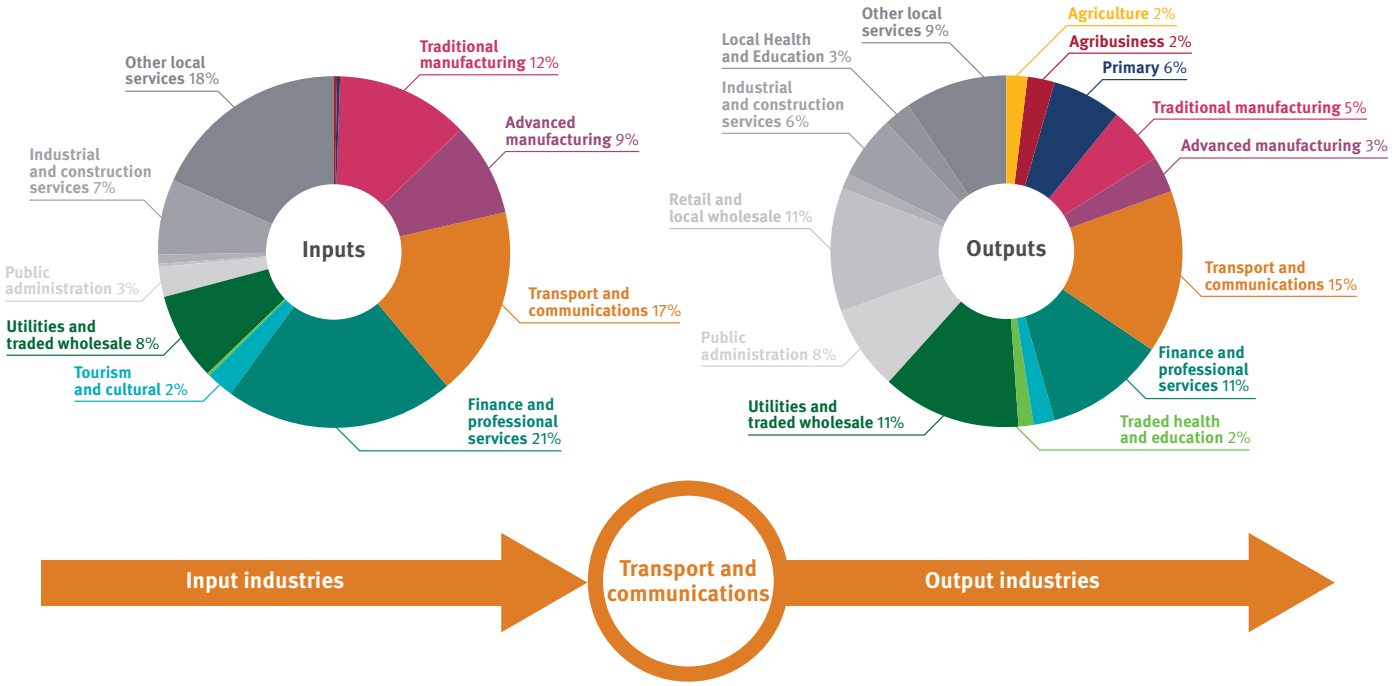


Figure 50 – Transport and communications inter-industry input and output links
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note

Opportunities

A number of opportunities that have the potential to grow the transport and communications industry cluster in SEQ are listed below.

Technology and automation

Technology and automation is one of the most significant opportunities for the industry cluster, the impacts of which are already being realised. While the exact scope of change is difficult to anticipate, known advancements in new technologies, including data analytics, automation and platform solutions, have the potential to significantly improve the competitiveness of the industry cluster.

In an increasingly competitive environment, technological advancement has the potential to increase productive output for the industry cluster through improved system efficiency, capacity utilisation and process execution. Within warehousing and logistics industry groups, technology is enabling value-added services such as cross-docking (direct distribution from supplier / manufacturer to customer / retail with minimal handling or storage time), precise inventory management, and full supply chain solutions.

Additional opportunities may be realised through technological advancements within complementary and supporting industries; technology-driven changes in freight and logistics inputs, the creation of new market segments and changing consumer preferences will increase demand for transport and communication services and functions.

Enabling transport infrastructure

SEQ has significant enabling transport infrastructure which supports the transport and communications industry cluster. Importantly, the region has an integrated transport network that connects industries, and supports the movement of freight between production and final markets. Most notably, SEQ has a number of international gateways which connect the region directly to international markets – the Port of Brisbane, Brisbane Airport, Gold Coast Airport, Sunshine Coast Airport and Wellcamp Airport. These gateways are supported by a network of road and rail infrastructure.

New infrastructure projects, such as Inland Rail and the Toowoomba Second Range Crossing, will provide additional landside capacity, better freight connections and improve multimodal freight efficiency within SEQ.[90]

Leveraging the region's transport network, there are a number of opportunities for the transport and communications industry cluster to adapt and respond to increasing demand for inter-regional and interstate freight.

Rise of online retailing

The rise of online retailing and e-commerce is a significant opportunity for the industry cluster, particularly for the logistics, warehousing and storage, internet and web hosting industry groups.

Changing consumer preferences is driving innovation and the development of omni-channel logistics solutions which are required to meet the demand for more personalised, dynamic delivery options, e.g. just in time delivery.

The continued expansion of online retailing will generate further opportunities through increasing demand for third-party supply chain solutions; retail is no longer restricted to brick and mortar storefronts and, accordingly, there is growing demand for warehousing and storage.

Containerised freight

The growth of containerised freight movements, both import and exports, is an opportunity for the transport and communications industry cluster. Containerisation has increased globally as the freight sector adapts to provide agile and globally efficient freight transport.

Since 2004, containerised freight exports from the Port of Brisbane has increased by 202,604 TEU (56 percent from 2004 to 2014).[91] Further growth is anticipated in containerised freight volumes as projected strong economic growth in Asia increases the demand for SEQ's containerised exports (such as agricultural products) through the Port of Brisbane.[92]

The growth of containerised freight in SEQ has further implications for the transport and communications industry cluster, including the requirements for additional infrastructure, such as intermodal facilities, to support efficient and effective global supply chains.

[90] Department of Infrastructure, Local Government and Planning, 2017, State Infrastructure Plan Part B
[91] Twenty-foot equivalent (TEU) is a measure of cargo capacity of container ships
[92] Ports Australia. 2015. "Trade Statistics: Containerised Trade In TEU for 2004/2005 and 2014/15" Accessed September 6, 2017. http://www.portsaustralia.com.au/aus-ports-industry/trade-statistics/?id=5&period=15

Risks and challenges

A number of risks and challenges that have the potential to impact on the future growth of the transport and communications industry cluster in SEQ are listed below.

Network congestion and inefficiencies

The transport and communications industry cluster is becoming increasingly impacted by network congestion, across both the transport and communication networks.

Growing congestion in urban areas and along key freight corridors in SEQ limits freight productivity, particularly around transport hubs and port areas. SEQ's freight task is primarily serviced by the region's road network, which is being further constrained through population growth and urban migration. As the region's freight task continues to grow, demand for the road network will outstrip growth in capacity, resulting in the significant costs of congestion for SEQ.[93]

Similarly, variability in telecommunications infrastructure contributes to network congestion, digital 'blackspots' and low connection speeds during periods of peak demand across the region. While additional business-based communications solutions will be required, network congestion and inefficiencies across the communications network will be addressed, at least in part, by the completion of the NBN.[94]

Policy and regulatory environment

The speed of which the transport and communications industry cluster will be disrupted by innovative technology and economic change will need to be supported by an agile regulatory framework. As the contextual environment evolves, the regulatory framework must be able to respond in a timely manner to support the industry cluster capitalise on arising opportunities and realise productivity gains.

Further, policy initiatives that address the growing impact of network congestion (on both the transport and telecommunications network) and improve supply chain efficiency will be required to support the industry cluster moving forward.

[93] Bureau of Infrastructure, Transport and Regional Economics. 2016. "Australian Infrastructure Statistics – Yearbook 2016: Part T – Transport" Accessed September 6, 2017 https://bitre.gov.au/publications/2016/yearbook_2016.aspx
[94] NBN. 2015. Corporate Plan 2016. http://www.nbnco.com.au/content/dam/nbnco2/documents/nbn-corporate-plan-2016.pdf

Roadworks, Kawana Waters, Sunshine Coast

Enablers

There are a number of enablers that will support the future growth and productivity of the transport and communications industry cluster. These enablers capture both the infrastructure and policy initiatives that will improve the productivity of the industry cluster, creating a strong foundation to support the growth complementary industries throughout SEQ.

Recent investment and planning by the Australian and Queensland Governments to improve interstate freight movements through the committed Inland Rail project will support the future growth of this industry cluster. Government has also been focused on establishing freight links to emerging industrial areas in SEQ, including the Bromelton SDA and Ebenezer industrial area.

At a regional level, recent investment in SEQ has included Wellcamp Airport in Toowoomba, the construction of a second runway at the Brisbane Airport, and the continued expansion of the Port of Brisbane. In addition, the development of the SEQ Regional Transport Plan will provide the context and direction for future strategic transport network and supply chain planning.

Key enablers to support the growth of the transport and communications industry cluster will improve accessibility and connectivity within and outside sthe region. These include infrastructure provision, network management and the integration and coordination of land-use and transport planning. These enablers are further detailed in the table below.

Land	
Land-use planning	Preserve land for corridor expansion and development, and development of intermodal terminals. Protect future freight corridors to facilitate growing freight movements. Ensure suitable land is available for Intermodal facilities which consume large areas of land and generate substantial amounts of truck flows. These activities are increasingly difficult to accommodate as a result of competing land uses.
Infrastructure	
Improve the efficiency and capacity of the freight network	Optimise use of existing infrastructure through demand management and other network optimisation solutions.
Infrastructure	
Infrastructure linkages	Develop strategic intermodal facilities at key transport nodes to provide connections to, from and between industries and market.
Develop a business-based broadband solution	Prioritise targeted business-based communications solutions / enabling technology to provide certainty to businesses and industry, improving the desirability and viability of operating in the regional areas of SEQ.
Policy	
Integration of transport, land use and industry development planning	Better integrate and coordinate transport, land use and industry development planning to improve supply chain efficiency and support multi-modal freight movements.
Whole-of-system solutions	Develop whole-of-system solutions for SEQ, integrating the transport and communications network with the Internet of Things and other smart technology.
Financial capital	
Alternative funding and financing solutions	Consider alternative funding and financing solutions, such as user pricing and opportunities for leveraging value sharing mechanisms.

Tourism and creative

Priority industry overview

Tourism is a major employer and contributor to the SEQ economy, building on the unique natural and cultural experiences that SEQ offers. Similarly, creative and cultural activities contribute to vibrant, liveable communities, as well as niche exports, though they make up a smaller proportion of the overall economy. These two industries have been grouped into a single priority industry cluster because of their similar geographic distribution and their interrelatedness. Co-location of these industry clusters often occurs as places desirable to tourists are often also desirable to the creative community. Both industries are enhanced by the same natural amenity, connectivity and services of a place. In addition, creative activities (shows or events) draw national and international visitors to the region.

Domestic tourism continues to be the foundation of the tourism sector, and represents 64 percent of visitor expenditure in Australia.[95] The Gold Coast, Sunshine Coast, and City of Brisbane are top domestic tourist destinations for SEQ and, given their established tourism industries and natural assets, they will likely continue to attract the largest share of tourism activity in the region.

However, this is a highly competitive industry and will require careful consideration to continue to compete with other destinations and meet shifting consumer preferences. This is particularly true of the 'experience economy' section of the market. Tourists no longer want to be merely spectators but are instead driven by the need for meaning and memorable, personalised experiences. Tourism and Events Queensland (2015) describe this transformation in consumer expectations:

> **"Today's guests want more than just to see the sights. They want to learn, participate and engage with local people and places when they travel. They want stories of amazing people and places they can share with their friends and family. Consumers are looking for a tourism experience – the emotional feeling or personal achievement a visitor derives from the purchase, participation or consumption of a tourism product. The 'tourism product' is what the consumer buys; the 'tourism experience' is what they remember."[96]**

The need to develop new experiences to drive growth in this industry cluster is imperative.

The creative industry has an important role in supporting the tourism industry with creative outputs which often contribute to the amenity of the area and attract increased visitation. Further, the region has a strong visual production industry, anchored in film production on the Gold Coast as well as local radio, television and performing arts content across the region. The industry is also strongly tied to an array of professional services industries that move this content into other mediums, such as digital marketing, web design and other value-adding industries.

Figure 49 provides an overview of the tourism and creative industry cluster in SEQ.

Movieworld, Gold Coast

[95] Griffith University Institute for Tourism. 2015. Australian Tourism Demand for Domestic Travel Experiences: Insights for the Gold Coast
[96] Tourism and Events Queensland. 2015. Destination Hero Experiences

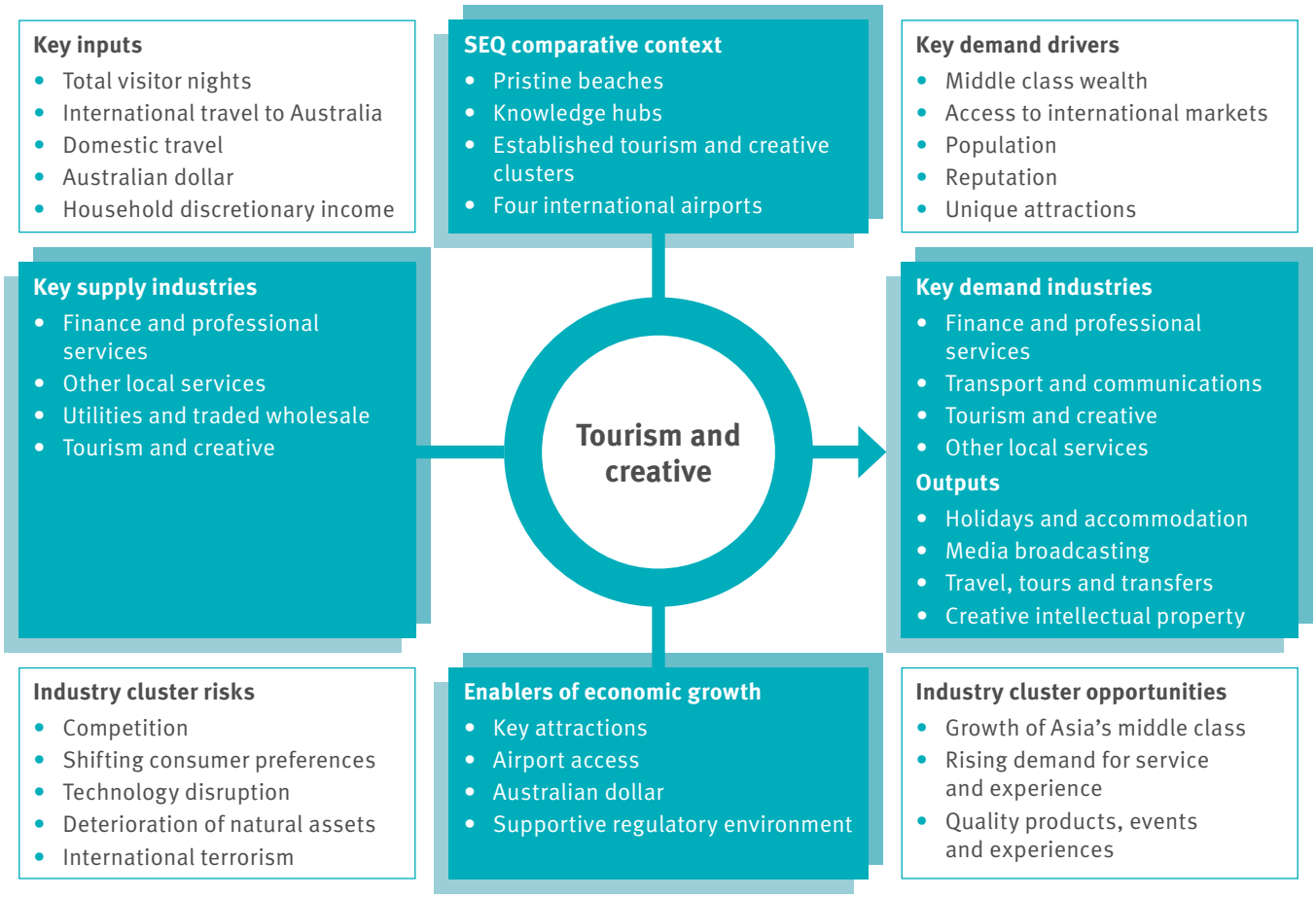


Figure 51 – Tourism and creative industry cluster overview
Source: CTT, Queensland Government

Tourism and creative in SEQ

Activity in the tourism and creative industry clusters has grown throughout SEQ over consecutive decades, leveraging the region's natural assets to establish mature industry clusters, particularly in coastal and hinterland areas. SEQ has been a popular destination for tourists seeking a sub-tropical climate, beaches, islands, rainforests and rural hinterland. The tourism and creative industry cluster is a priority industry cluster in SEQ because of the region's natural assets, mature industry clusters, access to a stable workforce and existing infrastructure (e.g. accommodation, preforming arts facilities).

A clear example of a prominent cluster of creative industry activity is the Oxenford cluster on the Gold Coast. This cluster brings together a specialised workforce in the surrounding area, and utilises the surrounding natural landscape and built studios to underpin film production.

Similarly, the City of Brisbane, Gold Coast and Sunshine Coast have seen significant investment in tourism infrastructure, including a second runway at Brisbane Airport, Brisbane International Cruise Ship Terminal, new luxury hotels, the planned extension to the Gold Coast light rail and investments associated with the Commonwealth Games 2018. Businesses, such as major hotels and sightseeing services, continue to grow within the region building on the region's advantages.

The tourism and creative industry cluster is estimated to employ close to 42,400, or three percent of workers within SEQ, generating approximately $81,100 GVA per worker in 2016. This industry cluster has lower GVA per worker compared to the Australian worker in the same industry cluster. Through improvements to productivity, there is opportunity to increase the GVA per worker, growing the contribution to the economy from this industry cluster. This economic activity is driven by large employment bases around its established tourism and creative hubs, located at the Gold Coast (tourism and creative), Sunshine Coast (tourism), and Brisbane (tourism and creative). A key differentiator for the industry cluster relative to other industry clusters is the predominantly small business nature of its participants.

Festival of Lights, Gold Coast

Key locations

Business activity in the tourism and creative industry sector is concentrated in areas with key natural endowments that lend themselves to visitor experiences. These include the region's beaches, islands, rainforests and rural hinterland. These are highlighted in the 'regionally significant scenic amenity' areas (Figure 53) that have been identified through the development of *ShapingSEQ*.

Business location decisions also reflect key built form investments, including the region's airports as well as the significance of key business districts across the region that provide demand for accommodation.

The tourism and creative industry cluster is located in a number of significant spatial clusters including the Moreton Bay islands and the coast and hinterland areas of the Sunshine Coast and Gold Coast including the Southport–Broadbeach and Southern Gateway REC (all predominantly small-business led clusters). The Coomera Precinct similarly reflects the concentration of high value creative activities in one location, including film production and associated supply chains. In addition, the Brisbane CBD (Capital City REC) is a key spatial cluster of tourism and creative industry activity. The CBD cluster has a strong concentration of services, activities and cultural precincts, including preforming arts, museums, art galleries and accommodation.

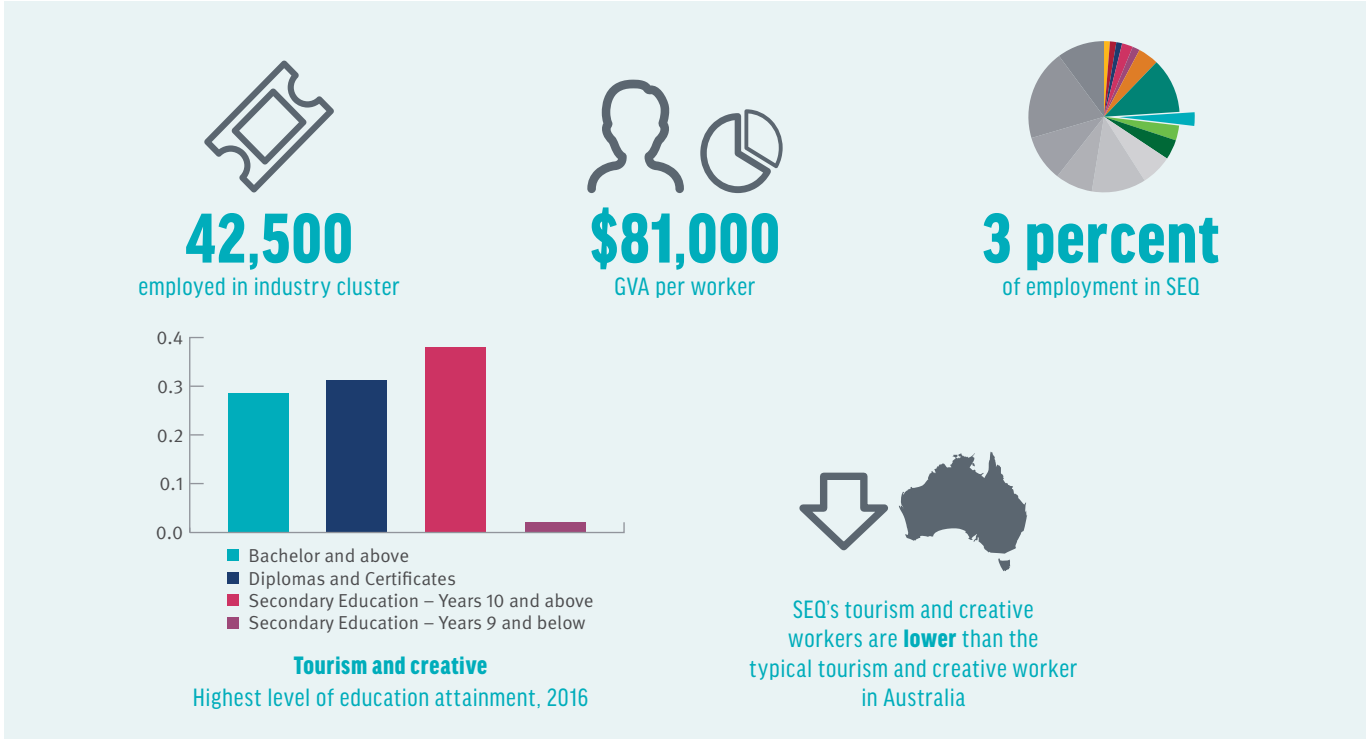


Figure 52 – Key industry cluster characteristics – tourism and creative
Source: CTT, Queensland Government. Refer Appendix B – Technical Note; University annual reports, 2016; ABS Census, 2016

Tourism and creative in the SEQ Region

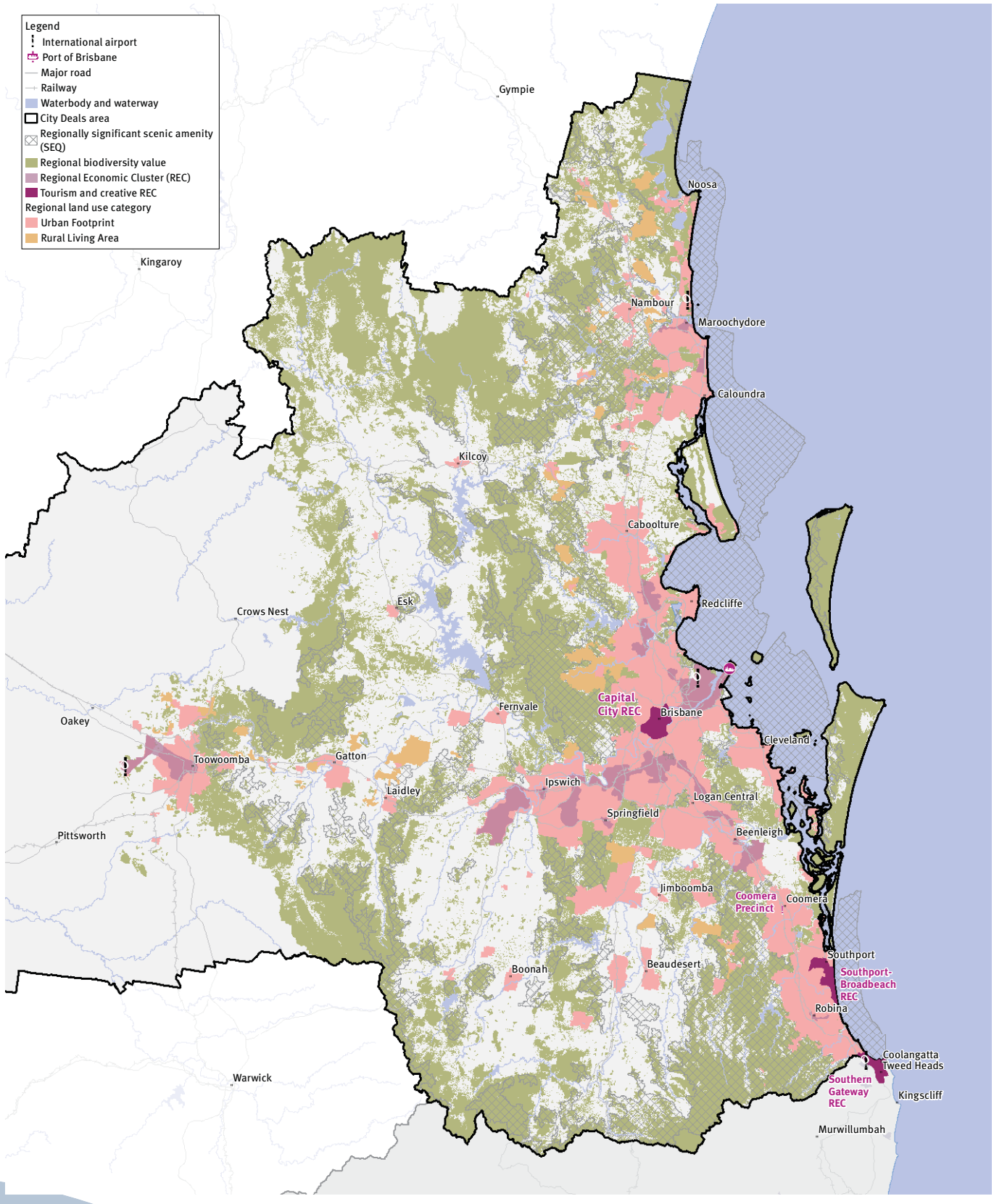


Figure 53 – Tourism and creative in the SEQ Region
Source: Regional and Spatial Planning, Queensland Government. September 2017

Inter-industry links

To continue to grow the tourism and creative industry cluster within SEQ, it is necessary to identify which other industry clusters can support and enable growth. The key relationships to other industry clusters are illustrated in the inter-industry link diagram (Figure 54).

The tourism and creative industry cluster primarily supports (32 percent of inter-industry outputs) and is supported by (24 percent of inter-industry inputs) the financial and professional services industry cluster. This includes businesses' administration, property operation, and legal and accounting services. Financial and professional services generate business tourism – for example, people coming to a region for trade shows, capital raising, and visiting other office branches or suppliers. The tourism and creative industry cluster also requires various inputs related to running a business which include legal advice, administration, marketing and employment services. This relationship between the two industry clusters is spatially visible in the co-location of these industries in key centres across the Brisbane, Gold Coast and Sunshine Coast local government areas.

Secondly, the priority industry cluster supports (nine percent) and is supported by (10 percent) activity within its own industry cluster. For example, travel agents sell products which are generated in the industry cluster such as tours, airport transfers and accommodation.

The priority industry cluster also supports activity in transport and communications (nine percent) which includes international and domestic air service provision, and other local services industry cluster (eight percent). These other local services include takeaway, cafe and restaurant operation, and retail. Other local services are often included as part of the tourism industry in other publications. However, as these are non-traded industries, they are not the focus of this paper.

The tourism and creative industry cluster also supports the growth of other priority industry clusters in a more holistic sense through the promotion of the region's natural assets and cultural experiences, both fundamental aspects of liveability and attractiveness of a region.

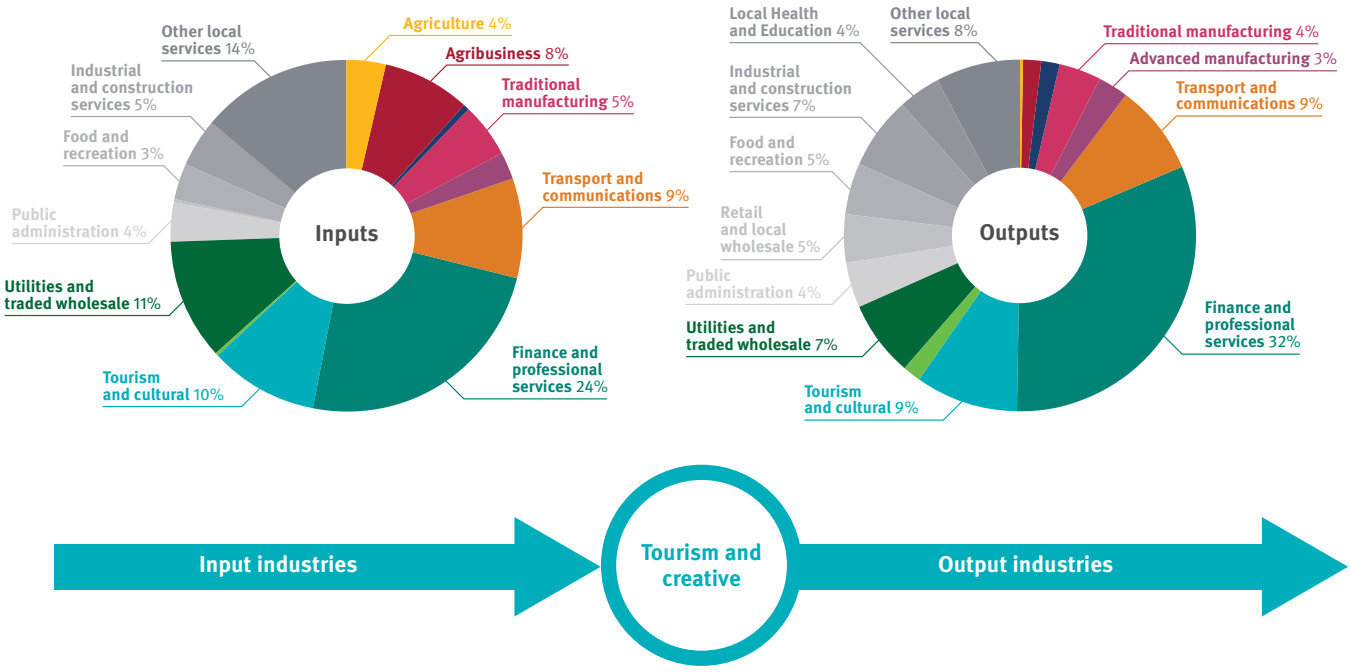


Figure 54 – Tourism and creative inter-industry input and output links
Source: CTT, Queensland Government. Refer to Appendix B – Technical Note

Opportunities

A number of opportunities that have the potential to grow the tourism and creative industry cluster in SEQ are listed below.

Growth of middle class in Asia

The increasing affluence of Asia's population will drive demand in tourism, with wealthy visitors seeking attractive destinations, cultural experiences, luxury accommodation and high-quality service. Currently, Asia is the region's fastest growing international market (nine percent growth) in Queensland for the year ending March 2017.[97] There is an opportunity to increase the tourism visiting friends and family sub market by leveraging the international students visiting the region.

The increasing affluence of Asia's population will also drive demand in, and provide opportunities for, growth of the creative industry services. Demand across Asia for creative services and cultural products is growing fast and continues to present opportunities for organisations.

Grow quality products, events and experiences

SEQ has a strong pipeline of tourism and cultural infrastructure being developed, including Queen's Wharf, Integrated Resort Developments (IRDs), Brisbane International Cruise Terminal, Howard Smith Wharves and Jewel Towers. Visitors to the SEQ region have a strong interest in nature-based adventure and cultural activities, particularly the international leisure tourism market, however there are some gaps in these types of tourism product in SEQ.[98] For example, indigenous cultural experiences to provide insight into the region's cultural heritage offer a chance to develop the 'experience economy'. The Queensland Government 'North Stradbroke Island Economic Transition Strategy' identifies a range of initiatives to stimulate business growth including promoting tourism, including Indigenous cultural tourism, on North Stradbroke Island.

There is opportunity to build on existing infrastructure and natural assets to facilitate the development of new products and experiences that meet the expectations of target markets. These could include premium experiences that attract 'high-yield' visitors as part of new or existing tourism developments.

Rising demand for services and experiences

As incomes grow, both domestically and internationally, people are more likely to spend their discretionary expenditure on new experiences rather than products. There is rising demand for services and experiences, including tourism, education and entertainment. Nationally, between 2004 and 2010, Australians increased their spending on cultural and entertainment services by 25 percent of average household expenditure (in nominal terms).[99] Future tourist markets will seek to create experiences that are personalised, 'authentic' to the destination and its people, involve face-to-face interaction and create emotional connection.

[97] Tourism and Events Queensland. 2017. International Tourism Snapshot, https://cdn-teq.queensland.com
[98] Tourism and Events Queensland. 2008. Brisbane Regional Tourism Investment and Infrastructure Plan
[99] Australian Bureau of Statistics. 2011. "Arts and Culture in Australia: A Statistical Overview." Catalogue Number 4172.0

Risks and challenges

A number of risks and challenges that have the potential to impact on the future growth of the tourism and cultural industry cluster in SEQ are listed below.

Increasing competition and shifting consumer preferences

Australian tourists are increasingly choosing foreign locations for recreational travel, moving away from domestic long-term stays in favour of overseas travel. This is reflected in analysis by Tourism Research Australia (TRA) that outbound departures by Australian residents have grown at a faster rate than domestic day and overnight trips over the past five years.[100] Price is one of the main factors in this decision, and is a point in which the region's industry operators will struggle to compete. It is also one that is influenced by exchange rates of key currencies that are out of the control of the industry cluster. Currently, the region's industry operators perform strongly by offering a superior tourism offering. However, as foreign locations mature their service offering, they will also become more competitive in terms of a quality offering, creating a greater challenge for the region's operators.

Australia has experienced a strong rise in inbound tourist numbers over the past five years, with visitor numbers increasing as the Australian dollar decreases. However, TRA have identified that SEQ is losing market share to other states and territories.[101]

Connecting to global markets

The local market for creative services, such as design, is small by international standards. Most firms will need to obtain export revenue to achieve sustainable growth and remain competitive. Creative industries are often micro businesses or small to medium sized enterprises. Given their size, these industries are often challenged to make an impact on the competitive international stage. Commercially, there can be difficulties in raising finance, navigating the regulatory environment, gaining business skills or establishing export markets.

Technology disruption

Technology has enabled massive transformations in areas such as music, film, television, publishing and games. It has provided entrepreneurs with emerging services for new business, such as the Brisbane based developers of the Fruit Ninja app, and Half Brick studios. However, it continues to demand innovation and adaptation of traditional models. In some areas, it has opened the way to more engagement with overseas markets and intensified international competition.

Preservation of natural assets

Tourism businesses often choose to locate in proximity to natural assets (attractions) which underpin the industry. To ensure the key attractions are preserved, it is necessary undertake strategic planning to consider the best uses and sustainable outcomes for the SEQ's natural environment and assets.

[100] Tarrant. N. 2017. IBISWorld Industry Report X0003 Tourism in Australia www.ibisworld.com.au
[101] Tourism Research Australia. 2017. State of the Industry 2016 Accessed September 6, 2017 https://www.tra.gov.au/research/view-all-publications/all-publications/state-of-the-industry/state-of-the-industry-2016

Enablers

Enablers of the tourism and creative industry cluster are initiatives which encourage growth by overcoming suggested barriers, and / or leveraging opportunities. Recent investment has been directed at physical assets (mentioned above) as well as several industry growth strategies (e.g. Destination Success[102], Draft Advancing Tourism). Key enablers for the industry cluster include investment, coordination and collaboration, promotion and skills. These enablers are further detailed in the table below.

Infrastructure	
Unique tourist attractions	Government initiatives that enable and support significant private sector investment in tourism ventures to develop key attractions in the region. These should complement existing experiences and natural endowment for example, an indigenous cultural experience / cultural centre or a regional food trail.
Tourism connections	Ensure the transport network provides efficient connections to tourism destinations – airports, accommodation and sights – to improve the tourism experience. For example, improved frequency of key international routes to Asian population centres, improved public transport connectivity to regional airports (i.e. Gold Coast, Sunshine Coast and Wellcamp).
Human capital	
High quality workforce	Strengthen industry pathways for students to encourage careers in tourism to grow the customer-focused service culture and experience. Improved skills will deliver higher quality services to meet market requirements and improve the competitiveness of the industry cluster.
Cultivating skills, entrepreneurship and innovation	Creative skills support the development of creative and cultural industries. Stimulating creative industry entrepreneurship and innovation can drive growth.
Policy	
Market Analysis	Undertaking ongoing market analysis to enable businesses to meet and adapt to market expectations. The tourism industry consists of several small businesses without the individual resources to undertake significant research and development activities. Market analysis would enable targeted consumer marketing; a more effective use of smaller business resources.
Community engagement in tourism	Provide complete service offering to people visiting the region to provide a 'unique experience of the destination'. Obtaining community acceptance and support for tourism is essential to building sustainable communities and industry.
Creative hubs	Enable co-location of creative industries including creative education to grow innovation through interactions, sharing of facilities and exchange of expertise and knowledge. Co-location requires affordable and fit-for-purpose spaces that are well connected within the region.

[102] Department of Tourism, Major Events, Small Business and the Commonwealth Games. 2014. Destination Success – The 20-Year Plan for Queensland Tourism

Road train

The economic foundation of SEQ

The purpose of this economic foundations paper is two-fold. It has been designed to:

- Provide an evidence base for a framework to inform investments in the region
- Inform an overarching economic narrative for the region.

The preceding chapters have articulated how key industry clusters across the region have the potential to drive growth in traded economic activity. These will inform both the framework and the narrative. This chapter builds on this analysis by:

- Summarising the key enablers for growth across all industry clusters
- Identifying the clusters that will be critical to this growth
- Summarising these elements to create the economic foundation – a priority industry and spatial lens to inform future investment
- Outlining how the above will inform a framework for investment in this growth.

It is intended that this foundation can be applied across a range of infrastructure and economic planning activities for the region, including the SEQ City Deal and the SEQ Narrative.

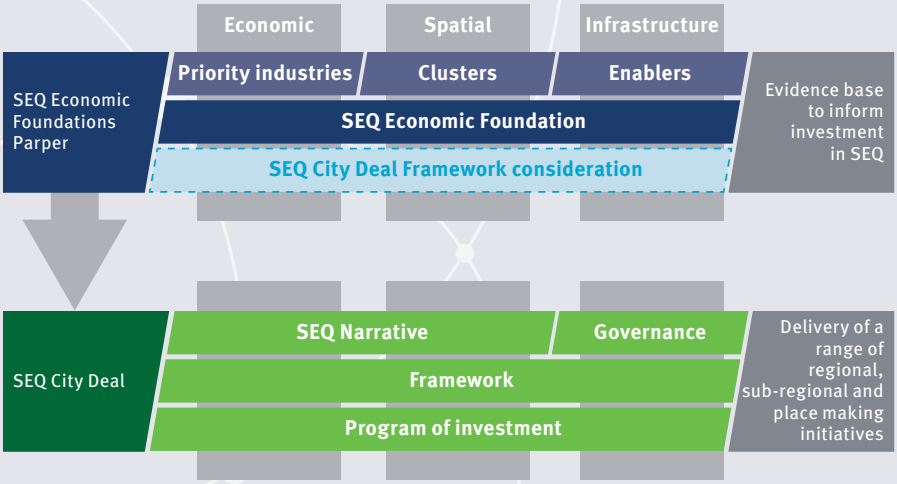


Figure 55 – Economic foundations paper relationship with the SEQ City Deal
Source: CTT, Queensland Government

Priority industry clusters

SEQ's priority industry clusters will position the region to realise its economic aspirations. As set out earlier in this report, expanding SEQ's traded industry clusters is the only way to generate growth above trend. Local industry clusters, in contrast, only grow in proportion to population increases, and therefore cannot generate the volume of jobs – and particularly high value, knowledge-intensive jobs – that will drive the competitiveness of the region in a global economy. These industry clusters which will drive the competitiveness of the region include:

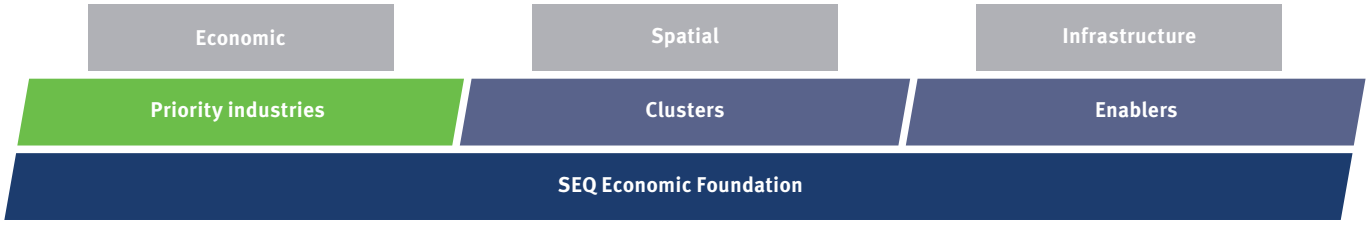
- advanced manufacturing;
- agribusiness;
- traded health and education;
- transport and communications; and
- tourism and creative.

Growing the traded industry clusters to be a greater proportion of the overall regional economy (in line with cities such as Greater Sydney and Greater Melbourne) will ensure the prosperity of SEQ for future generations.

The priority industry clusters set out in this report were selected on the basis of:

- A robust analytical method based on the quantitative techniques developed by Harvard Business School
- Interviews with stakeholders in local and state government
- The trajectory of these industries in light of the megatrends that are shaping the global markets of tomorrow.

A long-term planning horizon will ensure that these industries will be well-positioned to grow the region's economy and provide the jobs of the future for SEQ.



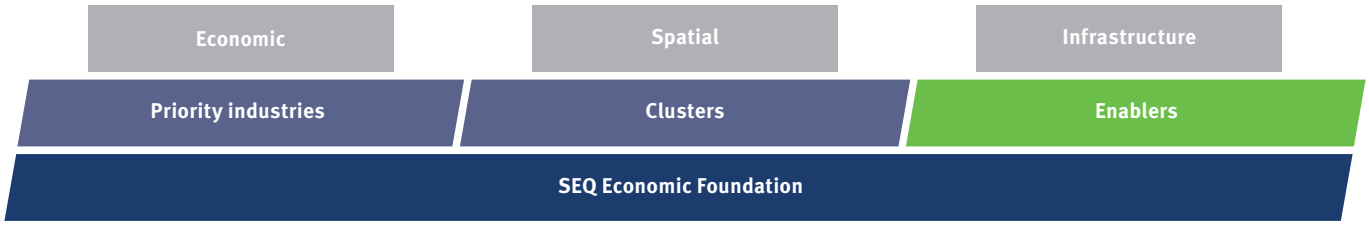
Enablers to growth

Enabling and unlocking growth is a complex proposition. However, economic theory provides a foundation for thinking about the inputs into growth, and how these can be best applied in order to ensure the future prosperity of a region such as SEQ. In simple terms, economic output can be attributed to:

- Land (and other natural resources) – natural endowments, such as oil or mineral deposits, can be an important source of economic growth. However, aside from land supply, these are finite and therefore difficult or impossible to influence in order to increase growth.
- Infrastructure – the physical capital, such as machinery, roads, and increasingly, digital infrastructure, are key drivers of economic growth and an important role for the public industry cluster in the provision of public goods.
- Open information – is data that can support technological innovation and economic growth through the development of applications and services.
- Human Capital – which includes both growth in the overall population as well as the skills of that population.
- Financial capital – investment is integral to the ability of businesses to invest and grow.
- Policy – government policy, regulations, and institutions are also an important determinant of growth.
- Technology – is technological and an improvement through both innovation and adoption, which has the potential to increase productivity.

Unlocking growth therefore needs to focus activity on those enablers that have the greatest potential to grow SEQ's priority industries. For the purposes of the economic foundations paper, the high level enablers have been broken down into the categories described in the table below. These have been generated by reviewing the existing evidence base for these industry clusters as well as interviews with stakeholders in local and state government. As such, the enablers listed primarily relate to initiatives which can be implemented by government.

The key enablers highlighted in the economic foundations paper for each industry cluster are indicated in the table below. These are not designed to be an exhaustive list, rather they represent the views of stakeholders consulted in the development of the economic foundations paper.



Technology

Technology is a key determinant of productivity and an important enabler of innovation. It transforms the way of doing business, establishes new markets and demand, and changes consumer preferences. Technology can transform existing industries by making production faster, simpler and more efficient. The capacity of a region to enable technological change is a result of a combination of the enablers identified in this paper. The roll out of ETCS in SEQ is an example of implementing technology to enable more efficient passenger and freight movements. This initiative uses a combination of enablers as seen in the figure opposite, highlighting how initiatives are not often a single type of solution.

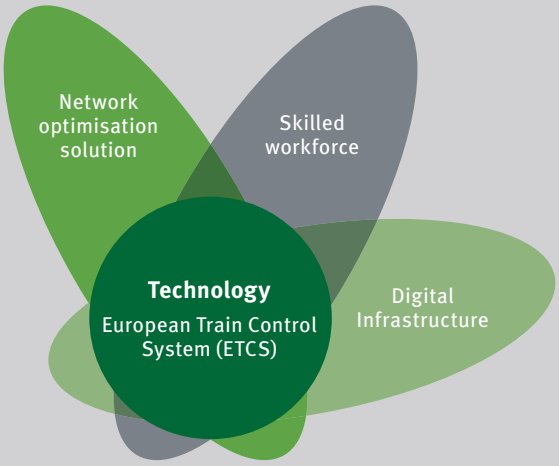


Figure 56 – ETCS an example of technology initiative
Source: CTT, Queensland Government

Land and natural resources	
Land supply	Land supply enables economic growth through residential and commercial development as well as corridor preservation for transport and utilities. Efficient management of land supply enables both new business and new workers to locate in the region, and stabilises market prices. Providing sufficient land is necessary to support the projected workforce population, ensuring supply and affordability of housing and connecting labour markets to employment. Importantly, development of land requires the land to be serviced by basic infrastructure which includes road, water, sewer, and communications. Strategic land supply enables industry co-location: a prerequisite for agglomeration. New transport infrastructure is often initially enabled by corridor preservation.

Infrastructure	
Utilities	Utilities are infrastructure services required to enable development or densification of land; these include water supply, sewerage and electricity. The provision of utilities enables new productive areas and consolidation growth. These infrastructure assets are necessary precursors for any development. In addition to supply of physical utilities, the cost of these services for commercial use is a determining factor when businesses are establishing or further expanding business operations in a given region.
Transport	Transport infrastructure includes road, rail (freight), public transport (rail, bus, light rail, ferry) and active transport (cyclist, pedestrian). Transport investment is fundamentally about improving efficiency, accessibility and safety. The direct impacts of the investment in transport include changes in journey times and reduced congestion for freight and labour force movements. The immediate outcome of the investment is to change the patterns of land uses, both commercial and residential (densification). Finally, together with transport investment itself, Finally, the impact on land uses combine with the transport investment will interact to create intermediate outcomes. These include: location choices, agglomeration, economic interactions between places, and effectively contributing to the competitiveness of places. These intermediate outcomes all contribute to an uplift in economic activity.
Network optimisation solutions	Network optimisation solutions are programs that specifically relate to physical infrastructure (e.g. transport and water). These investments can augment the existing network without duplicating or extending existing assets. Network management solutions are targeted at addressing a particular infrastructure problem through no, or low cost infrastructure interventions that either improve the capacity of, or demand for, the asset.
Digital	Digital infrastructure includes both mobile and fixed line internet connectivity. High speed internet digital infrastructure connects people and businesses to the information and business opportunities. Digital connectivity is the predecessor for any economic development; it is required for business, government, skills development and, equitable access to information and opportunity.

Information	
Open data	Sustainable, high-quality data is necessary for businesses, organisations, governments and members of society to build new business models, digial applications, plan better services and products and gain insights into how we live. Using data requires both privacy and openness and helps create trust. It is necessary that data is protected, kept private, just as it is necessary that it is openly published, open for everyone to use.

Human capital	
Skills	Skills programs enable employees to: undertake more complex and dynamic tasks, upskill in technological advancements, and obtain the skills required to service emerging industries. Investment in skills benefits the economy through improved productivity, engagement in higher value work and increased innovation. Skills investments may include workforce planning, skills programs for technological change, and leadership and strategic management. Leadership and strategic management skills for SMEs can assist in the transition to new business models, improve productivity and innovation, and highlight the value in investing more time into long-term planning. Technology uptake refers to businesses adopting new technologies which requires an appropriately skilled workforce. New technologies transform the way of doing business, create new markets and demand, result in changing consumer preferences and increase productivity. To manage supply of labour, and demand for labour, the appropriate skilling of future employees requires linkages between education institutions and industry.

Financial capital	
Investment and Financing	Investment is a key enabler for all industry clusters. Investment and financing includes access to finance, tax incentives, joint investment models, alternate financing, direct foreign investment and incentives for investment. Ensuring there are frameworks and mechanisms to support alternative funding, financing and investment improves businesses' accessibility to capital, particularly for research and development which drive innovation.

Policy	
Coordination and collaboration	Coordination and collaboration refers to the relationship between businesses within an industry cluster (business-to-business) and business to research and education institutions (business-to-research). Business-to-business collaboration can enable innovative solutions to be identified faster through pooled knowledge and experience. For example, with increasing the amount of data available, industries can collaborate to centrally pool data, to draw insights for the benefit of the entire industry. Alternatively, collaboration can include organisations coming together to establish good governance for their industry. For example, becoming more active in enabling growth across their industry. Business-to-research collaboration improves businesses' access to research facilities which can be achieved by business placement opportunities for researchers and structured collaboration models.
Government regulation	Government regulation is the set of rules and regulations that govern the conduct of business. Government regulation is an enabler of industry development when it is conducive to economic development: a sustained increase to productivity. Government regulation is important for the protection and management of natural assets, including agricultural land, national parks and water quality. Government policy and legislation regulate the use and development of land. Governments can use policy to enable economic growth by accelerating development through streamlined assessment processes. Governance frameworks have a key role in anticipating and shaping the delivery of emerging technologies and adapting to changing circumstances.
Promotion	Promotion is the marketing of the region and the industries to increase investment, sales and public awareness. Promotion communicates the benefits of the region to businesses, investors, and skilled workers looking to set-up, invest or move to the region. Effective promotion can negate public perception issues and attract skilled labour. Working together to undertake regional promotion helps develop and strengthen the priority industry cluster.

Source: CTT, Queensland Government

Innovation Hubs

Regions and cities are increasingly setting up knowledge precincts and hubs to encourage innovation through information sharing and cross-industry cluster collaboration. To establish these hubs requires a mix of enablers depending on the context. These include appropriate activity designations (land use policies), utilities, digital infrastructure and passenger connectivity.

Land use policies enable co-location of related industries to establish specialised precincts. These precincts enable growth of the traded industries if they are enabled in key locations, with fit-for-purpose spaces, that are well connected within the region. Co-location of like activities grows innovation by supporting interactions, sharing of facilities and exchange of expertise and knowledge. Co-location stimulates innovative activity through interactions, sharing of facilities and exchange of expertise and knowledge. Clustering of activities contributes to technology transfer, networking and information circulation.

In addition, government policy to reduce the administrative burden of creating a new firm, the regulatory protection of incumbents, and the complexity of regulatory procedures reduce barriers for new companies and encourage investment in new ideas, growing innovation.

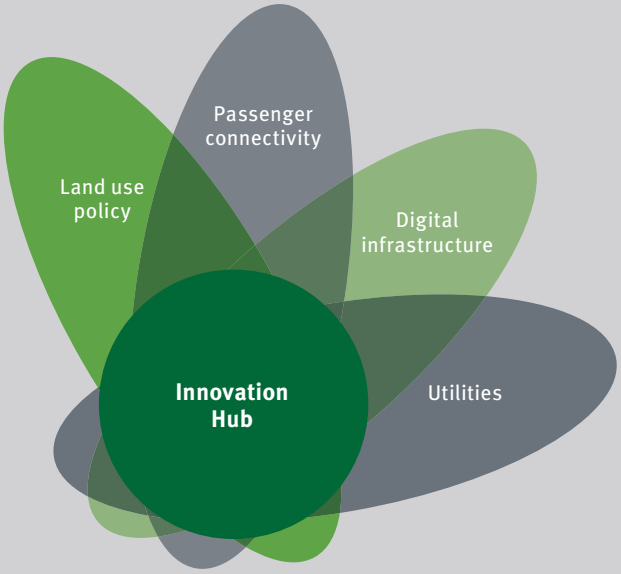


Figure 57 – Enablers for an innovation hub
Source: CTT, Queensland Government

Location of priority industry clusters

Understanding the location of key activities involved in the traded industry clusters and their supply chain links across SEQ is important to appreciate the potential role that infrastructure investment and other policy initiatives could play to support growth. The identification of key clusters and corridors to these activities has been informed by *ShapingSEQ* (which identifies 16 RECs across the region as well as key freight corridors) as well as consultation with government and industry. Whilst there are other areas of economic significance in the region, the areas identified below relate specifically to the priority industry clusters in the economic foundations paper, which include advanced manufacturing, agribusiness, traded health and education, transport and communications, and tourism and cultural.

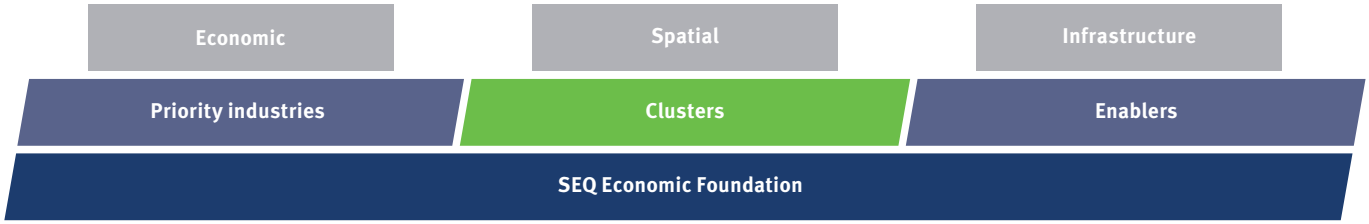
Regional economic clusters

Traded industry clusters have emerged within SEQ in areas that afford their businesses access to competitive advantage. This may be the result of a range of factors, including: access to a suitable labour market, appropriately zoned land in close proximity to enabling infrastructure (such as key freight routes and for export industries), a high level of accessibility to export gateways (such as airports and ports), among other factors. As these areas of economic activity have matured over time, they have attracted other related supporting industries and, in some cases, created specialised precincts.

These precincts occur as businesses benefit from the productivity improvements associated with co-location. This is often a result of reduced input costs (through supply chain efficiencies), access to shared labour markets, ease of doing business, and the knowledge that spillovers are associated with the close proximity related economic activity. Key clusters in the SEQ have been identified by triangulating cluster analysis with the RECs identified in *ShapingSEQ*, to determine areas of significance for the priority industry clusters.

The economic foundations paper seeks to spatially illustrate the clusters that are of greatest scale, value and potential to the traded industry clusters. These economic clusters include the following:

- Capital City;
- Australia Trade Coast;
- South West Industrial Corridor;
- Ipswich;
- Western Gateway;
- Pacific Motorway;
- Meadowbrook–Loganholme;
- Yatala–Stapylton– Beenleigh;
- Southport– Broadbeach;
- Strathpine-Brendale-Petrie; and
- Kawana.



Capital City

The Capital City area includes roughly the inner 5km of Brisbane; encompassing St Lucia, Herston and Dutton Park. Capital City is the largest concentration of knowledge-intensive industries, such as education, health, professional services, scientific and technical services, in the region and state. Notably, it is the region's key traded health and education cluster as it includes a number of major established education and health facilities, such as the Royal Brisbane and Women's Hospital, Princess Alexandra Hospital, Translational Research Institute, Boggo Road Ecosciences Precinct, Mater Hospital, Lady Cilento Children's Hospital, and campuses of the University of Queensland, Griffith University and Queensland University of Technology.

Advanced manufacturing, associated with research and health institutions, is also a key traded industry cluster in the area. For example, biomedical and pharmaceutical manufacturing benefit from co-location with health institutes through the sharing of knowledge, facilities and resources.

The Capital City is a key tourism and creative industry cluster with both significant cultural assets, accommodation and tourism services facilitating this activity.

Financial and professional services, whilst not a priority industry cluster, is a key enabler of activity within this area. Financial and professional services serves the five priority industry clusters within this economic foundations paper, providing a number of specialised services to businesses operating in these clusters.

Australia Trade Coast

Australia Trade Coast encompasses the Port of Brisbane, Brisbane Airport and Brisbane Intermodal Terminal, and is connected by the heavy rail network, Port of Brisbane Motorway and Gateway Motorway.

Enabled by this infrastructure, it has developed as a key location for transport and communication, advanced manufacturing, and agribusiness industry clusters, as they each derive significant benefits from being in close proximity to the major import and export hub.

South West Industrial Corridor

South West Industrial Corridor is centrally located within the region. It is a large industrial area serviced by the Acacia Ridge Intermodal Terminal, Ipswich Motorway, heavy rail network, Warrego Highway, Cunningham Highway and Logan Motorway. Advanced manufacturing and agribusiness are the primary traded industries within this cluster, dispersed across the large precinct. In addition, in Nathan / Coopers Plain located in the eastern part of the REC, there is a traded health and education cluster consisting of research, medical and educational institutions.

Ipswich

The Ipswich REC is included in the Western sub-regional directions in *ShapingSEQ*, positioned between SEQ's rural production area and metropolitan centre. It is serviced by a heavy rail network, Warrego Highway and Cunningham Highway. It is a key precinct for advanced manufacturing, traded health and education and agribusiness. Notably, this REC includes defence activity located at the RAAF Base Amberley. This type of activity is a key enabler of the advanced manufacturing industry cluster.

Western Gateway

Western Gateway is an important economic hub as it is a centre for western SEQ and western Queensland. It is a key import-export hub serviced by Brisbane West Wellcamp Airport, Intermodal Facility, a heavy rail network, Toowoomba Second Range Crossing, Gore Highway, Warrego Highway and New England Highway. Enabled by this infrastructure, it has developed as a key location for advanced manufacturing and transport and communication traded industry clusters.

Pacific Motorway

Pacific Motorway is a linear precinct developed along the enabling infrastructure, the Pacific Motorway and South East Busway. Advanced manufacturing is the key traded industry cluster within this area.

Meadowbrook–Loganholme

Meadowbrook–Loganholme is a precinct bounded by the Logan Motorway and Pacific Motorway. This precinct is serviced by passenger rail and includes the Logan Hospital, Griffith University Logan campus and TAFE Queensland, Logan campus. Traded health and education and advanced manufacturing are key traded industries within this precinct.

Yatala–Stapylton– Beenleigh

Yatala–Stapylton– Beenleigh is a large industrial cluster centred on the Pacific Motorway. Advanced manufacturing and agribusiness are key traded industries within this precinct.

Southport– Broadbeach

Southport–Broadbeach is the primary activity centre in southern SEQ. This precinct is serviced by light rail and heavy rail networks and is in close proximity to the Pacific Motorway. Traded health and education and advanced manufacturing are the key traded industries within the precinct.

Griffith University, Gold Coast campus, Gold Coast University Hospital, Queensland Academy for Health Sciences, Gold Coast Private Hospital are the institutions which enable the high concentration of traded health and education activity.

Strathpine-Brendale-Petrie

Strathpine-Brendale-Petrie is an emerging cluster for traded health and education with the establishment of the University of Sunshine Coast campus at Petrie. This precinct serviced by the heavy rail network and has direct arterial access to Gateway Motorway and Bruce Highway.

Kawana

Kawana is a traded health and industry cluster in northern SEQ. The Sunshine Coast University Hospital enables the high concentration of traded health and education activity.

The distribution of these economic clusters is highlighted in Figure 58.

SEQ Economic Clusters

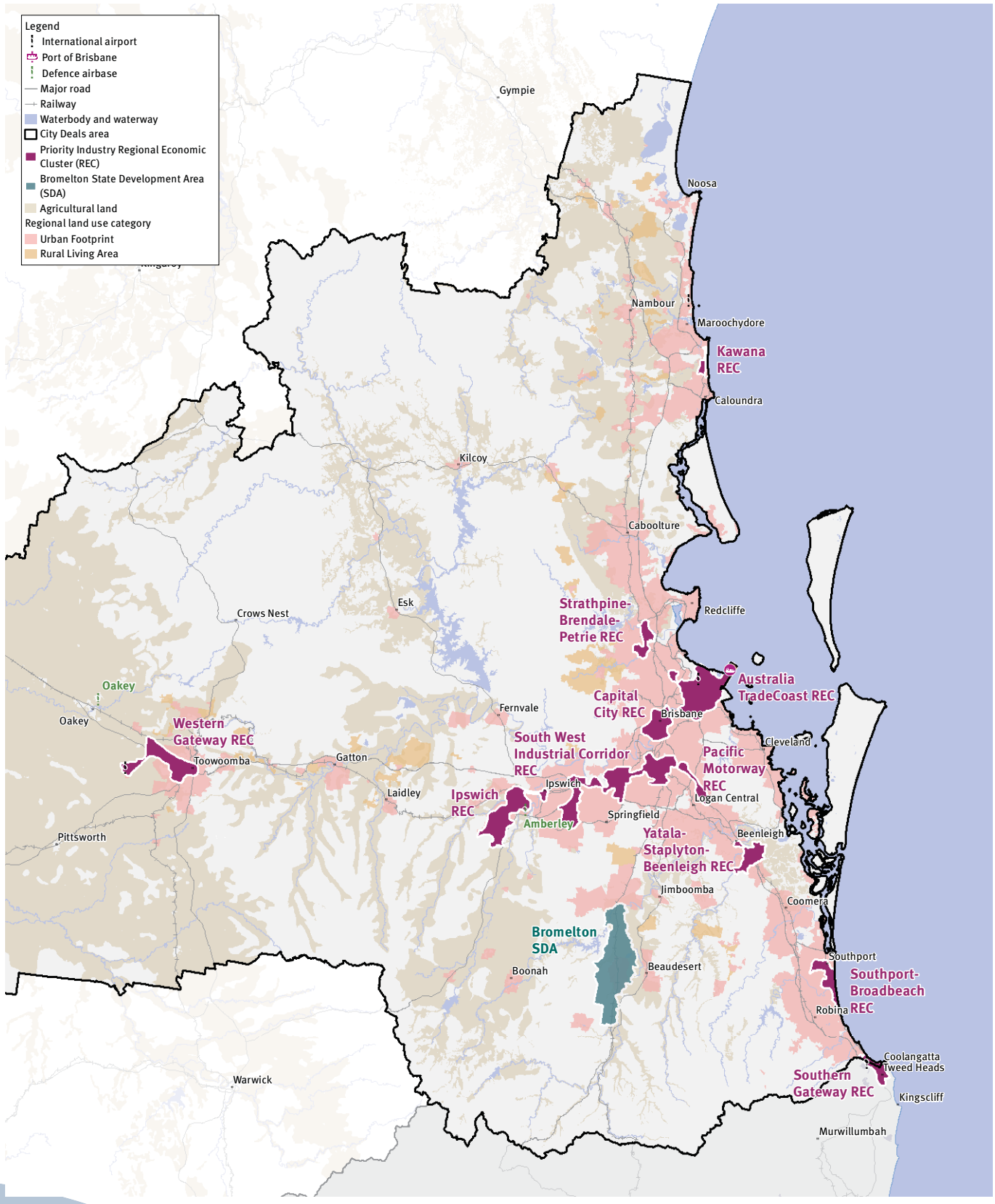


Figure 58 – SEQ Economic Clusters
Source: Regional and Spatial Planning, Queensland Government. September 2017

Urban growth fronts

Residential growth fronts have an important role ensuring that the traded industry clusters have continued access to labour markets. *ShapingSEQ* outlines that the region's future growth will be accommodated primarily in existing urban areas (60 percent) and secondly in expansion areas (40 percent). The future urban growth fronts include:

Expansion Area	Estimated dwelling take-up to 2041[103]
Coomera	8,000
Ripley	34,000
Springfield	24,100
Greater Flagstone/ Flinders	27,600
Park Ridge	23,300
Yarrabilba	15,750
Caboolture West	18,000
Southern Redland Bay	1,500
Beaudesert	1,800
Beerwah East	9,500
Caloundra South	16,750
Palmview	6,400
Westbrook	1,200
Total	**187,900**

Strategic planning to support growth

As the region continues to expand, both the economy and population, and the growing workforce needs to be accommodated and well connected to major employment areas. Growth fronts, together with key urban consolidation sites, are a critical consideration of the planning for transport infrastructure in connecting the future residential population of the region to economic activity centres.

The relationship between housing affordability and cost of transport to employment should be considered in developing a range of housing options for workers and their families. As the growth fronts are located well outside capital city areas, the gains in housing affordability may be offset by increased transport to work costs. In addition, the growth fronts may not offer the amenities and options for housing necessary to attract the range of knowledge workers required by the expanding economy.

Given the level of expansion anticipated in the growth fronts, careful planning and quality urban design is required to ensure the desired level of amenity of the areas is maintained. These are also necessary to ensure the social value of the region matches its growing economic value, to attract the knowledge workers needed to support the growing economy. Preserving the natural environment and amenity while allowing for significant population growth is a major challenge for the SEQ region.

To enable development in these growth fronts, investment in catalytic infrastructure is required, including road, water, sewer, and communications. Water supply and sewerage projects are investments which will unlock the development potential of land to support residential growth. Transport networks play a regionally significant role by connecting the residential population to economic precincts and key labour markets. As growth fronts are located on the fringe of urban areas, strategic investment in these emerging residential areas is particularly important, as they often require significant upfront works to enable residential development. The initial investment in these assets creates an environment that attracts ongoing, market-led private industry cluster investment and provides the capacity for future expansions.

[103] *Department of Infrastructure, Local Government and Planning, 2017, ShapingSEQ Background Paper 1: Grow. Figures for Park Ridge, Springfield and Palmview are estimates based on applying local government wide take-up rates to SEQ Broadhectare study capacity for the selected areas for the period 2013 to 2041.*

SEQ Residential Growth Fronts

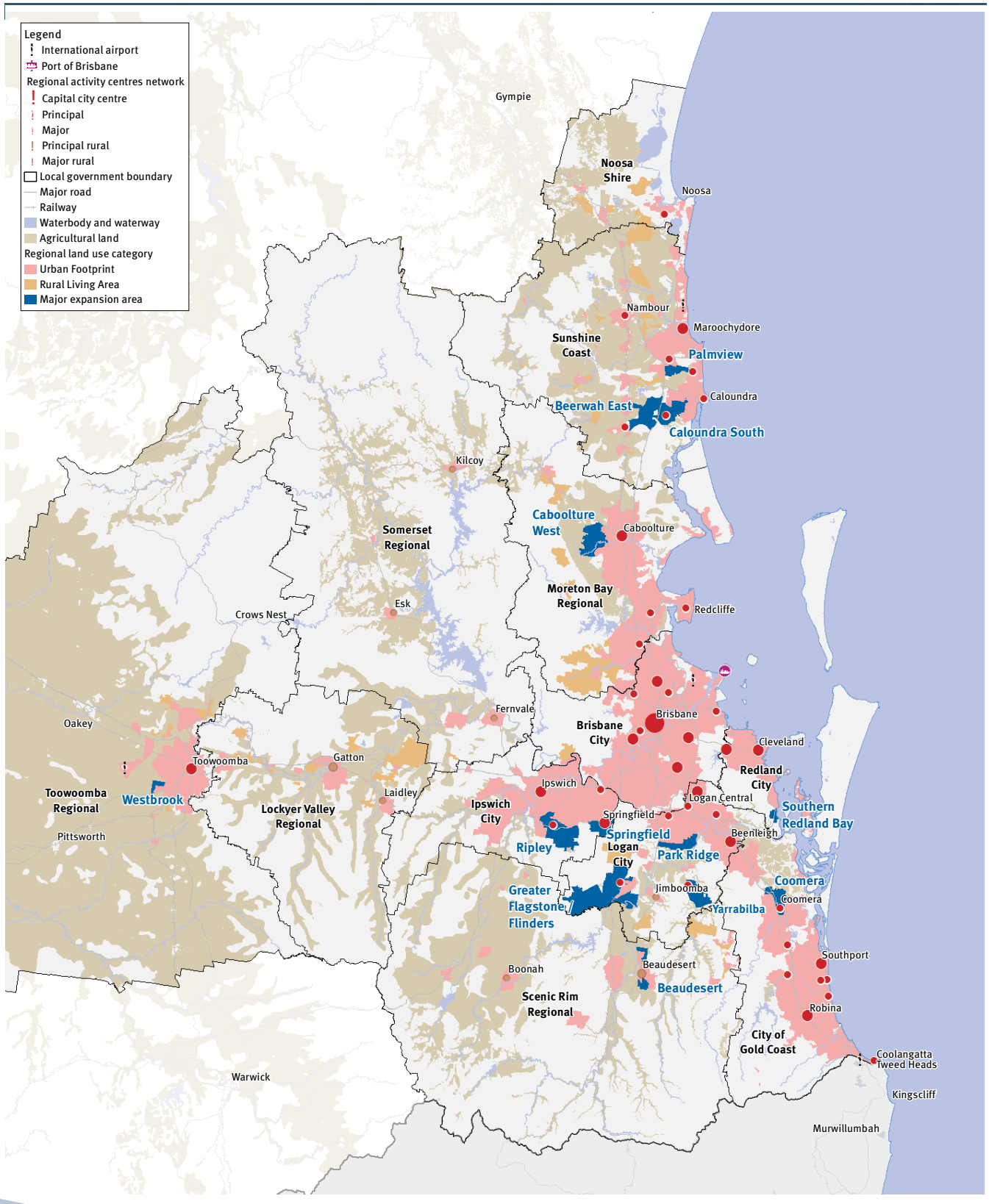


Figure 59 – SEQ Residential Growth Fronts
Source: Regional and Spatial Planning, Queensland Government. September 2017

SEQ Economic Foundation

The SEQ Economic Foundation draws together priority industries, the spatial location of key clusters, and key enabling infrastructure (e.g export gateways and transport corridors). The SEQ Economic Foundation identifies key economic corridors that serve as both key inter-regional and cross-regional corridors for passengers and freight. These have been identified on the basis of their capacity to link key economic clusters with one another, urban growth areas and the key export gateways for the region. These include:

- East-West Corridor;
- Capital City Knowledge Corridor;
- South Corridor;
- North Corridor; and
- South-West Corridor.

Corridors are the critical link that bring key areas of economic activity closer together, as well as efficiently linking productive precincts and clusters with key trade gateways (i.e. the Port of Brisbane or key airports across the region). Major infrastructure investment in rail and road has established corridors to enable the efficient movement of people and goods through the region.

Industry has located along these corridors to leverage the efficient freight access and achieve reduced transport input costs. SEQ freight corridors, intermodal precincts, air and sea ports connect industries to export opportunities, support inbound investment, underpin productivity, and support the competitiveness of the region's priority industry clusters.

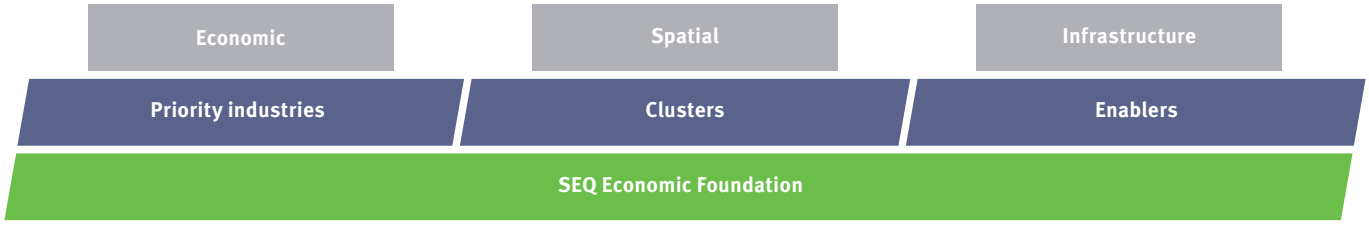
The regional movement of goods and services is central to the success of advanced manufacturing, agribusiness, and transport and communications. Notably, corridors are the key enabler for transport and communications activity which is dispersed across clusters within the region. The transport network is radial in nature, focused on the Capital City, and extending outward along strategic transport corridors to SEQ's economic hubs and beyond, connecting the region to activity throughout Queensland, Australia and international markets.

At a local level, corridor connections between and within health and knowledge precincts and tourist destinations are important for the operation of these precincts but are not drawn out through the regional lens of this report.

The corridors in SEQ highlight the significance of the Capital City and Australia Trade Coast RECs through their location at the cross-roads of all four corridors and their connection to the region's largest export gateways. On this basis, initiatives that effectively link these corridors and the Capital City to the Australia Trade Coast will be of regional economic importance.

Similarly, the economic foundation map highlights the importance of better linking the key economic clusters and growth fronts along the length of each of the corridors. This is critical to ensuring that the businesses driving SEQ's economic growth have access to the greatest pools of labour to support this growth. Similarly, it is critical to ensuring that residents across the region can readily access a broad range of employment opportunities within an acceptable travel time. The importance of this connectivity has been highlighted through *ShapingSEQ*, with analysis on each of the large RECs highlighting the importance of travel time to work as a key determinant of employment location and choice. On this basis, initiatives that effectively unlock new capacity in growth fronts and economic clusters will be of sub-regional importance. When unlocking growth, it is necessary to be cognisant of connecting residents and jobs. Similarly, initiatives that better link growth fronts with key employment locations (whether physically or digitally) will be of regional economic importance.

Key relationships between the clusters and growth fronts across each of the corridors are detailed in the table for each corridor. In addition to these relationships, it will also be critical for any investment framework to consider how investments in consolidation development are strategically unlocked and delivered to support employment accessibility.



East – West Corridor

The east-west corridor is one of the most significant freight routes for the region and to this end, freight productivity and minimisation of passenger / freight conflicts along the corridor is critical.

The corridor includes a road freight, rail freight and a future rail freight (Inland Rail) networks. The corridor is bookended by two export gateways: Wellcamp Airport to the west and the Port of Brisbane and Brisbane Airport in the east. This corridor is dominated by freight movements but also supports passenger connectivity, currently primarily by private vehicles. Recent infrastructure investments in this corridor include the Toowoomba Second Range Crossing and the Melbourne to Brisbane Inland Rail.

The east-west corridor is the primary supply chain corridor in SEQ for agriculture, agribusiness, transport and communications and resources. It links the rural production areas of SEQ to the Australia Trade Coast and Western Gateway. More broadly, it is a key link for regional Queensland and interstate freight.

The corridor also has several key clusters of co-located growth fronts and economic activities, including the Westbrook growth front with the Western Gateway Cluster and nearby Swartz Barracks (Oakey), as well as the Ripley and Springfield growth fronts with the Inner-West cluster of activities and the RAAF Base (Amberley).

Regional Economic Clusters

- Australia Trade Coast
- South west industrial corridor
- Ipswich
- Western Gateway

Urban Growth Fronts

- Ripley
- Springfield
- Westbrook
- Under-Utilised Urban Footprint

- ✓ Connecting agribusiness and advanced manufacturing outputs to export gateways.
- ✓ Gateway to wider western Qld, NSW and Victoria along national freight corridors.
- ✓ Efficient linkages between export gateways will grow priority industries.

Capital City Knowledge Corridor

The Capital City Knowledge Corridor is the state's and region's most significant concentration of economic activity. It is the primary employment centre and the largest agglomeration of knowledge-intensive industries.

This corridor includes roughly the first five kilometres of the Brisbane Central Business District (CBD). The corridor includes traded health and education, tourism and creative and financial and professional services which supports and is supported by the five priority industry clusters in SEQ.

Achieving high-quality urban amenity and greater levels of accessibility is central to the development of this dense urban cluster. The existing knowledge and technology precincts provide opportunity for complementary development to build on the current high-level health, education and research activities. Growth of these precincts will be complemented by additional consolidation housing development, locating workers and students near work and education centres.

Tourism and creative activity will continue to grow in the cluster with the development of accommodation and cultural assets, strengthening the cluster as a key anchor for tourism in the region.

The movement of people to the Capital City Knowledge Corridor is facilitated by a radially-based heavy rail network and dedicated busway connections. Creation of more efficient linkages within the corridor, between the precincts will enable increased economic activity. Improved passenger movements within the corridor will be facilitated by both active and public transport.

Regional Economic Clusters

- Capital city

Urban Growth Fronts

- Under-Utilised Urban Footprint

- ✓ Largest agglomeration of knowledge-intensive industries.
- ✓ Opportunity for increased innovation through improved collaboration between research and business.
- ✓ Efficient linkages between knowledge precincts to facilitate ongoing growth.

South Corridor

The south corridor is a key passenger commuter route, while also providing a coastal freight route between Queensland and New South Wales. It links many economic clusters to the south of the Capital City with the large residential populations of Brisbane, Logan and the Gold Coast.

The corridor services a diverse range of industry clusters with the emergence of key traded service industry clusters (including tourism and creative and traded health and education) of critical importance to the growth of the Southern Centre. Similarly, the advanced manufacturing, traded health and education and agribusiness industry clusters are of importance to the growth of the Inner-South cluster. The diversity of these growth opportunities will be critical to the skill requirements of workers along this corridor.

Key co-located clusters and growth-fronts include the importance of the Inner-South cluster to the Southern-Redland Bay and Yarrabilba growth fronts, as well as continuing connections into the Capital City. Similarly, the Coomera growth front and the large residential population of the Gold Coast will be reliant on the growth in the Southern Gateway cluster to support employment opportunity.

This corridor is a key freight corridor for activity between the Logan and Gold Coast local government areas. The South corridor also links SEQ to northern NSW and south-eastern Australia.

This corridor is established around the existing road freight corridor, the Pacific Highway. It is also supported by the passenger rail corridor from Brisbane to Robina, which links to the Gold Coast light rail network enabling the movement of people between Gold Coast precincts.

Regional Economic Clusters

- Pacific Motorway
- Meadowbrook-Loganholme
- Yatala Stapylton-Beenleigh
- Southport-Broadbeach
- Robina Varsity Lakes
- Southern Gateway

Urban Growth Fronts

- Southern Redland Bay
- Yarrabilba
- Coomera
- Under-Utilised Urban Footprint

- ✓ Connecting key labour markets to employment through established public transport networks.
- ✓ Corridor interspersed with transport and communications, and advanced manufacturing industries.
- ✓ Opportunities for increased collaboration to foster innovation in southern knowledge precincts.

North Corridor

The north corridor is a key passenger and local freight transport corridor, linking the rapidly growing regions of Moreton Bay and the Sunshine Coast with key employment opportunities along the length of the corridor and through to the Capital City. The corridor also provides a freight route linking central and coastal Queensland centres with the Australia Trade Coast and the export gateways at the Port of Brisbane and Brisbane Airport.

Traded health and education is a key employment industry cluster along the corridor, with the growth of the Sunshine Coast University Hospital and the Petrie Mill University providing opportunities for employment growth. Similarly, considerations around the connecting of residents to employment opportunities in the tourism and creative industry cluster in the Northern Centre as well as the advanced manufacturing industry cluster in the Inner-North will be important to ensure that these locations can access the skills and workers that they require to grow.

The north corridor is key to the agribusiness, agriculture and transport and communications traded industries. This corridor links northern SEQ and Queensland with the Port of Brisbane and Brisbane Airport. This corridor allows for the movement of tourists to and from the Sunshine Coast tourism and cultural industry clusters, linking destinations within SEQ and airports. The RECs are not serviced by the heavy freight rail network but are in close proximity to the major road freight corridor, the Bruce Highway.

The corridor includes a number of large growth fronts, including Caloundra South, Beerwah East and Palmview, all of which are located in close proximity to the Northern Centre. Considerations for how the Caboolture West growth front is effectively linked to the inner-north and other key employment clusters along the corridor will be critical in the future.

Regional Economic Clusters

- Strathpine-Brendale
- North Lakes-Mango Hill
- Kawana
- Northern Gateway

Urban Growth Fronts

- Caloundra South
- Beerwah East
- Palmview
- Caboolture West
- Under-Utilised Urban Footprint

- ✓ Opportunities to improve passenger connectivity to emerging traded health and education clusters.
- ✓ Connecting key tourism destinations and airports.
- ✓ Urban growth fronts provide new labour pools to grow priority industries.

South-West Corridor

The south-west corridor is an emerging corridor that has traditionally serviced key freight linkages into New South Wales. Following the construction of the inland rail project and its connection to the growing Bromelton State Development Area, this corridor has the opportunity to emerge as a significant economic area.

The corridor is characterised by the expansion of growth fronts and economic activity along the Mount Lindesay Highway and the parallel standard rail gauge line between Brisbane and Sydney. The importance of the economic growth of this corridor is highlighted not only by the emerging capacity constraints on industrial land in the inner-west (and therefore the importance of the SDA), but also through the scale of residential development planned for Greater Flagstone, Park Ridge and Beaudesert growth fronts.

The transport and communications and advanced manufacturing industry clusters will be key employers along this corridor into the future and this will drive key considerations for workforce planning.

Regional Economic Clusters

- Bromelton State Development Area (potential future REC)

Urban Growth Fronts

- Greater Flagstone
- Beaudesert
- Park Ridge
- Under-utilised urban footprint

- ✓ Emerging transport and communications cluster centred on the Bromelton State Development Area.
- ✓ Inland Rail provides opportunities to grow priority industries.
- ✓ Opportunity to connect growth fronts to emerging industry cluster areas.

The distribution of these economic corridors relative to the economic clusters is highlighted in Figure 60.

SEQ Economic Foundation – SEQ Region

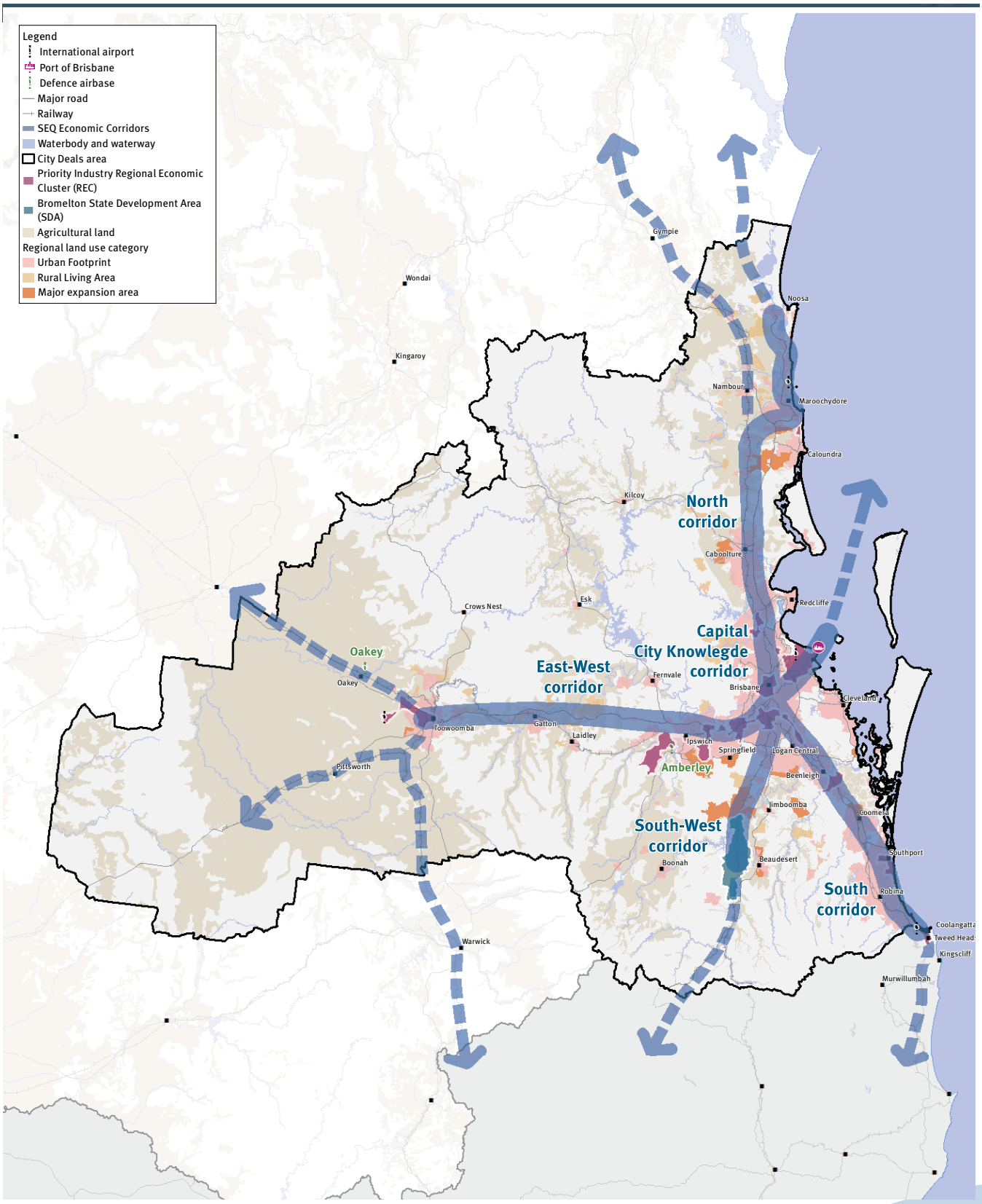


Figure 60 – SEQ Economic Foundation – SEQ Region

Source: Regional and Spatial Planning, Queensland Government. September 2017

SEQ Economic Foundation – Capital City Knowledge Corridor

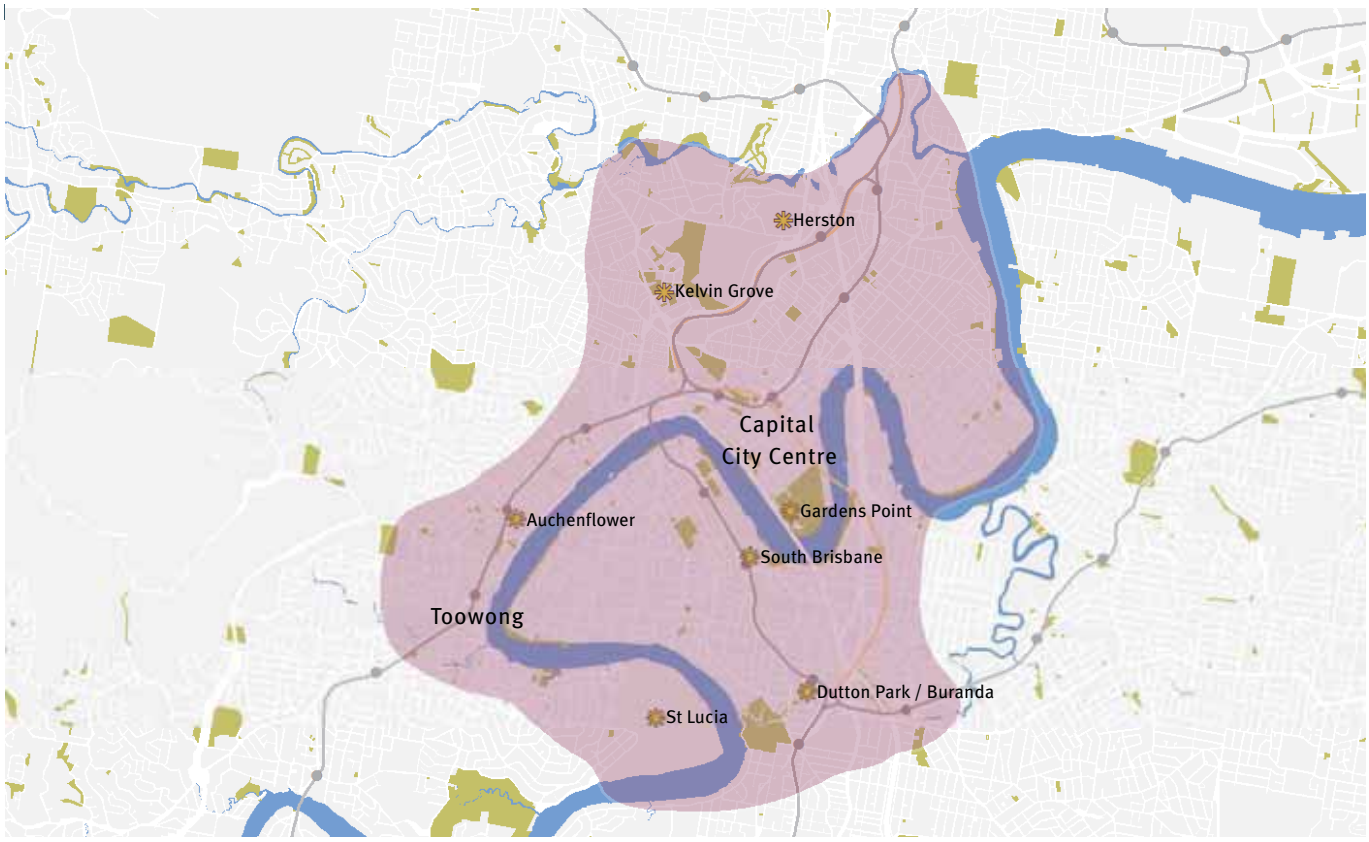


Figure 61 – SEQ Economic Foundation – Capital City Knowledge Corridor
Source: Regional and Spatial Planning, Queensland Government. September 2017

SEQ Economic Foundation – SEQ Urban Extent

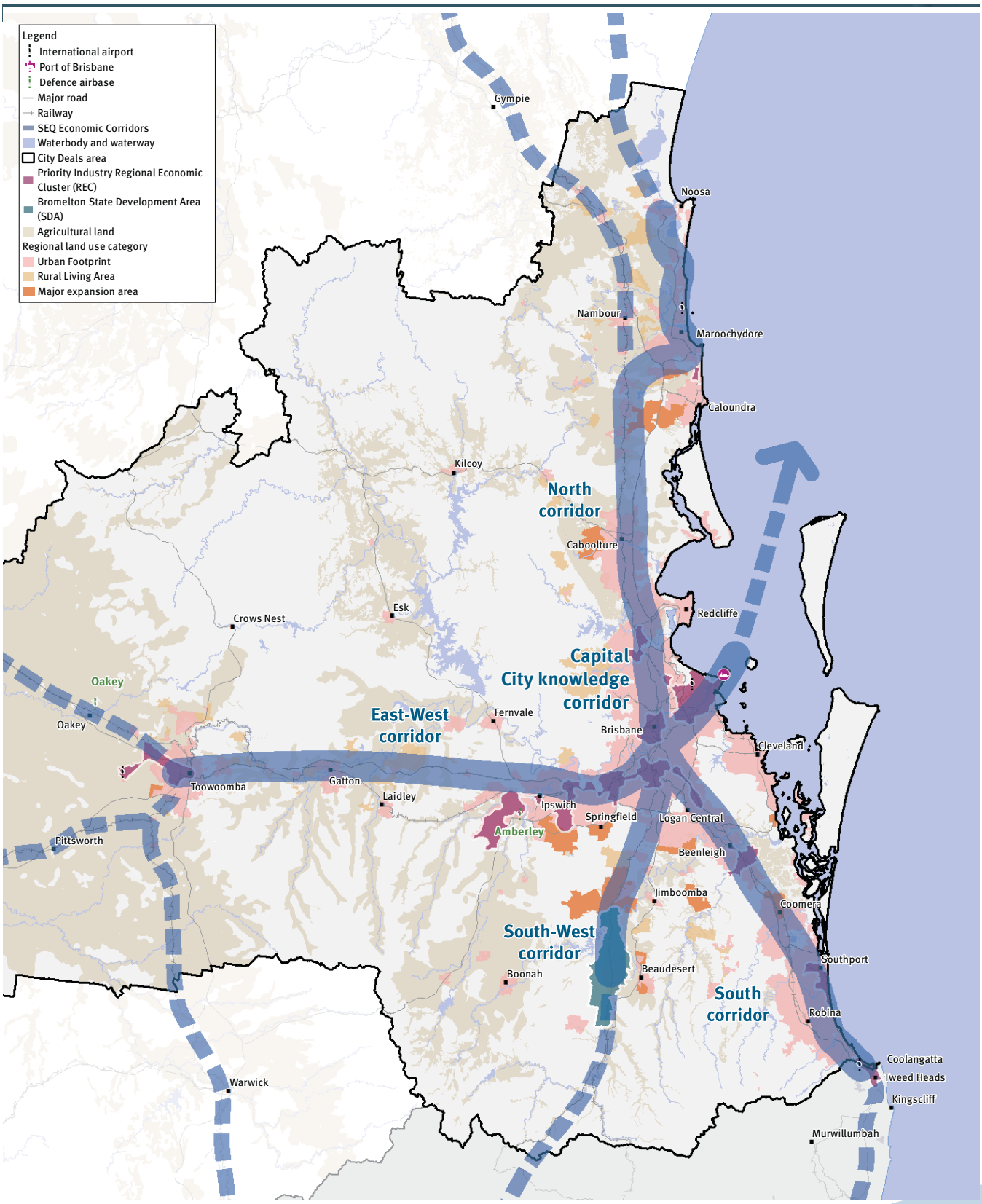


Figure 62 – SEQ Economic Foundation – SEQ Urban Extent
Source: Regional and Spatial Planning, Queensland Government. September 2017

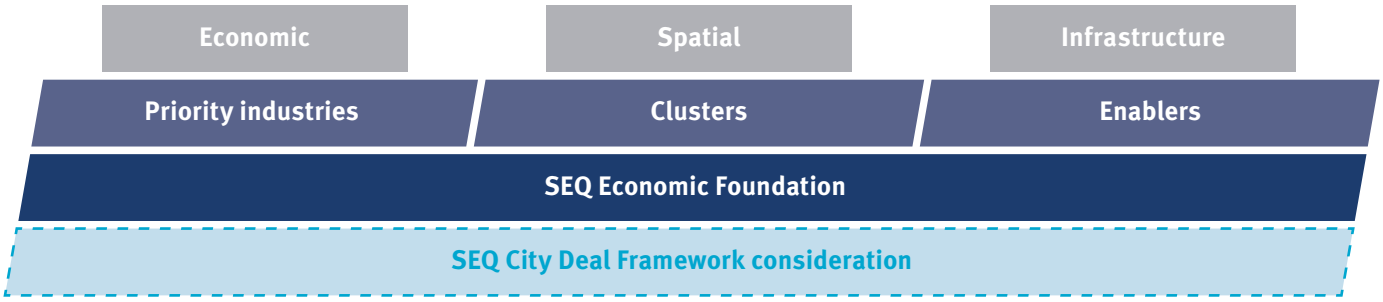
Informing the SEQ City Deal framework

The SEQ economic foundations paper has identified both the industry clusters with the potential to drive the economic growth to which the region's leaders aspire, as well as the key spatial locations and enablers that will be critical to realising this growth. These insights will be valuable to both an overarching narrative for the region's economic future, as well as providing the foundations for an investment framework for the region.

This investment framework has been identified as a priority input for the development of an SEQ City Deal for the region. The parameters of the City Deal are currently being negotiated between all three tiers of government (local, state and commonwealth) and will ultimately culminate in a joint agreement on a series of investments and initiatives for the region. Accordingly, it is important that the inputs from all tiers of government that have informed the development of this economic foundations paper are reflected in the investment framework and ultimately the City Deal.

The spatial insights from the foundations paper will be of relevance to the design of sub-regional scale investments across SEQ. As identified in the figure below, the Deal will likely consist of:

- **Regional initiatives** that have a transformative impact across SEQ, rather than a single corridor or location. Examples of the potential scale of these projects include Inland Rail, Cross River Rail, the Resilient Rivers Initiative or a regional housing investment program.
- **Sub-regional initiatives** that have an emphasis on improving the connection or capacity of a key corridor or cluster of locations. Examples of the potential scale of these projects include key public transport links or trunk infrastructure extensions to unlock residential growth fronts.
- **Place-making initiatives** that improve a location or precinct. Examples of the potential scale of these projects include the Commonwealth financing contribution toward the Petrie Mill university campus or key transit oriented development and local amenity improvement investments.



Regional initiatives

Sub-regional initiatives

	East-West Corridor	Capital City Knowledge Corridor	South Corridor	South-West Corridor	North Corridor
Regional Economic Clusters	• Australia Trade Coast • South west industrial corridor • Ipswich • Western Gateway	• Capital City	• Pacific Motorway • Meadowbrook-Loganholme • Yatala Stapylton-Beenleigh • Southport-Broadbeach • Robina Varsity Lakes • Southern Gateway	• Bromelton SDA	• Strathpine-Brendale-Petrie • North Lakes-Mango Hill • Kawana • Northern Gateway
Urban Growth Fronts	• Ripley • Springfield • Westbrook • Under-Utilised Urban Footprint		• Southern Redland Bay • Yarrabilba • Coomera • Under-Utilised Urban Footprint	• Greater Flagstone • Beaudesert • Park Ridge • Under-Utilised Urban Footprint	• Caloundra South • Beerwah East • Palmview • Caboolture West • Under-Utilised Urban Footprint

Place making initiatives

Figure 63 – SEQ clusters, corridors and growth fronts that will underpin regional growth
Source: CTT, Queensland Government

Figure 61 demonstrates how the corridors, clusters and urban growth fronts identified through the economic foundations paper provide a potential organising frame for the consideration of sub-regional initiatives.

The SEQ City Deal framework will require further design parameters to determine how individual projects or programs align to and enable economic activity in these locations. This will require detailed consideration of the scale of the projects and their alignment to key enablers for industry development across the region. This work is ongoing and will be presented separately during the development of the SEQ City Deal.

Appendix A: List of stakeholders

Local Government

- Brisbane City Council
- Gold Coast City Council
- Ipswich City Council
- Lockyer Valley Regional Council
- Logan City Council
- Moreton Bay Regional Council
- Redland City Council
- Scenic Rim Regional Council
- Somerset Regional Council
- Sunshine Coast City Council
- Toowoomba Regional Council
- Council of Mayors (SEQ)

State Government Departments*

- Department of Agriculture and Fisheries
- Department of Education and Training
- Department of Infrastructure Local Government and Planning
- Department of Science, Information Technology and Innovation
- Department of State Development
- Department of the Premier and Cabinet
- Department of Tourism, Major Events and Small Business and the Commonwealth Games
- Department of Transport and Main Roads
- Queensland Treasury
- Trade and Investment Queensland

Commonwealth Government

- PM&C, Commonwealth Government

Queensland Government Cities Advisory Panel

- Prof Greg Clark CBE, Global Advisor on City Development (The Business of Cities)
- Geoff Roberts (Deputy Chief Commissioner and Economics Commissioner, Greater Sydney Commission)

* Under the former Queensland State Government the CTT, as part of the former Department of Infrastructure, Local Government and Planning, engaged with the State Government Departments included in Appendix A. Following the State Election in November 2017 there were a number of Departmental adjustments through Machinery of Government changes. As the SEQ City Deal continues to progress the CTT will continue to engage with relevant government agencies.

Appendix B – References

Delgado, M., Porter, M. E., & Stern, S. (2014). *Defining Clusters of Related Industries*. Cambridge: National Bureau of Economic Research.

Porter, E. M. (1990). The Competitive Advantage of Nations. New York: The Free Press.

Porter, E. M. (2003, August/October). The Economic Performance of Regions. *Regional Studies* (37.6&7), 549-578.

Porter, M. E. (1998, November/December). Clusters and the New Economics of Competition. *Harard Bussines Review*, 77-90.

Image credits

Images courtesy of Tourism and Events Queensland/Jason Charles Hill

Location	Page
Natural landscape, Scenic Rim	54
Koala, Queensland	58

Images courtesy of Tourism and Events Queensland

Location	Page
Movieworld, Gold Coast	103

Images courtesy of Port of Brisbane Pty Ltd

Location	Page
Aerial of Port of Brisbane	71

Images courtesy of Ben Vos Productions

Location	Page
QIMR Berghofer Medical Research Institute, Brisbane	Cover
Volunteer Surf Life Savers, Noosa Main Beach, Noosa Heads	10
Redcliffe, Moreton Bay	16
State Disaster Coordination Centre, Brisbane	18
Active lifestyle, Brisbane River	20
Tourism and technology, Holoverse, Gold Coast	30
Kitefest, Redcliffe, Moreton Bay	33
Sir Leo Hielscher Bridges, Gateway Motorway, Brisbane	34
QUT Robotics, Brisbane	43
QIMR Berghofer Medical Research Institute, Brisbane	44
Kirra Beach, Gold Coast	46
Transport, Brisbane	49
Innovation Centre, Sunshine Coast	53
Evolve Skateboards, Gold Coast	62
Roadworks, Kawana Waters, Sunshine Coast	101
Festival of Lights, Gold Coast	105

Queensland Government

Level 12, 1 William Street
Brisbane Qld 4000
tel 13 QGOV (13 74 68)

www.qld.gov.au

ISBN 978-0-9875431-1-0