GEELONG'S MANUFACTURING RENAISSANCE

A study of Geelong and the region's manufacturing

Summary Report

Geelong Manufacturing Council

Advancing Regional Industry

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SUMMARY REPORT

A study of Geelong and the region's manufacturing sector
for the Geelong Manufacturing Council
with funding support from Deakin University

Read the Full Report at www.geelongmanufacturingcouncil.com.au

Geelong Manufacturing Council
Advancing regional industry for 25 years

DEAKIN UNIVERSITY AUSTRALIA

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1 EXECUTIVE SUMMARY

1.1 Key findings

This document provides a snapshot of Geelong and the region's manufacturing sector.

A major insight from this study is that Geelong's manufacturing sector is growing and the mood among manufacturing firms interviewed is upbeat, a noticeable turnaround from a similar study in 2018. The 2021 Census shows employment in the manufacturing sector in Geelong increased from 8172 in 2016 to 8339 in 2021. Similarly, there were 979 people employed in manufacturing in Colac in 2016 and this has increased to 1174 in 2021[1]. New companies have come onto the scene. Many established companies are making new investments to increase capacity and efficiency. Companies which were dependent on Ford and Alcoa have introduced new business models, have stabilised, and are positive about their prospects.

Anxieties arising from closure and loss of customers have been replaced with concerns about being able to recruit sufficient staff with the appropriate experience and qualifications. Further, given the 2021 Census was conducted during COVID lockdowns, employment figures are more likely to understate than overstate underlying employment structures. Growth of Geelong's manufacturing is extraordinary given the closure of major regional manufacturers over the last decade.

As a result, the structure and composition of Geelong's manufacturing sector continues to evolve.

- Geelong's largest manufacturing industry measured by Value Added is petroleum refining
- The fastest growing manufacturing industry is food, which has recorded increased Value Added of more than 50 per cent since 2016. Food manufacture is also the largest employer, although average productivity is not high in comparison to some other manufacturing industries.
- Other growing industries are beverages, machinery, non-metallic minerals (largely building materials) and fabricated metals
- Textile Clothing and Footwear and Wood Product manufacturing are static or recording slightly negative growth
- Basic Chemical production, Polymer Manufacturing and Beverage Manufacturing shows static Value Added over the last five years, although the 2021 Census records significant employment growth in each of these industries.
- The value of Basic Metals and Printing production have shown significant decline, based on id.economy data. However, the Census shows that employment in Basic Ferrous Metals (iron and steel casting, pipe and tube manufacture) has increased from 185 to 237. Similarly, the Value Added in Geelong's Printing Industry is estimated to have fallen from $13m in 2015/16 to $8m in 2020/21 although the Census records an increase in employment from 203 to 223.

In addition, the development of Hanwha's facility at Avalon is expected to create 250-1200 new jobs over the next few years, depending on Australian Government tender outcomes.

In reading the report it is important to recognise that segments within industries can exhibit contrasting trends. So, for example, Transport Equipment manufacturing overall has shown

[1] ABS Census 2016,2021

steep decline in Value Added and employment, driven by the closure of Ford and the consequent reduction in motor vehicle production. However, this has been offset to some degree by a significant increase in employment in motor vehicle parts, most likely reflecting the output from Carbon Revolution, as well as increases in employment in Shipbuilding and Boat Manufacturing, and in Aircraft Maintenance. In other words, there can be strongly growing companies in a contracting industry. Ideally analysis is best conducted at the firm level.

1.2 Structure of the report

The report is structured as follows. A preliminary section sets the scene, briefly outlining trends in manufacturing in Australia, Victoria and Geelong.

Section 3 records key themes arising from the interviews conducted for this study. Thirty-five businesses were interviewed across a spectrum of firm types. Most firms had plans for expansion and new investment. Many firms are exploring new markets including the defence sector. Improved processes, automation, consolidation and greater efficiencies were common interests for firms with regional or national markets. There are shared concerns about the availability of skills and energy costs and security.

Section 4 provides an analysis of employment in each of Geelong's manufacturing industries based on Census data. Census data is useful because it provides a greater level of granularity than other data sources. For example, as suggested above, industry-level data shows Transport Equipment manufacturing has declined since 2016. However, because Census data is more disaggregated, we can see employment in motor vehicle part manufacturing has increased. Similarly, the declining Value Added for Primary Metals and Printing are challenged to a degree by Census data which shows increasing employment.

Section 5 provides an analysis of sales outside the region for Geelong regional manufacturing industries. This shows regional manufacturers are strong exporters and provides a strong positive indicator: industries and firms with exposure outside the region are more likely to experience higher levels of growth. This points to the importance of petroleum refining, transport equipment, food products, TCFL and fabricated metal products.

Section 6 provides data on long-run productivity growth among Geelong's manufacturing industries. Some of the data is surprising as it suggests falls in productivity across many industries. However, in principle, the industries with the higher levels of productivity should have created a basis for competitive advantage to underpin superior returns and wages.

Section 7 provides information on the knowledge intensity of each industry, measured by formal qualification attainment. It also provides information on the Fields of Study undertaken by employees within each industry. The 'knowledge intensive industries' measures as those with higher rates of tertiary qualifications in their workforces are Transport Equipment, Beverage Production, Petroleum Refining, Machinery and Equipment and Basic Chemicals. The most common Field of Study is engineering-related, followed by management and commerce.

Section 8 provides information of incomes within the manufacturing sector, and on income levels correlated to formal qualifications.

1.3 Method and data sources

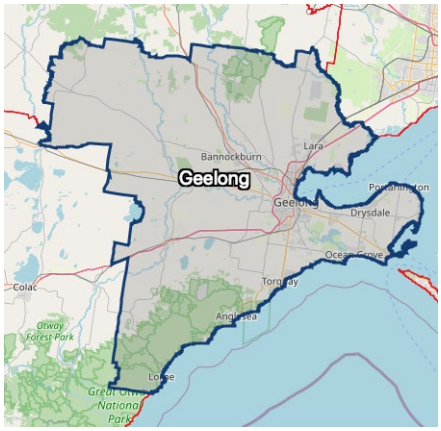
The study brings together information from the following sources:

- Statistics on the manufacturing sector. These are drawn largely from id.economy data on Geelong, supplemented with a selection of ABS data
- Interviews with selected industry leaders
- Census data for 2016 and 2021 analysed around manufacturing employment in Geelong. Note that Census data includes only people who live in Geelong and does not include those who live outside the region but work in Geelong.
- Because Colac is a significant manufacturing hub, data on the composition of Colac manufacturing workforce is included at Table 9

These data define the Geelong region differently.

Figure 1: Geelong region as used in different statistical collections.

Id.economy Geelong region



ABS Geelong Statistical Area Level 2 (SA2)

ABS Significant Urban Area for Geelong (SA4)

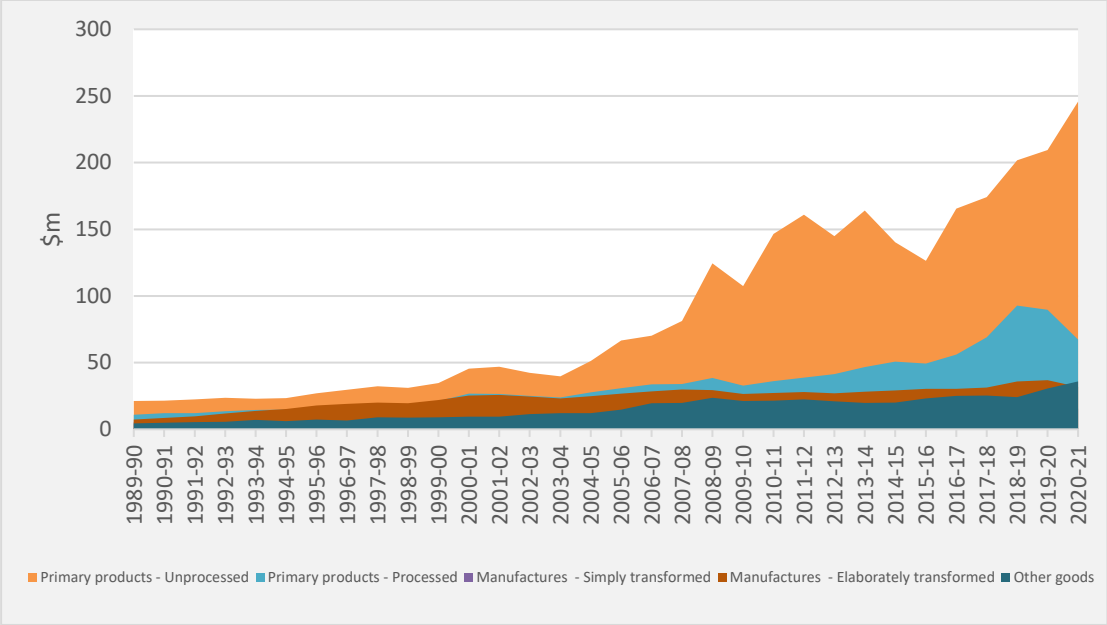
The area defined by id.economy is shown in the upper left map above.
ABS Counts of Australian Businesses uses the Geelong Statistical Area Level 2 (SA2) shown in the upper right, while the Australian Census analysis uses the ABS Significant Urban Area for Geelong (SA4), lower left.

2 MANUFACTURING IN AUSTRALIA

Apart from a short period in the 1950s, the services sector contributed more than half of Australia's economic output throughout the 20TH Century. The manufacturing sector was also of growing significance in terms of contribution to GDP and employment, however its contribution peaked in the 1960s and has been declining since. Meanwhile the resources sector was much smaller, but was capital intensive, productive, and focused on export markets. The agriculture sector generally comprised small family-owned farms with export exposure. Its contribution to the economy has been declining since the 1920s, apart from the wool boom of the early 1950s.

A comparative view

The specialisation of a country's economy is often assessed in terms of the composition of its exports, which reveals its relative competitive advantage. Since the 1970s the contribution of rural commodities has shrunk from around 40 per cent to around 10 per cent, while the minerals and fuels sector expanded from around 15 per cent to more than half. In the early 1970s manufactured goods comprised around 20 per cent of exports, expanding slightly in the 1990s, before falling back to a bit more than 10 per cent currently. This can be seen in Figure 2 below.



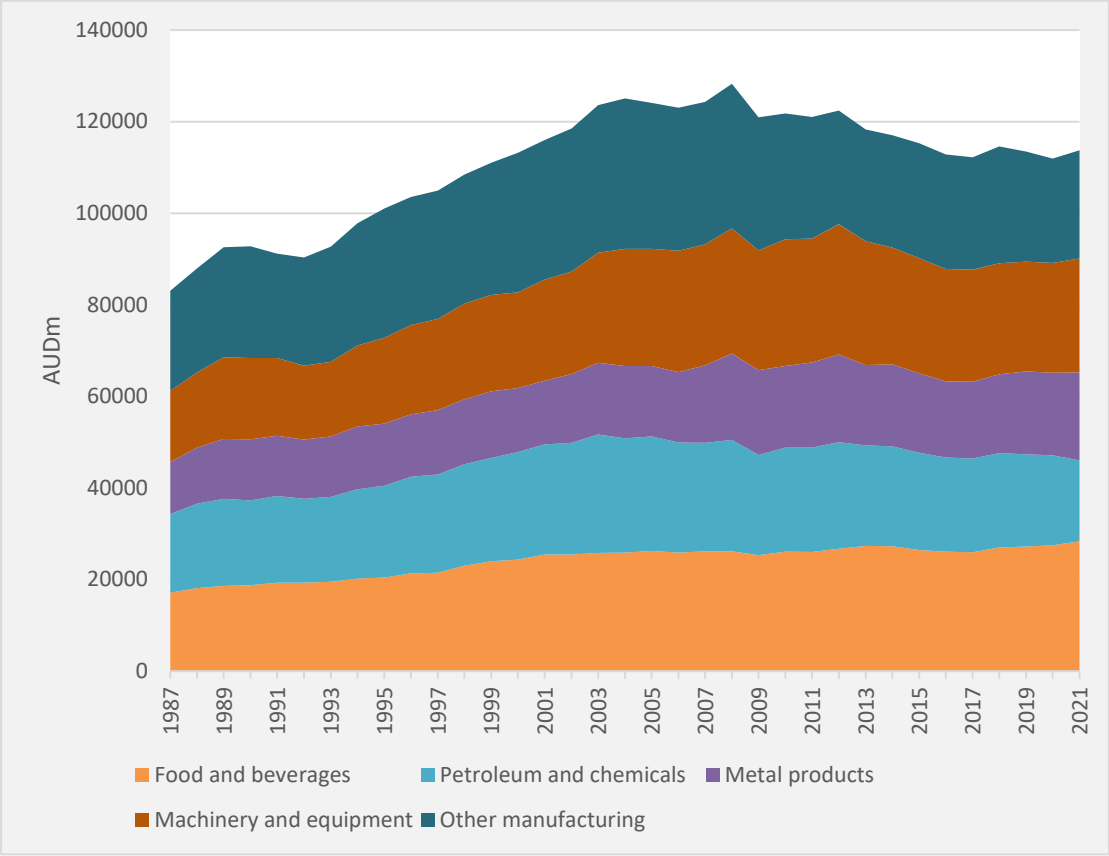
Source: DFAT TRIEC database
Figure 2: Composition of exports by sector, 1989-90 to 2020-21

The message is that Australian manufacturers are making a smaller contribution to export earnings (compared to the dramatic growth in the minerals and resources sector) but some product groups have shown strong growth. These include pharmaceuticals, processed food, medical and scientific instruments, essential oils (from a very small base), chemical preparations and inorganic chemicals.

Trends in Manufacturing

Turning to trends in Australia's manufacturing sector, Figure 3 shows manufacturing Industry Value Added (IVA) in chain volume measures over the last 40 years. Here we see real

manufacturing output (i.e. adjusted for inflation) peaking around 2008 followed by a slow decline, with a stabilisation over the last five years.



Source: ABS

Figure 3: Australia, manufacturing output 1987-2021, chain volumes

Across Australia, currently around 840,000 people are employed in the manufacturing sector. This has reduced by around 100,000 in the last decade, which is largely accounted for by employment lost in the Passenger Motor Vehicle (PMV), Textile Clothing and Footwear, Primary Metals, Printing and Polymer Products industries. The Fabricated Metals and Machinery and Equipment categories both showed significant losses of employment following the 2008 Global Financial Crisis, but have shown signs of recovery over the last few years.

Figure 4 below shows employment for each manufacturing industry for the years 2010 to 2020. By far the largest manufacturing industry employer at the Australian and New Zealand Standard Industry Classification (ANZSIC) level is food production. The next largest employers are metal fabrication, machinery and equipment manufacturing, and transport equipment, although these are much smaller compared with food.

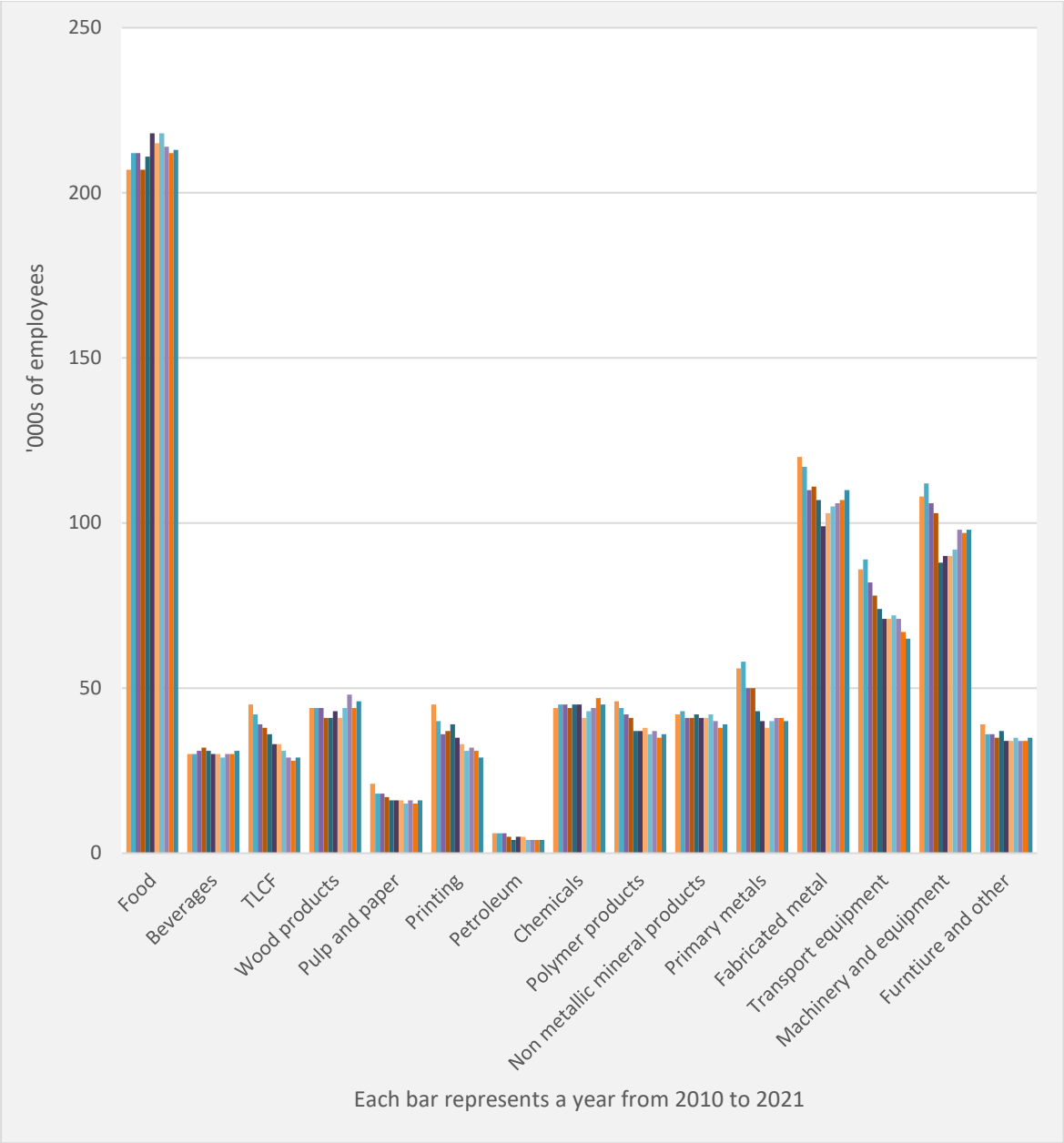


Figure 4: Australia, employment in each manufacturing industry, 2010 to 2021

2.1 Manufacturing businesses in Victoria

Across Victoria there are around 15000 manufacturing businesses. Geelong has in the order of six to seven percent of all Victorian manufacturing businesses (based on ABS SA4 region shown above).

Table 1: Victoria, manufacturing industries – frequency count by employment range, 2021

	Non Employing	1-19 Employees	20-199 Employees	200+ Employees	Total
Food Products	478	935	314	44	1,771
%	27	53	18	2	
Beverages	260	191	40	3	494
%	53	39	8	1	
Textile, Leather, Clothing and Footwear	508	548	70	6	1,132
%	45				
Wood Products	366	637	83	4	1,090
%	34	58	8	0	
Pulp, Paper and Converted Paper Products	51	88	26	6	171
%	30	51	15	4	
Printing	420	573	83	5	1,081
%	39	53	8	0	
Petroleum and Coal Products	20	31	8	0	59
%	34	53	14	0	
Basic Chemicals	196	224	66	15	501
%	39	45	13	3	
Polymer Product and Rubber Products	205	395	112	6	718
%	29	55	16	1	
Non-Metallic Mineral Products	236	357	57	6	656
%	36	54	9	1	
Primary Metal and Metal Products	106	247	53	3	409
%	26	60	13	1	
Fabricated Metal	822	1,439	174	11	2,446
%	34	59	7	0	
Transport Equipment	373	477	120	15	985
%	38	48	12	2	
Machinery and Equipment	739	1,186	192	12	2,129
%	35	56	9	1	
Furniture and Other	656	689	85	0	1,430
%	46	48	6	0	
All manufacturing industries, Victoria	5,436	8,017	1,483	136	15072
%	36.1	53.2	9.8	0.9	

Source: ABS Cat 8165 Table 4

2.2 City of Greater Geelong industry structure

Table 2 below shows the structure of industrial activity in the City of Greater Geelong (CoGG) region, measured in terms of Industry Value Added (IVA) and employment, during 2021-21. The largest industries are health care and construction. Manufacturing is the third largest industry by IVA, and the sixth largest in terms of employment.

Table 2: Geelong Region, composition of Industry Value Added and Employment (FTE), 2020-21

Industry Sector	IVA $m	%.	FTE	%
Arts and Recreation Services	87.2	0.7	1046	1.1
Mining	99.9	0.8	247	0.3
Information Media and Telecommunications	130.6	1.1	667	0.7
Agriculture, Forestry and Fishing	174.8	1.4	1506	1.6
Other Services	251.7	2.1	3249	3.5
Accommodation and Food Services	253.8	2.1	3871	4.2
Rental, Hiring and Real Estate Services	284.6	2.3	1192	1.3
Administrative and Support Services	366.3	3	1844	2
Wholesale Trade	418.1	3.4	1966	2.1
Transport, Postal and Warehousing	438.5	3.6	3331	3.6
Electricity, Gas, Water and Waste Services	439.2	3.6	1585	1.7
Professional, Scientific and Technical Services	656.8	5.4	5293	5.8
Financial and Insurance Services	699.2	5.8	2812	3.1
Retail Trade	894.4	7.4	9540	10.4
Public Administration and Safety	1096.9	9	8169	8.9
Education and Training	1204.8	9.9	10888	11.8
Manufacturing	1245.1	10.2	7432	8.1
Construction	1671.1	13.7	12259	13.3
Health Care and Social Assistance	1744.6	14.3	15153	16.5
Total industries	12157.5	100	92052	100

Source: id.economy

2.3 Structural change in City of Greater Geelong

Table 3 below estimates changes in the composition of CoGG Regional Product (approximately the sum of the value added of each sector above) from 2015-16 to 2021-21 compared to the rest of Victoria, and all of Australia.

Notable structural differences in 2020-21 are the larger health care, construction, manufacturing, education and training and public administration industries. Conversely, the Financial and Insurance, Professional, Scientific and Technical services, Transport, Postal and Warehousing services, Agriculture and Information, Media and Telecommunications sectors are noticeably smaller. In comparison with the rest of Victoria and the whole of Australia, the green shaded industries make a more significant contribution – healthcare, construction, manufacturing and education, while the red shaded industries – finance and insurance, professional services, transport, agriculture and information are smaller.

Over the period manufacturing's contribution to Regional Product declined from around 12 per cent in 2015-16 to around 10 per cent, offset by increases in Health Care and Construction. Note that this does not mean the manufacturing sector has contracted – in fact as shown in Table 3it has grown, but other sectors have grown faster.

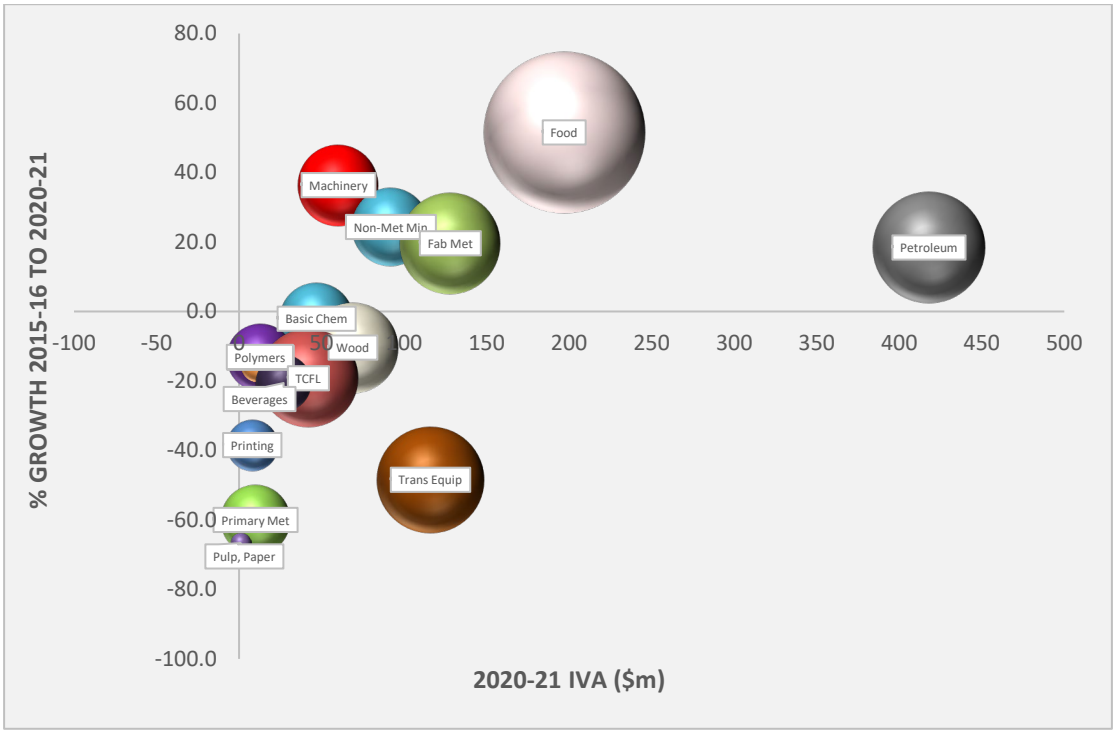
Table 3: Change in composition of CoGG Regional Product, 2015-16 to 2020-21 compared to Rest of Victoria and Australia

	2015/16				2020/21				2015/16 to 2020/21
	Geelong $m	Geelong %	Victoria %	Australia %	Geelong $m	Geelong %	Victoria %	Australia %	Geelong change in $
Health Care and Social Assistance	1333.6	13.2	8.5	7.5	1744.6	14.3	9.8	9	411
Construction	1236.6	12.2	9	9.4	1671.1	13.7	9.1	8.2	434.6
Manufacturing	1220.1	12	9.1	7.2	1245.1	10.2	7.8	6.7	25
Education and Training	936.1	9.2	6.4	5.8	1204.8	9.9	6.5	5.7	268.8
Public Administration and Safety	584.9	5.8	5.6	6.1	1096.9	9	6.3	6.5	512
Retail Trade	841.5	8.3	5.8	5	894.4	7.4	5.7	5.1	52.9
Financial and Insurance Services	541.3	5.3	11.1	9.2	699.2	5.8	11.3	9	157.8
Professional, Scientific and Technical Services	538.1	5.3	8.5	7.4	656.8	5.4	9.8	8.5	118.7
Electricity, Gas, Water and Waste Services	464.4	4.6	3.5	3	439.2	3.6	3.2	2.7	-25.2
Transport, Postal and Warehousing	453.5	4.5	6	5.6	438.5	3.6	5.1	4.8	-15
Wholesale Trade	364.5	3.6	5.9	4.4	418.1	3.4	6	4.6	53.6
Administrative and Support Services	314.6	3.1	4.1	3.8	366.3	3	4.2	3.6	51.8
Rental, Hiring and Real Estate Services	284.7	2.8	3.3	3.4	284.6	2.3	3.1	3.3	-0.1
Accommodation and Food Services	269.3	2.7	2.3	2.6	253.8	2.1	2	2.3	-15.5
Other Services	243.3	2.4	2.1	2.1	251.7	2.1	1.8	1.9	8.4
Agriculture, Forestry and Fishing	181.3	1.8	2.9	3	174.8	1.4	2.6	2.8	-6.5
Information Media and Telecommunications	125.6	1.2	3	2.4	130.6	1.1	3.4	2.6	5
Mining	106.1	1	1.5	11.2	99.9	0.8	1.2	11.6	-6.2
Arts and Recreation Services	101.3	1	1.3	0.9	87.2	0.7	1.2	0.9	-14.1

2.4 Manufacturing in the City of Greater Geelong

2.4.1 Trends in CoGG manufacturing

Figure 5 provides a summary of three key dimensions of Geelong's manufacturing industries. The horizontal axis shows the value added by each industry in 2020-21. Here it can be seen the industries contributing the largest value added are petroleum refining, followed in order by food products, fabricated metal products, transport equipment and non-metallic mineral products. The vertical axis shows real growth in the period 2015-15 to 2020-21. Industries showing growth are food products followed by machinery and equipment, non-metallic mineral products, fabricated metal products and petroleum refining. Finally, the size of the sphere for each industry reflects employment numbers. The largest employer is food products, followed by petroleum refining, transport equipment, fabricated metal products and textiles, leather, clothing and footwear.



Source data: id.economy

Figure 5: Geelong region manufacturing industries – showing growth 2015-16 to 2020-21, IVA in 2020-21 and relative employment

Table 4 below presents additional information on each manufacturing industry in the Geelong region. The first three columns reflect the data in Figure 5. Column 4 shows changes in labour productivity since 2015-16.

Column 5 shows the incidence of tertiary qualifications in the industry. The incidence of tertiary qualifications can be a proxy for knowledge intensity and absorptive capacity. It may also suggest the industries which are likely to be most receptive to utilising Deakin's research capabilities. The industries with the highest incidence of tertiary qualifications in their workforces are, in order, beverage production, transport equipment, petroleum refining, machinery and equipment and basic metal production. Those with the lowest incidence of tertiary qualifications are furniture, fabricated metal products, wood products, non-metallic mineral products, primary metals and polymer products.

Column 6 shows each industry's exports, and Column 7 shows each industry's sales outside the Geelong region. Exports indicate specialisations with competitive advantage; domestic sales

outside the Geelong region also suggests a degree of competitiveness and specialisation. Exports and sales outside the region are important because they release firms from the specific economic circumstances and growth of the region and allow firms to tap into other potentially faster growing markets.

The colour coding generally reflects relatively performance – green approximates the top third, yellow the middle third and red the bottom third. The exception is labour productivity, where the green coding represents the industries where labour productivity has increased since 2015-16.

Table 4: Geelong region manufacturing industries – showing growth 2015-16 to 2020-21, IVA in 2020-21 and relative employment

	1	2	3	4	5	6	7
	Industry growth 2015-16 to 2020-21 ($m)	IVA ($m) 2020-21	Employment (EFT)	Change in labour productivity 2015-16 to 2020-21	% of workforce with Bachelor degree or above	Exports (AUDm)	Domestic sales outside Geelong region (AUDm)
Food products	+52	197	1743	+6614	10	239	432
Machinery and equipment	+36	60	434	+11490	23	28	48
Non metallic mineral products	+24	92	394	+36457	9	8	51
Fabricated metal products	+20	129	671	-205	6	25	135
Petroleum refining	+18	418	830	-71648	24	178	3201
Basic Chemicals	-2	48	349	-21288	21	53	64
Wood products	-10	70	536	-33735	7	15	92
Furniture	-13	13	293	-8961	3	3	18
Polymer products	-10	12	73	-12517	9	4	8
TCFL	-19	42	645	-22640	17	85	100
Beverage production	-20	27	202	-30510	33	13	25
Printing	-5	8	171	-22961	16	1	3
Transport Equipment	-48	117	750	-52309	32	54	552
Primary Metals	-60	11	315	-22682	9	55	63
Pulp, Paper	-67	2	25	-39670	14	1	2

Sources: id.economy, ABS Census 2016

The Food Products, Machinery and Equipment, Fabricated Metal Products and Non-Metallic Mineral Products industries all generally have positive indicators.

Table 5 shows CoGG region key manufacturing outputs in 2015-16 and 2020-21. There are modest gains in each of the value of sales, value added exports and domestic sales outside the region.

Table 5: City of Greater Geelong, manufacturing sector, changes in key outputs, 2015-16 to 2020-21

	2015/16			2020/21			
	CoGG	Australia	CoGG/ Australia %	CoGG	Australia	CoGG/ Australia %	Change $m
Output/Total Sales ($m)	4181.51	378566.1	0.011	4481.6	395445.4	0.011	300.1
Value add ($m)	1220.12	112670.8	0.011	1245.1	113641	0.011	25.0
Domestic sales outside COGG ($m)	4725.45	138010.6	0.034	4885.9	140102.2	0.035	160.5
Exports ($m)	736	101097	0.007	763	105329	0.007	27.7

Source: id.economy

2.4.2 Current structure of Geelong's manufacturing sector

The structure of Geelong's manufacturing industries in 2020-21 is shown in Table 6 below in terms of IVA and employment. The largest industry measured by value added is Petroleum Refining ($418m), followed by Food ($197m), Fabricated Metal Products ($128m) and Transport Equipment ($116m).

By employment, the largest industry is Food (1743 FTE), followed by Petroleum refining (830 FTE), Transport Equipment (750 FTE), Fabricated Metal Products (671 FTE) and Textiles, Clothing, Footwear and Leather (645 FTE).

Table 6: Industry Value Added (IVA) of Geelong manufacturing industries, 2020-2021

	IVA (AUDm)	% total Regional GVA	Employment (FTE)	% total Geelong employment
Food	197.1	1.6	1743	1.9
Beverages	27.4	0.2	202	0.2
TCFL	42	0.3	645	0.7
Wood	69.5	0.6	536	0.6
Pulp, Paper	1.9	0	25	0
Printing	8.1	0.1	171	0.2
Petroleum	418.1	3.4	830	0.9
Basic Chemical	47.6	0.4	349	0.4
Polymers	11.6	0.1	73	0.1
Non-Metallic Mineral	92.3	0.8	394	0.4
Primary Metal	10.6	0.1	315	0.3
Fabricated Metal	128.7	1.1	671	0.7
Transport Equipment	116.7	1	750	0.8
Machinery	60.4	0.5	434	0.5
Furniture and Other	13	0.1	293	0.3

Source: id.economy

2.4.3 Employment in manufacturing

There were 240453 people employed in the Geelong region in 2019, not including self-employed.

Different data sources provide different estimates of manufacturing employment. There are various reasons for this, however Census data enumerates people resident in Geelong and excludes those who reside outside Geelong but travel to Geelong for work.

ABS regional data suggests there are around 12000 people employed in manufacturing in the Geelong region.

Table 7: Manufacturing employment, Geelong region (ABS SA4), 2015-2019

	2015	2016	2017	2018	2019
Number of employee jobs - manufacturing	12 630	11 763	11 997	11 784	11 945

Table 8 below shows estimates of manufacturing employment using 2016 and 2021 Census data.

Table 8: Geelong, employment in manufacturing industries, 2016-2021

	2016	2021	Change	% Change
Manufacturing, not further defined	525	572	47	9.0
Food Product Manufacturing	1669	2045	376	22.5
Beverage and Tobacco Product Manufacturing	298	426	128	43.0
Textile, Leather, Clothing and Footwear Manufacturing	636	567	-69	-10.8
Wood Product Manufacturing	431	310	-121	-28.1
Pulp, Paper and Converted Paper Product Manufacturing	49	55	6	12.2
Printing (including the Reproduction of Recorded Media)	223	230	7	3.1
Petroleum and Coal Product Manufacturing	564	432	-132	-23.4
Basic Chemical and Chemical Product Manufacturing	379	398	19	5.0
Polymer Product and Rubber Product Manufacturing	145	189	44	30.3
Non-Metallic Mineral Product Manufacturing	429	457	28	6.5
Primary Metal and Metal Product Manufacturing	356	374	18	5.1
Fabricated Metal Product Manufacturing	545	610	65	11.9
Transport Equipment Manufacturing	1365	1107	-258	-18.9
Machinery and Equipment Manufacturing	373	425	52	13.9
Furniture and Other Manufacturing	329	400	71	21.6
Total	8172	8339	167	2.0

Source: ABS Census 2016, 2021

Table 9 shows manufacturing employment for Colac, also based on Census data.

Table 9: Colac, manufacturing employment, 2016-2021

	2016	2021
Textile, Leather, Clothing and Footwear Manufacturing	4	0
Pulp, Paper and Converted Paper Product Manufacturing	3	0
Petroleum and Coal Product Manufacturing	0	0
Printing (including the Reproduction of Recorded Media)	7	3
Basic Chemical and Chemical Product Manufacturing	0	3
Transport Equipment Manufacturing	3	3
Furniture and Other Manufacturing	0	3
Polymer Product and Rubber Product Manufacturing	0	4
Beverage and Tobacco Product Manufacturing	0	8
Machinery and Equipment Manufacturing	11	8
Fabricated Metal Product Manufacturing	9	10
Manufacturing, nfd	13	11
Primary Metal and Metal Product Manufacturing	14	16
Non-Metallic Mineral Product Manufacturing	24	23
Wood Product Manufacturing	215	236
Food Product Manufacturing	675	837
Total	979	1174

Source: ABS Census 2016, 2021

3 SNAPSHOTS FROM INTERVIEWS WITH GEELONG REGION FIRMS

Interviews were conducted with 32 individuals from 31 manufacturing firms in the region during 2022, as outlined in 11 below. The firms were drawn from all sectors except beverages, printing, primary metals, pulp and paper and furniture.

Table 10: List of firms interviewed

Food	Irrewarra Bulla Cobram Estate Malteurop
TCFL	Godfrey Hirst
Wood Products	CMTP AKD
Petroleum	Viva Energy
Basic Chemical	Incitec Pivot SNF Dow
Polymers	GT Recycling Think Fencing RPC Technologies Sykes
Non-Metallic Mineral	Boral
Fabricated Metal	Innovative Windows Rendine FormFlow Thornton Engineering Infrabuild
Transport Equipment	Conflux Air Radiators Carbon Revolution
Machinery and Equipment	Austeng IXL Foundry UMS FLAIM Marand IXL Hanwha

The interviewed firms were skewed towards larger firms – two thirds of those interviewed had turnover greater than $50m, as shown below.

Table 11: Turnover ranges of interviewed firms

Turnover <$5m	Turnover $5m-$50m	Turnover >$50m
1	11	20

Ownership structures can be a useful characteristic for analytical purposes. Locally-based firms are less likely to be footloose – owners and key employees are tied to the region whereas public companies are obligated to pursue strategies for the benefit of shareholders, irrespective of location. Private companies with multiple owner usually have a greater focus on profitability

than owner-operated businesses. Ownership arrangements for interviewed firms are shown below below.

Table 12: Ownership arrangements of interviewed firms

Locally owned	
Victorian markets	Ports Victoria FormFlow Innovative Windows GT Recycling Rendine Irrewarra
National markets	Bulla IXL Group RPC Tech Thornton Engineering CMTP AKD Austeng Think Fencing Boomaroo Nurseries
National and international markets	UMS FLAIM Sykes Conflux
Ownership outside Geelong	
Australian owned, local plant	Marand Air Radiators Scale Innovation
Australian public company, Geelong base, Victorian and national markets	Viva Energy
Australian public companies, Geelong base, national and international markets	Carbon Revolution Cobram Estate
Australian public companies, local plant serving regional markets	Incitec Pivot Boral
Foreign owned, Australian market focus	Infrabuild SNF Godfrey Hirst Dow Hanwha
Foreign owned exporter	Malteurop

3.1 Outlook

Interviewees generally reported that conditions were buoyant and they were optimistic about the short to medium term prospects. Factors driving demand included an increased interest in developing and maintaining sovereign capabilities and continuing interest in onshoring. A pipeline of defence projects and the Victorian government's program of infrastructure investments are also driving confidence.

Against this otherwise positive outlook, two areas are seen as problematic. The first is availability of appropriate staff, a problem which exists across the board. Some firms are

looking for high-end engineering staff, project managers and costs controllers, while there are also issues in recruiting semi-skilled workers such as forklift drivers and truck drivers or unskilled labour which can be trained on specific operational functions.

The second issue concerns energy costs and energy security. Some firms have invested in solar generation which has offset energy costs to a degree, but other firms report that uncertainty about energy is a negative in weighing up future investment attractiveness.

3.2 Innovation

The firms interviewed demonstrated high innovation orientation. Innovation was evident around products, processes and business models depending on the business. A quick scan of some of the businesses:

3.2.1 Technology-based product innovation

A range of businesses are involved in developing and bringing new products to market. Carbon Revolution's activities are well known, but there is also a generation of newer firms with sophisticated product offerings. These include:

- Conflux – offering high end design and additive manufacture of heat exchangers for high performance vehicles, aerospace, defence and oil and gas.
- FLAIM – providing immersive training systems for fire fighting
- UMS – uses industrial robotics for vehicle simulators, providing virtual environments for defence training
- Think Fencing – has developed modular PVC fencing and decking systems with proprietary technology

Generally these businesses are now employing 30+ staff and are looking to increase staffing as they expand.

3.2.2 Process innovation

Many of the region's mature businesses are looking to achieve efficiencies and remove bottlenecks. This is often being undertaken in the context of long-term planning to upgrade or replace ageing equipment and increase automation and SCADA systems.

- Boral has opened a new cement plant at North Shore with a high level of automation.
- Incitec Pivot has consolidated its operations at North Shore, closing a plant at Portland.
- Infrabuild expects to invest in new plant over the next five years – a proportion of this will be to replace equipment that dates from the 1960s
- Boomaroo Nurseries has developed a nursery production system. This incorporates semi-autonomous vehicles and has automated numerous functions, e.g. placing seeds in punnets and trays.
- Thornton Engineering has made major investments in plant and machinery for steelwork and fabrication, introducing unique capabilities to the Australian market.
- Sykes is looking to automate more of its operations, introducing pre-pregs in the composite manufacturing process and has made investments in new ovens and cutting machines. It is also introducing additive printing.
- AKD believes it leads in introducing new timber milling technologies to Australia. It has lifted the proportion of recovery of useable timber from logs from 50% to 60%.
- CMTP has introduced robotics into the process for manufacture of timber pallets.
- Dow already has a high level of automation and computer-controlled equipment but is looking to extend this further to enhance precision and quality.
- SNF is in the process of commissioning a new monomer plant.

- Viva Energy is investing in new storage facilities and plant for low-sulphur petrol.

  Many businesses are aware of the development of Artificial Intelligence (AI) and machine learning and are looking for discussion and guidance on what these developments might mean for them.

3.2.3 Business model innovation

- A number of firms had a high dependency on Ford and/or Alcoa and have reinvented their business models.
  - IXL Metal Castings Foundry has developed a new customer base in the mining industry
  - Austeng has invested in-kind or cash in new companies. It has a number of approaches including looking to exclusive manufacturing arrangements.
- RPC Technologies is taking advantage of changing regulation to introduce new asset management services for composites.
- Rendine is creating new markets for its modular buildings in the kindergarten segment.
- FormFlow has developed a prefabricated housing system with a decentralised production model. It is opening its first facility in Portland.
- Bulla has launched Murray Street to compete in the premium ice cream segment.

3.2.4 Linkages with research organisations

Many firms reported they have linkages with universities. Deakin is prominent but there are also connections with CSIRO, Swinburne, RMIT, IMCRC, Monash, University of Adelaide and offshore institutions.

4 GEELONG MANUFACTURING ECOSYSTEM

An industrial or manufacturing ecosystem describes the economic, industrial and social elements that help to nurture firms.

There are numerous models that are useful in this regard – here Spigel's Entrepreneurial Ecosystem framework is used to assess Geelong's manufacturing ecosystem. It incorporates eleven factors under three pillars - social, material and cultural. Prospects for value creation and growth are strengthened when there is alignment across these attributes.

4.1 Social attributes

Social attributes include the presence of networks that disseminate knowledge, including knowledge about new technologies and particularly tacit knowledge around market opportunities and business processes; availability of talented workers, including those that are prepared to work in a new venture while it is in the risky set-up stage; mentors who model and are prepared to share their experiences relating; and local sources of investment capital, including angel investors and venture capitalists.

Based on the interviews and other research, Geelong has many strong attributes that support the entrepreneurial ecosystem:

- Formal networks include GMC, and there are informal networks around Deakin/Carbon Nexus, Geelong Tech School and among former (and current) Ford employees.

- Investment capital is always cited as a difficulty, especially if it is locally scoured. However, there are more pathways to capital than are apparent in similarly sized cities. The establishment of Scale Facilitation in Geelong offers the possibility of new avenues of investment capital and other support for local technology manufacturers. Scale Facilitation has a major partnership with Deakin in the support for Recharge Industries.

Austeng has taken positions in several local firms, assisting with prototyping and product development. Nevertheless Carbon Revolution's recent announcement of an amalgamation with a US firm to access growth capital is indicative of the limitations of the local capital market.

- Mentors and role models: There is a very rich store of experience in the Geelong region to provide role models and mentoring. However, many of the firms are owned and managed by modest individuals who, perhaps, do not fully recognise the magnitude of their achievements and the potential value of their insights and experience. There would seem to be opportunities to selectively tap more of this resource to mentor new, high potential businesses.

- Availability of talented workers: The interviews showed there was widespread concern about the availability of workers at all levels. If Hanwha is successful and achieves its ambitions for its new Armoured Vehicle Centre of Excellence at Avalon, there will be substantially increased demand for high-end engineering and project management skills.

4.2 Cultural attributes

The region's cultural attributes include attitudes to and support for entrepreneurial activities, together with the presence of local examples of successful entrepreneurship as beacons and to build confidence.

- Supportive culture: Firms perceived there was reasonable attitudinal support for manufacturing entrepreneurship in the region. However, several firms felt government did not appreciate the costs and uncertainties which their (the government's) decisions imposed. It was suggested state government seemed preoccupied with chasing new manufacturing investors while not supporting existing businesses. In particular OH&S legislation and practice was cited as a problematic for some firms, with requirements seen as increasing costs and creating disincentives for reinvestment by existing firms. At the local government level, zoning issues and uncertainties were cited as unhelpful. Some firms were concerned that industrial land was being encroached on by new housing development and were fearful this would result in restrictions on their operations. Because of the scale of investment in existing facilities, it would be uneconomic for these firms to relocate unless financial support was offered.

- Histories of entrepreneurship: There are numerous examples of successful manufacturing entrepreneurship in the region. This includes established family businesses (Bulla, AKD, CTMP, Thornton Engineering, Austeng), new technology businesses (Carbon Revolution, FormFlow, Conflux, FLAIM, UMS), manufacturing companies which have shown great flexibility in changing their business models to adapt to changing circumstances (IXL Group, Austeng, Air Radiators) and newer, fast-growing firms in the food sector (Cobram Estate, Irrewarra, Farm Foods).

4.3 Material attributes

Material attributes include training and research facilities, support services, infrastructure, policy frameworks and market conditions. Research organisations supply technologies for new business opportunities and universities and VET institutions supply a skilled workforce and can foster entrepreneurial mindsets. Support services boost early-stage firms. Material attributes also include the policy and governance environment for firms – broader taxation treatment (mostly outside local control). Finally, market conditions in the region are an important factor. At minimum, markets need to be competitive and open.

- Markets: As noted earlier, the interviewees reported favorable market conditions with projected long-term demand. Their main concern was around attracting sufficient labour. However circumstances change quickly and with the 2022/23 Budget release concerns around energy costs and security were substantially heightened.

- Physical infrastructure: Many respondents felt that Geelong offered a good balance between urban-quality physical infrastructure and regional lifestyle. There was some discontent with the speed of broadband services.

- Research organisations: With the departure of CSIRO's carbon fibre research facility, Deakin is the anchor research organisation in the region. Deakin seems to be the main provider of support services for manufacturing technology start-ups, especially those originating in Deakin research. It has provided Manufutures and invested in some start-ups. Most firms reported satisfaction with their connections with Deakin (and with The Gordon TAFE). There

may be some opportunities to increase offerings around manufacturing technologies. In the experience of the author the quality of the links between Deakin and the local business community are probably unique in Australia.

In sum, the Manufacturing Entrepreneurial Ecosystem in Geelong would have to rank among the best in Australia. That is not to imply that many aspects could not be strengthened, but overall the culture and organisations around Geelong are well down the road to capturing and nurturing the region's manufacturing potential.

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Read the Full Report at www.geelongmanufacturingcouncil.com.au

5 APPENDIX

5.1 Data sources

This document is based on data from the following sources:

- id.economy for the Geelong region
- ABS Census data 2016 and 2021
- ABS Cat 8155 Counts of Australian Businesses
- ABS regional data.

Each of these has its shortcomings. Although it relies on ABS data, id.economy is based on modelling.

The most reliable data is that from ABS. However, particularly with respect to its industry collections, ABS often does not disaggregate its data to the regional level. Specifically, ABS's potentially most useful collection, the Business Longitudinal Analysis Data Environment (BLADE), does not disaggregate beyond the state level. Other ABS regional and industry collections are not of sufficient granularity to provide a great deal of insight.

A minor issue with Census data is that the location of the usual place of work defaults to respondents' usual place of residence. This means that people who work outside the Geelong region are enumerated as working in the Geelong region, and those travelling to Geelong are not counted.

ABS Counts of Australian Businesses provides counts at a regional level, but not beyond the ANZSIC Division level – ie it is not possible to disaggregate into separate manufacturing industries.

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