Flinders University
Australian Industrial Transformation Institute

Economic Activation of Precincts

City of Marion

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Australian Industrial Transformation Institute

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Key findings

- The Edwardstown Industrial Precinct in the City of Marion is home to more than 3,100 businesses, operating in over 300 industries. Its prominent location along the South Road corridor and nearby public transport are ideal for industrial development and transformation.
- While Retail and Food Services are the largest employing industries in Edwardstown, an analysis of the relative strength of the region's industries reveals the importance of Library and Information Services, Manufacturing; including clothing, furniture, transport equipment and fabricated metal products, and Professional, Scientific and Technical Services as sources of employment in the precinct.
- Strong clusters of businesses exist within the precinct, especially among manufacturing businesses, providing an opportunity for increased business collaboration.
- The Edwardstown Precinct is one of the most diversified regions in Australia. Of the 105 industries analysed, Edwardstown has an Industrial Comparative Advantage in 41 industries. This places Edwardstown in the top 50 of more than 2,000 regions for industrial diversity.
- Industry development and diversification opportunities for Edwardstown exist in many industries, notably Machinery and Equipment Manufacturing and Fabricated Metal Product Manufacturing.
- The City of Marion should prioritise improving the capabilities of the existing manufacturing industries in the Edwardstown precinct to take advantage of digital technologies and Industry 4.0 in light of the State Government's state growth agenda and focus on the high tech sector.
- 366 products are identified as opportunities for Edwardstown businesses to manufacture. These products are highly complex and share the industrial capabilities in which Edwardstown is strong.
- 156 of the products identified have experienced a strong five year growth in global demand and are opportunities for businesses in Edwardstown to begin or expand their export capabilities.

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1 Introduction

1.1 Background

The Cities of Marion, Charles Sturt and Holdfast Bay have commenced a project to help activate and revitalise the industry and employment precincts of Edwardstown, Charles Sturt and Somerton Park. The project aims to increase the three precincts' competitiveness through fostering innovation and employment growth, and by identifying and developing unique business development opportunities for each precinct.

This research report focusses on the Edwardstown Employment Precinct, identifying the precinct's skills, strengths and sectors and determining a pathway forward that takes advantage of growth industries identified through economic analyses and supported by government policy and plans.

The unfolding COVID-19 pandemic will have significant impacts on the productivity, economic viability and future focus of many sectors of the economy, including manufacturing, retail, and wholesale trade. Product opportunities and export priorities are likely to change according to altered global demand with impacts likely within most supply chains and across many sectors.

1.2 Strategic landscape

The Hon Steven Joyce's *Review of the South Australian Government's International and Interstate Engagement Bodies and Functions* (Joyce 2019) aimed to assist the South Australian Government to achieve its goal of lifting economic activity in South Australia and increasing the state's prosperity. The review impressed that identifying and accelerating the growth of sectors that have global appeal and in which the state has comparative advantage will build the future prosperity of South Australia. It recommended as an initial step, the definition of potential growth sectors that should be the focal point for the State Government over the next five to ten years. Nine sectors were identified through this process as having significant export growth potential and growth plans are under development for:

- Creative industries,
- Defence industry,
- Energy and mining,
- Food, wine and agribusiness,
- Health and medical industries,
- High-tech,
- International education,
- Space industry,
- Tourism.

The South Australian Government Chief Scientist developed the *Excite Strategy* to support the recommendations from the Hon Steven Joyce's review. The Chief Scientist identified innovation precincts and neighbourhoods as key 'Enablers of Collaboration' to support the growth of the Science, Technology, Engineering, Maths and Medicine (STEMM) Research and Innovation value chain (McMillen, 2019). The value chain comprises knowledge creation, knowledge transfer and knowledge application and requires key enablers in order to successfully deliver economic and non-economic outcomes. Innovation precincts, characterised by an agglomeration of industry, research and education activities, provide a mechanism for building partnerships and entrepreneurism, assisting local businesses to improve competitiveness, productivity and

innovative capacity (Department of Industry, Science, Energy and Resources, 2019). These unique environments, enabling the exchange of research knowledge, industry experience and business opportunity, help to translate innovation into high value, sustainable growth industries which underpin the economy.

The South Australian government has implemented policies focusing on key industry sector development, through the state sector growth plans, and the development of a business environment conducive to entrepreneurialism, through the Future Industries Exchange for Entrepreneurship (FIXE) hub.

1.3 Precinct success factors

Innovation precincts are clusters of industry, research and education activity in a specific geographic area (Department of Industry, 2019). They bring together leading institutions and companies, clustering start-ups, business incubators and accelerators in a physically compact, transit-accessible area. Precincts also are technically connected and combine mixed-use housing, office and retail environments (Wagner, Katz, & Osha, 2019).

Innovation precincts are a key source of economic productivity growth - a key determinant of a regions living standards (Baily & Montalbano, 2018). Their strength lies in their complexity, and integration of previously separated leaders, disciplines, investors and researchers (Wagner et al., 2019). Geographic clustering of firms and researchers has been extensively studied in economic development literature, revealing its value in terms of innovation, efficiency and productivity (Baily & Montalbano, 2018). The integration of and interaction between economic, physical and networking assets is what sustains and grows an innovation precinct (Baily & Montalbano, 2018). The economic assets include high value research sectors, creative industries, incubators, accelerators and training facilities. Physical assets relate to office buildings, lab spaces, retail outlets and parks, while the networking assets are the meetings, workshops and informal interactions that occur between precinct players (Baily & Montalbano, 2018). Separately, these assets are unable to support an innovation district, but together they provide a powerful platform for innovation and economic productivity (Baily & Montalbano, 2018).

The Silicon Valley high-tech precinct, backed by US Department of Defense funding in the 1950s, adopted a culture of collaboration by integrating research institutions, government funding, private sector investment and high-skilled workers to create a hub of innovation and entrepreneurship (Baily & Montalbano, 2018). The result is a highly innovative and economically productive precinct that, in 2016, contributed $722 billion to United States GDP (Baily & Montalbano, 2018).

Following the decline of the iron and steel industry in Pittsburgh, Pennsylvania, the Pittsburgh precinct realigned its charter with the strengths of the University of Pittsburgh and Carnegie Mellon University – information technology - focussing its efforts on biotech, pharmaceuticals and information technology (Baily & Montalbano, 2018). The positioning of the Pittsburgh precinct within the fast-growing health care sector, strong links with education and research institutions, and federal and state government funding lead to its success – contributing $138 billion to US GDP in 2016 (Baily & Montalbano, 2018).

Local leadership is critical to the success of an innovation precinct (Department of Industry, 2019). A successful precinct is one that builds on existing competitive strengths and comparative advantage. It utilises local skills and expertise through building collaborative relationships with likeminded industry partners and engages with research institutions and skills providers to ensure industry and community needs are addressed (Department of Industry, 2019).

Three of the key precinct success factors – Research and educational institutions; Collaboration with local partners; and Governance and investment – are discussed in more detail in the following sections.

1.3.1 Research and educational institutions

Collaboration with researchers and educational institutions is pivotal to the success of innovation precincts (Department of Industry, 2019). Collaborative partnerships support entrepreneurs and start-ups to establish and succeed, whilst also enabling established businesses to innovate and improve competitiveness and productivity (Department of Industry, 2019).

The Tonsley Innovation Precinct in the City of Marion, home to Flinders University and TAFE SA, is a hub of innovation and the nexus between research, vocational education and industry in South Australia.

> *"Tonsley brings together leading-edge research and education institutions, established businesses and start-ups, business incubators and accelerators as well as government and the wider community to connect and collaborate in Australia's leading innovation district."*[1]

The Tonsley Innovation Precinct focusses on four sectors that reflect South Australia's major economic strengths and opportunities – Health, medical devices and assistive technologies; Cleantech and renewable energy; Automation, software and simulation; Mining and energy services. The breadth of these focus sectors provides a wealth of knowledge sharing and collaboration opportunities that can support the reactivation of the Edwardstown Precinct.

1.3.2 Collaboration with local partners

Collaboration with local partners is essential for building a critical mass within a successful innovation precinct. Potential local partners include start-ups, small and medium enterprises (SMEs), large firms, researchers, specialised suppliers and international companies (Department of Industry, 2019). The ability to build on local strengths and common interests, to utilise complementary resources, and to share knowledge and technology enable an innovation precinct to compete and advance in competitive economies both locally and globally.

1.3.3 Governance and investment

Appropriate governance arrangements and organisational structure will provide a solid framework in which an innovation precinct can thrive. Coupled with this is the need for adequate and appropriate investment from precinct participants and funding bodies. The governance and investment arrangements will vary for each precinct according to scale, age and sophistication, and are critical to the precincts' success.

The *Revitalisation of the Edwardstown Employment Precinct Project* is supported by a Project Steering Group, comprised of members of the Edwardstown business community and key City of Marion staff. The Project Steering Group supports and informs the project, providing insights, information and recommendations on the Action Plan, with members acting as project advocates within the precinct community. The inclusion of business representatives provides a solid foundation for the Edwardstown Precinct revitalisation project. Consideration of financial investment is also a critical ingredient in the development of successful and thriving precincts.

[1] https://tonsley.com.au/

1.4 Planning regulations

The South Australian planning system is undergoing significant reform to modernise and simplify planning and development across the state. The new Planning and Design Code (the Code), underpinned by the new *Planning, Development and Infrastructure Act 2016,* is being rolled out across South Australia to replace all existing council development plans, to unify and clarify planning policy across the State. The Code will become operational for all urban councils in July 2020.

These changes will impact the Edwardstown Employment Precinct, with the existing Development Plan Zoning Categories (Figure 1) replaced by the Planning and Design (P&D) Code Zones (Figure 2) from mid-2020. Under the new Act, the areas currently classified as 'Industrial', will be reclassified as either 'Employment' or 'Suburban Employment', and the existing 'Commercial' zones will become 'Suburban Employment' zones. The Castle Plaza Shopping Centre will be rezoned as a 'Suburban Activity Centre', whilst the area to the north will become 'Suburban Main Street' and 'Suburban Business and Innovation'.

The South Australian Government *Guide to the Draft Planning and Design Code* defines the following:

- ***Employment Zone***

  This zone supports a range of industrial, high-impact activities including general industry, logistical, warehousing, storage, research and training land uses.

- ***Suburban Employment Zone***

  This zone supports a diverse range of low-impact, light industrial, commercial (including bulky goods) and business activities that complement the role of other zones with significant industrial, shopping and business activities.

- ***Suburban Activity Centre Zone***

  This zone accommodates small-to medium- sized activity centres servicing a local or neighbourhood area. Development will primarily comprise shops, offices and consulting rooms. Residential development will be appropriate only in conjunction with non-residential development.

  Building heights up to 4 storeys may be appropriate subject to appropriate interface with adjoining zones.

- ***Suburban Business and Innovation Zone***

  This zone provides for a range of commercial, light industrial, shop and residential land uses.

  Development will be designed and sited to minimise impacts on adjoining land uses.

- ***Suburban Main Street Zone***

  This zone accommodates small-to medium- sized activity centres servicing a local or neighbourhood area. Development will primarily comprise shops, offices and consulting rooms. Residential development is appropriate only in conjunction with non-residential development.

  Buildings will be oriented toward the main street to create active frontages and reinforce the main street character.

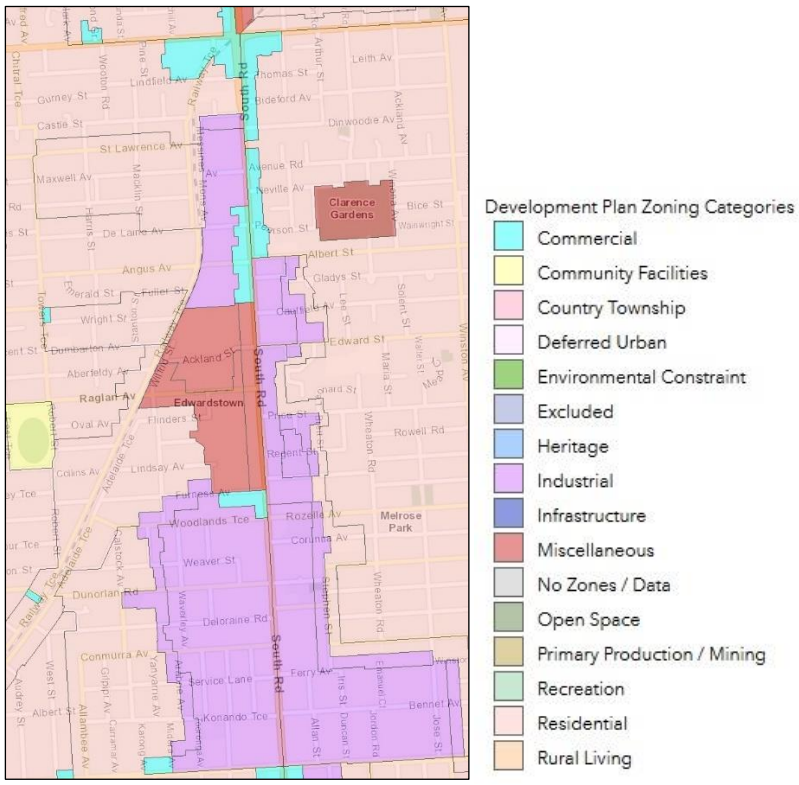
Building heights up to 4 storeys are anticipated where the building reinforces the main street edge. Buildings will decrease in height to provide an appropriate interface with adjoining low- to medium- density residential development.

In light of the proposed changes, the South Australian Local Government Association submitted a letter to the South Australian Government (November 2019) supporting the restriction of commercial development to main streets and commercial hubs in order to maintain and enhance activation of the main street areas of regions and towns.

The Edwardstown industrial and commercial precinct will be surrounded by residential areas classified in the new P&D Code as General Neighbourhood, Suburban Neighbourhood or Housing Diversity Neighbourhood.

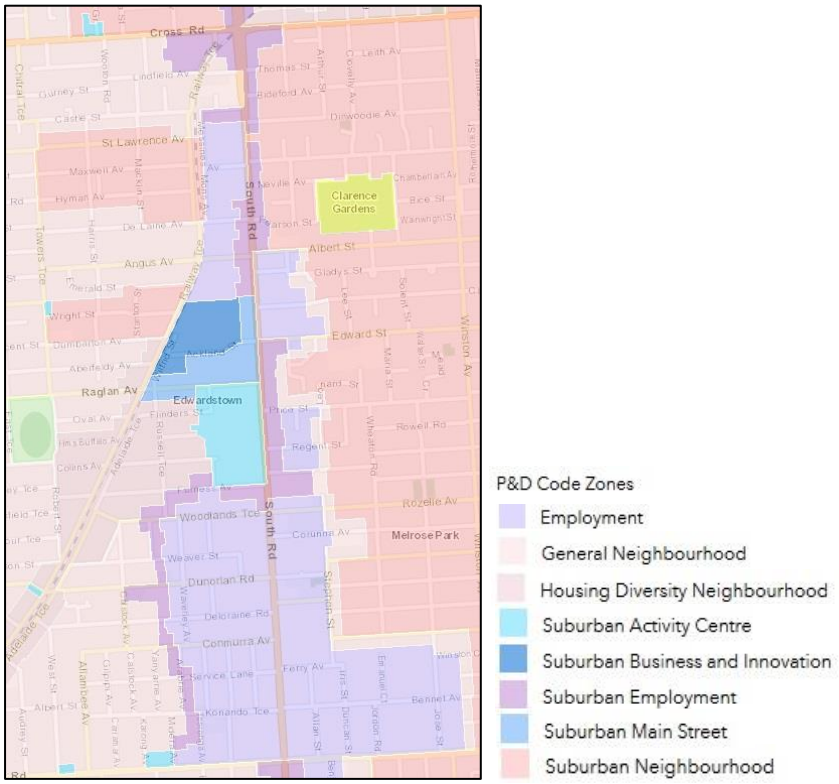
The P&D Codes listed above are described in detail in Appendix A.

Figure 1: Development Plan Zoning Categories, Edwardstown Precinct



Map source: [Planning and Design Code Consultation Map Viewer]

Figure 2: Planning and Design Code Zones (operational from July 2020), Edwardstown Precinct



Map source: [Planning and Design Code Consultation Map Viewer]

2 Edwardstown Employment Precinct

The Edwardstown Employment Precinct has been a central employment hub for the City of Marion for many years and is currently home to 1,775 businesses and 4,435 residents (Australian Bureau of Statistics, 2016). The 232-hectare industrial and commercial site is experiencing a period of decline with many underutilised and vacant sites.

The City of Marion are investing in strategic revitalisation and renewal activities, aiming to establish a mixed-use employment precinct for businesses and employees, integrated with diverse housing for residents. Located just 8 kilometres from the Adelaide central business district (CBD) and bordered by South Road, the Edwardstown precinct is ideally located for attracting new industries, workers and residents.

This research project is a direct action from the *Revitalisation of the Edwardstown Employment Precinct Project Action Plan* and will assist in future planning of business growth, international trade opportunities and investment attraction in the precinct over the next decade.

The *Revitalisation of the Edwardstown Employment Precinct Project* is supported by the Project Steering Group, comprised of members of the Edwardstown business community and key City of Marion staff. The Project Steering Group will support and inform the project, providing insights, information and recommendations on the Action Plan, with members acting as project advocates within the precinct community.

2.1 Review of existing plans and strategies

The City of Marion have implemented the *Revitalisation of the Edwardstown Employment Precinct Project* to provide a framework for reactivating the Edwardstown Precinct. The project involved several important analyses to identify, support and inform the need to reactivate the Precinct, namely:

- Edwardstown Precinct Analysis (2019)
    - Edwardstown - Attachment 1: Demographic Profile
    - Edwardstown - Attachment 2: Economic Analysis
    - Edwardstown - Attachment 3: Connection with Melrose Park
- Short Term Action Plan (1 July 2019 to 30 June 2020)

The ***Edwardstown Precinct Analysis*** provides a contextual summary of the Edwardstown precinct, differentiating between the industrial/commercial precinct (the focus of this report) and the residential precinct. The Precinct Analysis highlights the key principles of *access*, *activation* and *amenity* as important for driving the future growth and development of the area. The visual strengths and opportunities of the precinct are identified through textual and photographic analyses, and the current access and movement situation for vehicles and pedestrians is documented. Environmental quality (noise and air emissions, urban heat, vegetation coverage) of the precinct area is also considered.

The Precinct Analysis presents a basic ***demographic profile*** for the area based on the 2016 ABS Census. An ***economic analysis*** provides employment, wage and salary information, economic output data, exports, sales and business-related statistics. Since the Edwardstown precinct analysis was released, more recent economic data has been made available and is presented in Section 3.

The proximity of the Edwardstown precinct to the suburb of Melrose Park (in the City of Mitcham) is highlighted in ***Attachment 3: Connection with Melrose Park***. The western boundary of Melrose Park is formed by South Road, home to many commercial and industrial businesses,

and adjacent to the eastern boundary of the Edwardstown Precinct. The *Edwardstown Precinct Analysis* indicates underutilisation of this industrial zone, suggesting potential to collaboratively reactivate the area of South Road in both Edwardstown and Melrose Park.

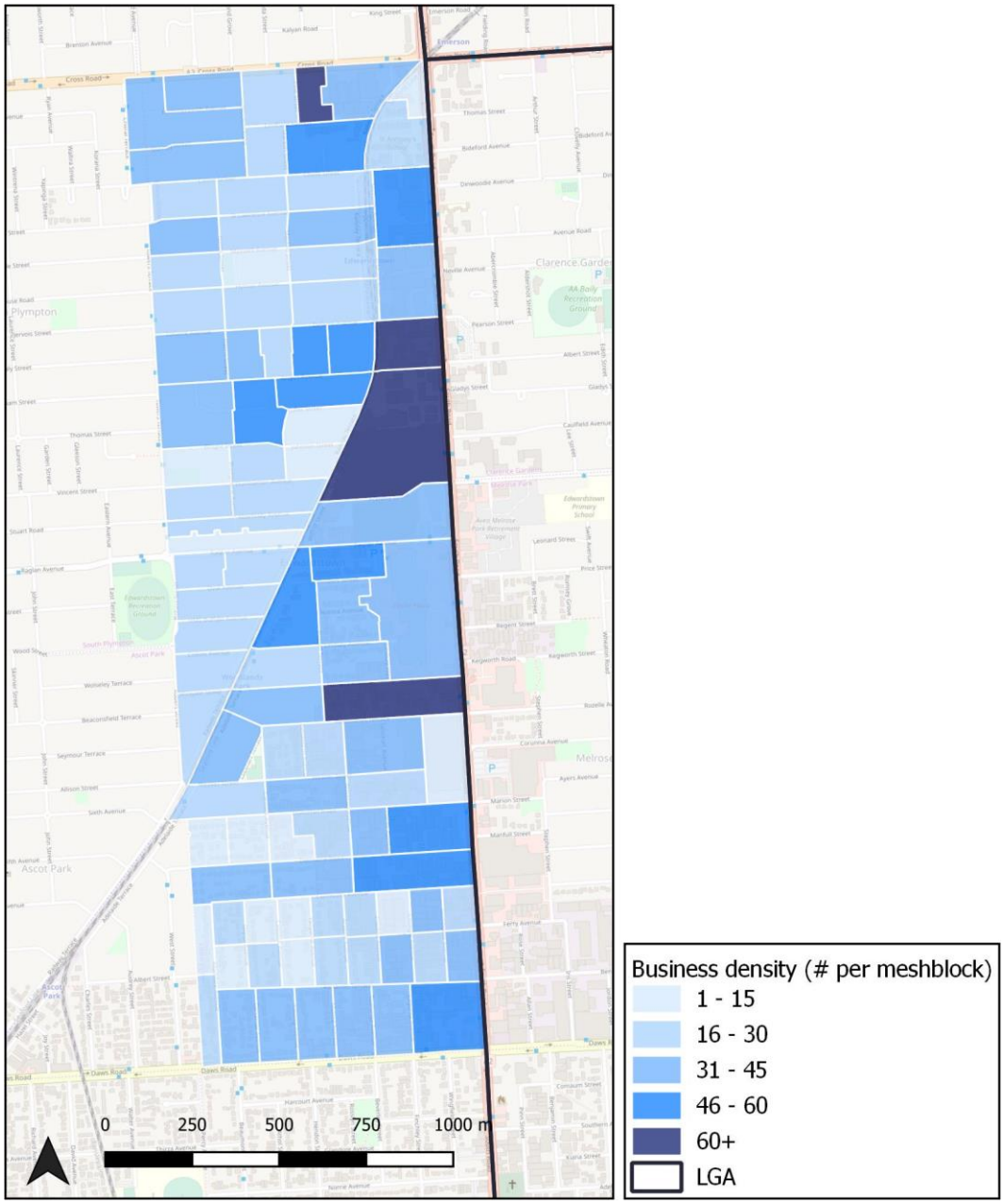
As part of the broader *Revitalisation of the Edwardstown Employment Precinct Project*, the City of Marion have developed and implemented an ***Action Plan*** that outlines activities to address the amenity, access and activation of the precinct over a twelve month period (from 1 July 2019 to 30 June 2020). The Action Plan covers all aspects of the project from greening initiatives, to urban design, transport infrastructure, attracting start-ups, street art and an economic activation plan – the mandate of this project.

3 Baseline mapping

3.1 Current business environment

Over 3,100 Edwardstown businesses are registered on the Australian Business Register (ABR). A map of their location within the Edwardstown precinct is shown below in Figure 3. There are 4 clear business 'hubs' within Edwardstown, where more than 60 businesses are congregated. These are visible in Figure 3. Business density appears to be highest on the south road corridor, and along the train line, indicating the strength of these transport corridors as drivers of business activity, and their potential for generating further economic activity.

Figure 3: Edwardstown business density



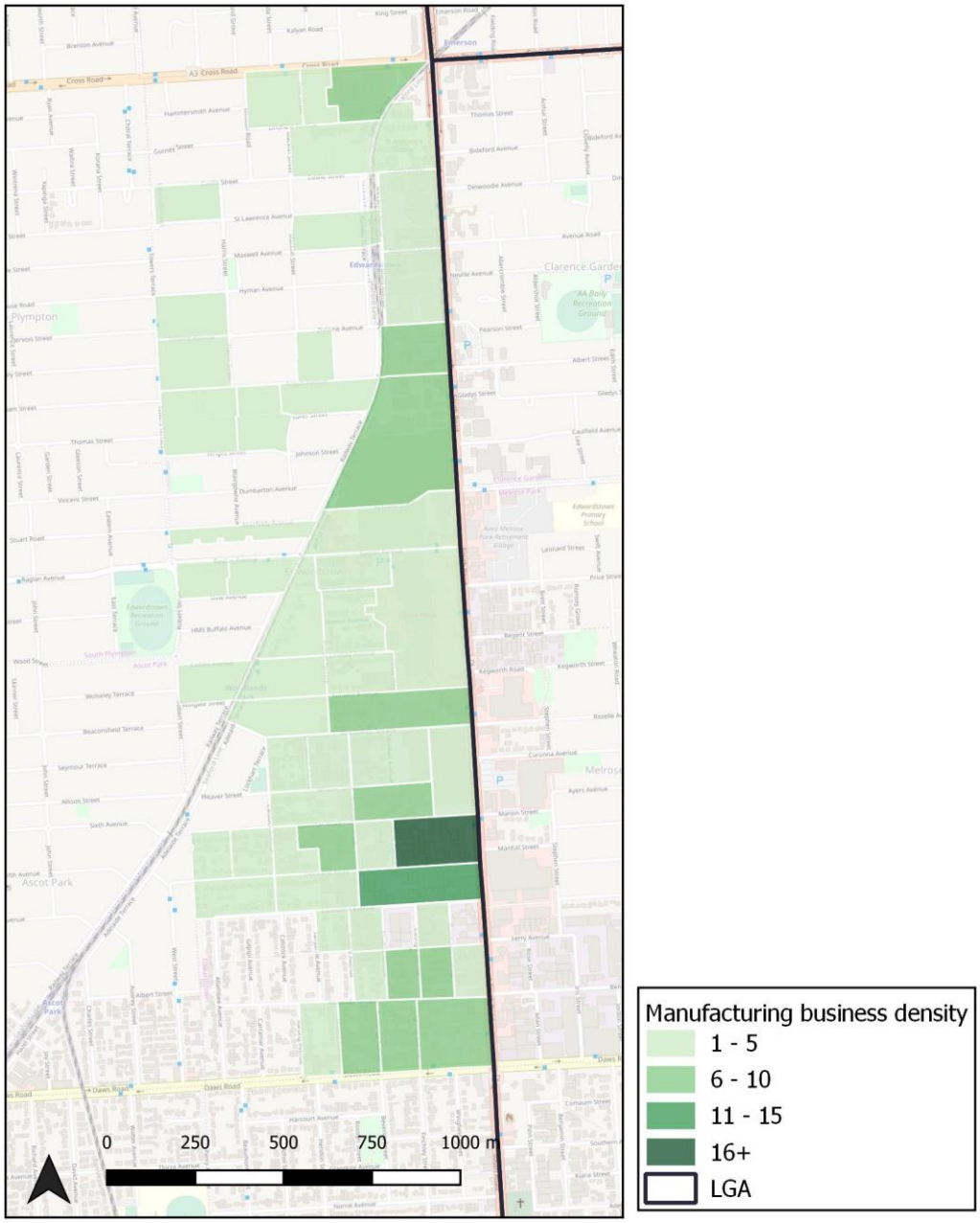
There are 316 different industries operating within the precinct. The top ten are shown in Table 1.

Table 1: Edwardstown Business Counts by Industry

Industry	Number of businesses
Building and Other Industrial Cleaning Services	174
Non-Residential Property Operators	150
Other Auxiliary Finance and Investment Services	116
Financial Asset Investing	115
Residential Property Operators	86
Superannuation Funds	79
Management Advice and Related Consulting Services	60
Computer System Design and Related Services	50
Other Automotive Repair and Maintenance	49
Hairdressing and Beauty Services	45

Many of the businesses operating in Edwardstown do not employ anyone – they are sole traders. There are two exceptions. Manufacturing, of which there are 16 businesses employing between 20 and 200 people, and Construction, with 12 businesses employing between 20 and 200 people. The Construction industry also contains the largest number of non-employing businesses. Other industries with large employing businesses include Retail Trade (7), Wholesale Trade (6), Professional, Scientific and Technical Services (5), Other Services, Education and Training, and Transport, Postal and Warehousing (3). The intensity of Manufacturing businesses in Edwardstown is summarised in Figure 4, with a clear pocket of manufacturing businesses congregating in the south eastern corner.

Figure 4: Edwardstown manufacturing business density



3.2 Business sentiment

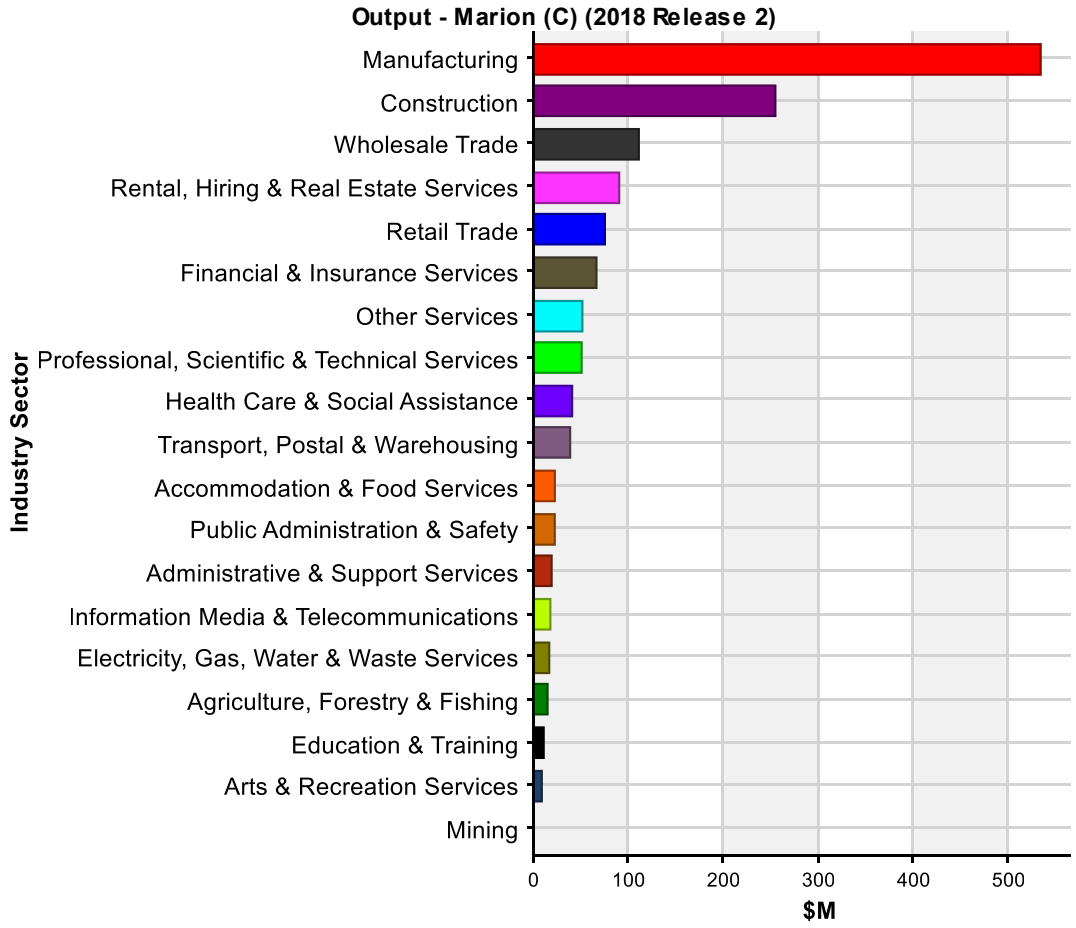
The City of Marion Council has conducted a survey of businesses in the Edwardstown precinct to assess business sentiment in the region. Fifteen businesses operating in ten industries responded to the survey. On average these businesses have been operating for 23 years, with 15 of those years at their current location in Edwardstown, and have grown from employing 40 people to 282 with the expectation of employing an additional 80 people over the next five years. All firms who responded to the survey indicated that they were looking to hire additional employees over the next five years indicating a high degree of confidence in the operation of their business, and the environment in which they operate. Six firms (40%) indicated that they would be willing to co-locate their business at Tonsley. The three most important factors for success of the businesses surveyed were the ease of their employees to get to work (through parking, and public/private transport infrastructure), high speed internet, and parking for customers. Of the four firms who are considering relocating their businesses, access to space,

concerns about a grade separated South Road, and the ability to grow their business were given as the key reasons for the potential relocation.

3.3 Output

The three zones which make up the Edwardstown precinct represent 4.2% of the total area of Marion Council, but contribute an estimated $1.44 billion (23.2%) of Marion Council's total output of $6.21 billion. This output is strongly concentrated in the Manufacturing ($533.6 million; 37%) and Construction sectors ($254.4 million; 17.6%).

Figure 5: Edwardstown Precinct Output ($millions) by Sector



Within the Manufacturing sector, output is concentrated in Transport Equipment and Parts Manufacturing ($164.3 million; 11.4%)[2], Metal and Metal Product Manufacturing ($126.5 million; 8.8%) and Technical Equipment and Appliance Manufacturing ($78.8 million; 5.5%). Overall, 14 Manufacturing sectors contribute to the output of the Edwardstown Precinct (Table 2).

[2] A significant proportion of this output is from the manufacture of Motor Vehicles and Parts, and Other Transport Equipment ($152.5 million). As Remplan data is sourced from the latest census (2016) it is likely that this sector's output has since decreased.

Table 2: Edwardstown Precinct Output ($millions) by Manufacturing Sector

Sector	Output	
Transport Equipment & Parts Manufacturing	$164.334	11.4%
Metal & Metal Product Manufacturing	$126.472	8.8%
Technical Equipment & Appliance Manufacturing	$78.808	5.5%
Basic Chemical, Cleaning & Polymer Manufacturing	$42.594	3.0%
Apparel Manufacturing	$33.942	2.4%
Food Product Manufacturing	$29.459	2.0%
Furniture Manufacturing	$17.606	1.2%
Printing (including the reproduction of recorded media)	$12.332	0.9%
Sawmill, Wood & Paper Product Manufacturing	$9.796	0.7%
Other Manufactured Products	$7.210	0.5%
Pharmaceutical Product Manufacturing	$6.567	0.5%
Non-Metallic Mineral Product Manufacturing	$4.495	0.3%
Beverage Product Manufacturing	$0.047	0.0%
Petroleum & Coal Product Manufacturing	$0.000	0.0%

Within Construction, the output is nearly evenly split between Construction Services ($131.0 million; 9.1%) and Construction ($123.4; 8.5%).

3.4 Employment

Total employment in the Marion Council area is estimated at 22,983 jobs. The Edwardstown Precinct contributes 4,582 (19.9%) to total employment, at an estimated 19.6 jobs per hectare. The largest employing industries in the Edwardstown Precinct are Manufacturing (925; 20.2%), Retail Trade (725; 15.8%) and Construction (610; 13.3%). A more in-depth analysis of employment within the Edwardstown Precinct is presented in Section 4.

4 Opportunity identification

4.1 Economic analysis

There has been significant investment in the precinct in recent years - the $45 million Bunnings development, expansion of the Castle Plaza Shopping Centre ($40 million) and the $8 million Edwardstown Oval redevelopment have prompted increased economic activity. As discussed in Section 3, the Edwardstown Precinct employs people in a wide range of industries such as Manufacturing, Retail Trade, and Construction. On a more detailed level, the Edwardstown Precinct predominantly employs in Food Retailing (393), Other Store-Based Retailing (345), and Construction Services (269).

The Edwardstown Statistical Area (SA2) is one of the most diverse regions in South Australia in terms of industry employment. Of the 105 industries analysed, Edwardstown has comparative advantage in 41 of them. Table 3 shows the top ten industries by industrial comparative advantage in Edwardstown. Compared to Australia, employment in Edwardstown is more concentrated in:

- Library and Other Information Services
- Manufacturing; including clothing, furniture, transport equipment, and fabricated metal products
- Professional, Scientific and Technical Services

Table 3: Edwardstown Industrial Strengths

Industry	Industrial Comparative Advantage (ICA)
Library and Other Information Services	10.1
Textile, Leather, Clothing and Footwear Manufacturing	5.3
Furniture and Other Manufacturing	5.2
Manufacturing, nfd	5.1
Fabricated Metal Product Manufacturing	4.6
Printing (including the Reproduction of Recorded Media)	4.4
Professional, Scientific and Technical Services, nfd	3.6
Other Goods Wholesaling	3.4
Polymer Product and Rubber Product Manufacturing	3.0
Non-Store Retailing and Retail Commission-Based Buying and/or Selling	2.8

The Industrial Comparative Advantage (ICA) is calculated as the ratio of the share of employment in an industry in Edwardstown to the share of employment in the same industry in Australia. As a share of Edwardstown's total employment, there are five times more employees in Furniture and Other Manufacturing compared to Australia. So, while Retail Trade (specifically Food Retailing and Other Store-Based Retailing) and Construction Services are the largest industries of employment in Edwardstown, the industry strengths of Edwardstown are better expressed in Table 3 above.

Finding the relationship between a precinct's employment strengths and their productive strengths is the next step in identifying opportunities at a precinct level. Utilising a model of economic complexity at the state level allows us to identify where productive capabilities exist in South Australia. This model uses the export value of 1,241 products from South Australia in 2016

to determine where South Australia has comparative advantage. Products are then matched to the industry which produces them, and this industry is matched to the industries identified as strengths in the industrial comparative advantage. Results are filtered such that:

1. Only the industries which Edwardstown has comparative advantage are kept.
2. South Australia does not have comparative advantage in production of the product.
3. The product is exported from South Australia in some capacity.
4. The product would increase the complexity of South Australia.

Out of the 1,241 products analysed, 366 opportunities are identified for Edwardstown, across 10 industries. They are summarised below in Table 4 and Table 5.

Table 4: Summary of Edwardstown product opportunities by industry

Industry	Product Opportunities
Machinery and Equipment Manufacturing	148
Fabricated Metal Product Manufacturing	44
Textile, Leather, Clothing, and Footwear Manufacturing	43
Primary Metal and Metal Product Manufacturing	34
Polymer Product and Rubber Product Manufacturing	32
Furniture and Other Manufacturing	30
Transport Equipment Manufacturing	23
Wood Product Manufacturing	7
Printing	4
Aquaculture	1

Table 5: Edwardstown product opportunities

Product	Industry	Exports (South Australia)	Complexity Gain
Screws and similar articles of iron or steel	Fabricated Metal Product Manufacturing	1,056,261	1.47
Machines n.e.c.	Machinery and Equipment Manufacturing	30,878,418	1.44
Lathes for removing metal	Machinery and Equipment Manufacturing	45,866	1.43
Machines for assembling electric lamps	Machinery and Equipment Manufacturing	11,151	1.41
Industrial electric furnaces	Machinery and Equipment Manufacturing	180,240	1.38
Instruments for measuring properties of liquids or gases	Machinery and Equipment Manufacturing	785,582	1.38
Machinery parts, not containing electrical features, n.e.c.	Machinery and Equipment Manufacturing	239,886	1.35
Interchangeable tools for hand tools	Machinery and Equipment Manufacturing	2,870,186	1.34
Parts of musical instruments	Furniture and Other Manufacturing	29,103	1.33
Tools for hand working, pneumatic, hydraulic motors	Machinery and Equipment Manufacturing	570,109	1.33

Imperative to the Council's decision making around which areas to prioritise is an assessment of the global demand for the products identified as opportunities. The 5-year growth of global exports is -10.7%. Any products exported from South Australia which are growing faster than this could be considered, however we take the approach of only including products which have

positive global export growth over the last five years. This reduces the potential opportunities for Edwardstown to 156 products. They are summarised in Table 6.

Table 6: Edwardstown Product Opportunities (Export Growth)

Product	Industry	Exports (South Australia)	Export Growth
Apparatus and equipment for photographic laboratories, n.e.c.	Machinery and Equipment Manufacturing	55,756	95.6%
Optical microscopes	Machinery and Equipment Manufacturing	678,785	72.7%
Video recording apparatus	Machinery and Equipment Manufacturing	47,535	60.2%
Textile footwear	Textile, Leather, Clothing and Footwear Manufacturing	131,779	50.3%
Plastic floor coverings	Polymer Product and Rubber Product Manufacturing	22,302	32.6%
Lamps	Machinery and Equipment Manufacturing	1,395,724	32.0%
Balances of a sensitivity < 50 milligram	Machinery and Equipment Manufacturing	3,494	31.9%
Wooden kitchenware	Wood Product Manufacturing	9,334	31.7%
Electrical lighting equipment used for motor vehicles	Transport Equipment Manufacturing	12,714,205	31.1%
Other aircraft and spacecraft	Transport Equipment Manufacturing	163,654	31.0%

5 Recommendations

The Australian Industrial Transformation Institute recommends the following actions for economic activation of the Edwardstown precinct:

1. Develop a Precinct Activation Plan.

The Precinct Activation Plan should focus on the staged deployment of the following recommendations. They can be divided into three stages. The first stage revolves around building on the existing strengths of the Edwardstown precinct – doing better what it is already good at. The second stage investigates the ability of Edwardstown manufacturing businesses to adjust their existing processes to utilise Industry 4.0 and digital technologies in light of the State Government's growth agenda. The final stage prioritises diversifying the products manufactured in Edwardstown to align with those products identified as opportunities in this analysis.

2. Build on the existing industrial strengths identified in Table 3.

The industrial strengths of the Edwardstown Precinct highlight the industries where employment intensity is higher than the national average. These industries form the character of the Edwardstown Precinct, and building on them will help to solidify the industrial base of Edwardstown.

3. Encourage existing / local businesses to reconsider their manufacturing processes in light of the High Tech Sector Growth Plan.

The State Government is prioritising the *High Tech Sector* as a key enabling sector for improving South Australia's economic productivity. This sector focuses on the development and use of key enabling technologies such as 3D printing, automation and robotics, advanced computing and big data, remote sensors and the Internet of Things, and machine learning to strengthen existing sources of industrial growth. The Edwardstown precinct is an ideal location for the City of Marion to develop and showcase these technologies being applied to existing manufacturing processes. Its proximity to South Australia's main transport corridor and the Tonsley Innovation Precinct accentuates the potential of this precinct.

4. Conduct a feasibility analysis of the product opportunities identified within this report.

The products identified as opportunities in this analysis (Table 5) do not consider individual business needs. While a survey was conducted by the City of Marion on businesses within the Edwardstown Precinct, the number of responses was low. The findings from this report should be presented to businesses at the Business Community Meetings to discuss the opportunity analysis with local businesses, and identify their feasibility, and any barriers which may exist.

5. Create a business environment favourable to exporting.

The model of economic complexity uses exports as a proxy for productive capabilities. A business which can export their product (whether interstate or overseas) creates additional sources of revenue and enables greater business growth. The products identified in Table 6 are those with strong global import demand, and exposing Edwardstown businesses to these markets would help them to become more competitive which brings additional domestic benefits.

6. Assess the City of Marion's access to skills

Using business intelligence and Council expertise, develop an inventory of the skills present in the broader Marion Council region and map these to the product opportunities. Where skills are missing, develop a strategy to attract those skills to the region via retraining opportunities, working with local TAFE and Universities to upskill local workers.

7. Develop and prioritise the sectors identified by the product opportunity analysis.

This can be accomplished by diversification of existing Edwardstown businesses and their activities into new products or attracting new business to the precinct.

Appendix A: Planning and Design Code descriptions

Extracted from the Guide to the Draft Planning and Design Code (Government of South Australia, 2019).

Employment Zone

This zone supports a range of industrial, high-impact activities including general industry, logistical, warehousing, storage, research and training land uses.

Suburban Employment Zone

This zone supports a diverse range of low-impact, light industrial, commercial (including bulky goods) and business activities that complement the role of other zones with significant industrial, shopping and business activities.

Suburban Activity Centre Zone

This zone accommodates small-to medium- sized activity centres servicing a local or neighbourhood area. Development will primarily comprise shops, offices and consulting rooms. Residential development will be appropriate only in conjunction with non-residential development.

Building heights up to 4 storeys may be appropriate subject to appropriate interface with adjoining zones.

Suburban Business and Innovation Zone

This zone provides for a range of commercial, light industrial, shop and residential land uses.

Development will be designed and sited to minimise impacts on adjoining land uses.

Suburban Main Street Zone

This zone accommodates small-to medium- sized activity centres servicing a local or neighbourhood area. Development will primarily comprise shops, offices and consulting rooms. Residential development is appropriate only in conjunction with non-residential development.

Buildings will be oriented toward the main street to create active frontages and reinforce the main street character.

Building heights up to 4 storeys are anticipated where the building reinforces the main street edge. Buildings will decrease in height to provide an appropriate interface with adjoining low- to medium- density residential development.

General Neighbourhood Zone

This zone encourages a range of dwelling types to increase housing diversity and supply. Other non-residential uses, including small-scale office and consulting rooms, and a range of community facilities, including education, recreation and community centres, will also be encouraged. Development will generally retain a suburban character and scale of 1 or 2 building levels.

Suburban Neighbourhood Zone

This zone adopts current development plan guidelines relating to building heights and allotment sizes. It will be applied where there is justification to vary site areas, setbacks and building heights due to local context / issues.

Housing Diversity Neighbourhood Zone

Development in this zone will generally retain a low-rise residential character and will involve replacing existing dwellings with medium density housing, primarily in the form of terrace housing, group dwellings or residential fat buildings.

Appendix B: Economic Analysis

Identifying targeted product level opportunities for precincts requires an understanding of the supply of labour at the precinct level, and the broader productive capabilities in the state, and how these can be matched. State level productive capabilities are determined using an economic complexity framework developed by AITI to incorporate the Australian States, and labour supply at the precinct level is determined through an adaption of the economic complexity model.

5.1 Economic complexity

Economic complexity modelling pioneered by Hausmann and Hidalgo (Hidalgo & Hausmann, 2009) has been identified as a tool to measure the productive knowledge present in a region based on the products that it exports with *comparative advantage* (Hausmann, Hwang, & Rodrik, What You Export Matters, 2007) (Hausmann, et al., 2014) (Hidalgo, Klinger, Barabasi, & Hausmann, 2007). Economic complexity identifies the present productive capabilities in a region, using data on the products it exports. Second, it identifies the similarities of capabilities required to develop products and quantifies the extent that these capabilities are present in a region. The premise of economic complexity is that a region can only successfully develop an industry for which it has comparative advantage or related capabilities. It must have the capability, skills and know-how (Rigby, 2015): it cannot do something competitively if it does not know how to do so.

Economic complexity analysis uses global export data to rank both countries and products based on their level of complexity[3]. Two measures of complexity are calculated: Economic Complexity Index (ECI) which ranks the complexity of countries, and Product Complexity Index (PCI) which ranks the complexity of products. The relationship between the number of products a region exports with comparative advantage (its diversity), the number of countries which export a product with comparative advantage (its ubiquity), and their respective complexity can be explained with an analogy to Scrabble. In the analogy, capabilities are represented by letters, and products are represented by words. Players (countries) with rarer letters (capabilities) can play both more words (products) and combine their letters in unique ways to produce words worth more points.

Countries with high economic complexity also tend to have many diverse businesses, which produce and export products which combine capabilities in such a way that cannot be produced elsewhere in the world (Roos, 2017). The most complex products are sophisticated chemicals and machinery, and the least complex products are raw materials and extractive agricultural products such as wheat.

Economic complexity analysis determines how related capabilities, materials and assets can be leveraged to provide and scale up production in areas which may be deemed economically important. Economic complexity analysis identifies where productive capabilities in an economy lie. Productive capabilities are identified by an assessment of the revealed comparative advantage in a product for a country, measured by the value of exports of that product relative to total world trade.

5.1.1 Methodology

[3] It is important to differentiate between economic or product complexity and 'technical complexity'. Where two regions may use very different technologies to extract minerals, the product which is exported has the same economic complexity. Although there may still exist a difference in the productivity of these activities across regions, this is not the focus of the economic complexity model, and these differences are likely to show up as other productive capabilities

The key outputs from economic complexity analysis include a description of the products in which a country has capabilities, based on the products which are exported with revealed comparative advantage, a level of economic complexity which is comparable across countries and across time, and a ranking of product complexity. This study follows the method for calculating economic complexity as developed by Hausmann and Hidalgo and uses the dataset published by The Growth Lab at Harvard (The Growth Lab at Harvard University, 2019) where Australia has been removed and replaced with the Australian States. As such, references to 'countries' below can be interpreted as a reference to an Australian State. An explanation of the indicators, and their derivation is provided below:

Revealed Comparative Advantage

Revealed comparative advantage (RCA) is a measure of the level of comparative advantage which a country possesses for a given product:

$$RCA_{cp} = \frac{X_{cp}}{\sum_c X_{cp}} / \frac{\sum_p X_{cp}}{\sum_{cp} X_{cp}}$$

Values of *RCA* over 1 indicate that a country has comparative advantage in the production of that product. That is, the share of the country's total exports captured by a product to its total exports is greater than the share of the world's total exports captured by the world's exports of that product. Comparative advantage in the production of a product is a useful proxy for a country's level of productive capabilities. The RCA is converted into a matrix M_{cp} with value 1 if the country-product pair has RCA greater than 1, and 0 otherwise.

Economic Complexity Index

The economic complexity index (ECI) is the level of complexity embedded in an economy, based on the complexity, ubiquity ($k_{p,0}$), and diversity ($k_{c,0}$) of the products they export. Highly complex economies export many highly complex (knowledge intensive) products, which in turn are exported by relatively few economies. The derivation of the Economic Complexity Index uses diversity (the number of products an economy exports with RCA>1) and ubiquity (the number of economies that export a product with RCA>1):

$$M_{cc} = \sum_p \frac{M_{cp} M_{c'p}}{k_{c,0} k_{p,0}}$$

The ECI is the eigenvector corresponding to the second largest eigenvalue of M_{cc}

Product Complexity Index

The Product Complexity Index (PCI) is the level of complexity embedded in a product, based on the complexity and the ubiquity of economies which export them. Highly complex products are non-ubiquitous products which are exported by complex economies. There is a recursive relationship between ECI and PCI, as can be seen by the similarity between the M_{cc} and M_{pp} matrices. The Product Complexity Index is the eigenvector corresponding to the second largest eigenvalue of M_{pp}.

$$M_{pp} = \sum_c \frac{M_{cp} M_{cp'}}{k_{c,0} k_{p,0}}$$

Proximity

The proximity between two products measures the relatedness of those two products based on the productive knowledge required to export them with comparative advantage. It is based on the proportion of economies which export both products with comparative advantage.

$$\phi_{pp'} = \frac{M_{cp}M_{cp'}}{\max(k_{p,0}, k_{p',0})}$$

Density

Density provides an indication of how near an economy is from the productive knowledge required to export a new product with Revealed Comparative Advantage. The density for a product is the proportion of related knowledge that the economy has revealed comparative advantage in, weighted by the proximity between the related products and the target product. Density can also be referred to as Distance where Distance = 1 – Density.

$$d_{cp} = \sum_{p'} \frac{(1 - M_{cp'})\phi_{pp'}}{\sum_{p'} \phi_{p,p'}}$$

5.2 Industrial Comparative Advantage

Analysis of employment by industry is an inadequate measure of the economic opportunities in a precinct however, as it does not identify where a precinct outperforms another. For example, employment in Manufacturing and Retail Trade tends to be high in all precincts. To that end, we have employed a measure of industrial comparative advantage, to identify in which industries a precinct employs a higher share than the Australian average. That is:

$$ICA_{p,i} = \frac{E_{p,i} / \sum_i E_{p,i}}{\sum_p E_{p,i} / \sum_{p,i} E_{p,i}}$$

Where ICA is the industrial comparative advantage for precinct p in industry i, and $E_{p,i}$ is the level of employment in precinct p in industry i. A precinct is defined as having industrial comparative advantage in an industry if $ICA \geq 1$. This is analogous to the revealed comparative advantage measure used to identify productive capabilities at the state level.

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