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Scottish Manufacturing

1 Introduction

The following paper provides a range of indicators on the Scottish economy and the manufacturing sector in particular. Section 4 of the paper identifies a range of strengths and weaknesses in the manufacturing sector.

Key points from this paper include:

- Scotland's manufacturing industry contributes significantly to exports, with the traditional sub-sector of whiskey distilling being the major contributor;
- Manufacturing is also the largest contributor to the region's business expenditure on R&D spend, with the chemical and electrical machinery sectors performing strongly;
- Over the last three years the GVA contribution of manufacturing has been in decline.
- Whilst manufacturing exports remain strong relative to other sectors, they remain significantly below pre-recession levels; and,
- The overall trend in manufacturing full-time equivalent jobs has been downward since 1998.

2 Overall economic position

The Scottish Government's July 2012 *State of the Economy* briefing notes the Scottish economy experienced negative growth of 0.1% in the last quarter of 2011, and in the first quarter of 2012. Whilst negative growth in two quarters ensures that the economy is classed as being in a technical recession, the publication argues that *'there have been positive signs in most sectors of the Scottish economy'*.¹ It states:

In our view, the best interpretation of the current climate is one of flat growth... If growth was substantially negative for a number of quarters then concern would increase that we were experiencing a double-dip recession.

*Comparing the past quarter [Q1 2012] with the previous quarter a year earlier shows that other sectors [i.e. not construction] of the Scottish economy have grown marginally. Production output has increased by 2.5 per cent and services by 0.9 per cent, whilst the construction sector has contracted by 14.1 per cent.*²

As such, the dip in output over the six month period encompassing the end of 2011 and beginning of 2012 has been attributed to this sharp contraction in construction.

The Scottish labour market strengthened during 2012, with the period March to May 2012 showing a fall in the headline unemployment rate of 0.2% to 8.0%. At the same time the employment rate rose by 0.1% to 71.4%.

Assessing the future prospects of the economy the publication concluded:

- The Scottish economy would continue to have a fragile recovery for a number of quarters, with events in Europe continuing to influence confidence and investment;
- The extent of the region's economic recovery will depend on events in key export markets;
- Increased private sector investment will be required to counter balance deleveraging. The recent fall in inflation was viewed as helpful in this respect. Significantly, economic confidence levels were deemed to be *'the key driver of growth in the months ahead'*; and,
- Conditions in the construction industry were expected to remain challenging, although there was thought to be scope to build on growth in the service and production sectors.³

Ultimately, the report concluded:

Assuming a gradual resolution to the Euro crisis coupled with a continued period of deleveraging, we expect growth to be fragile through 2012 before

¹ The Scottish Government *State of the Economy – Latest Assessment by the Chief Economist* (July 2012)
<http://www.scotland.gov.uk/Resource/0039/00397948.pdf>

² *Ibid*

³ *Ibid*

picking up somewhat in 2013 and returning to near trend in 2014. This would suggest that output will return to pre-recession levels at some point during 2014. There are however, clearly risks on both the up and downside.⁴

3 Economic position of Scottish Manufacturing

3.1 Headline data

Table 1 outlines a range of headline figures for Scottish Manufacturing for the years 2008, 2009 and 2010. Key points arising from this data include:

- Between 2009 and 2010 manufacturing GVA decreased by £321m (-2.5%), following a decrease of £378.1 (-2.9%) in 2008-2009;
- Manufacturing turnover also fell during the period examined. Between 2008 and 2009 it fell by £5,812.5m (-14.3%). The pace of decline slowed considerably between 2009 and 2010 when turnover fell by £78 (-0.23%).
- Measured in turnover, Scottish Manufacturing represented 8.1% of total UK manufacturing turnover in 2008, this fell to 7.7% in 2009 and to 7.1% in 2010;
- Measured in GVA, Scottish manufacturing represented 9.4% of total UK manufacturing GVA in 2008; this increased to 10.3% in 2009, but fell again in 2010 to 8.9%.
- Total employment (which includes full and part-time employees on the payroll plus the number of working proprietors employed) has fallen in each year measured. Between 2008 and 2009 total employment fell by 9,000 (-4.4%). Between 2009 and 2010 it fell by 17,300 (-8.9%);
- Total employees (estimate of full and part-time employees on the payroll, not a measure of full time equivalent) fell in each year. Between 2008 and 2009 the number fell by 8,400 (-4.2%). Between 2009 and 2010 the figure fell by 15,700 (-8.3%); and,
- GVA per employee increased on a yearly basis – from 2008 to 2009 it increased by £929 (1.4%), from 2009 to 2010 it increased by £4,185 (6.2%).⁵

⁴ *Ibid*

⁵ Scottish Government *Manufacturing Profile* (September 2012)

<http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/SABS/ManuProfile>

Table 1: Headline data Scottish Manufacturing⁶

Year	Totals					Per Employee		As % of UK Manufacturing	
	No. of Units	Total Employment (000s)	Total Employees (000s)	Total Turnover (£m)	GVA at Basic Prices (£m)	GVA Per Employee (£)	Total Labour Cost Per Employee (£)	Total Turnover %	GVA%
2008	9,115	203.6	198.0	40,386.9	13,053.6	65,919	31,567	8.1	9.4
2009	9,124	194.6	189.6	34,574.1	12,675.5	66,848	32,166	7.7	10.3
2010	8,737	177.3	173.9	34,496.2	12,354.5	71,033	32,884	7.1	8.9

3.2 GVA

Figures 1 and 2 compare Scottish manufacturing output to that of other UK regions (data tables are available at appendix 1). Figure 1 shows total GVA at basic prices⁷ for the years 2008, 2009 and 2010. Note: 2009 and 2010 data for East and South East regions has been suppressed to avoid disclosure. A number of things can be said about this data. Firstly, in 2008, the only year in which data is available for all regions, Scottish manufacturing recorded the sixth highest total GVA. In the same year the North West recorded the highest level of manufacturing GVA (£18,976m). Northern Ireland had the lowest (£4,662m), as would be expected considering it is the smallest of the regions.

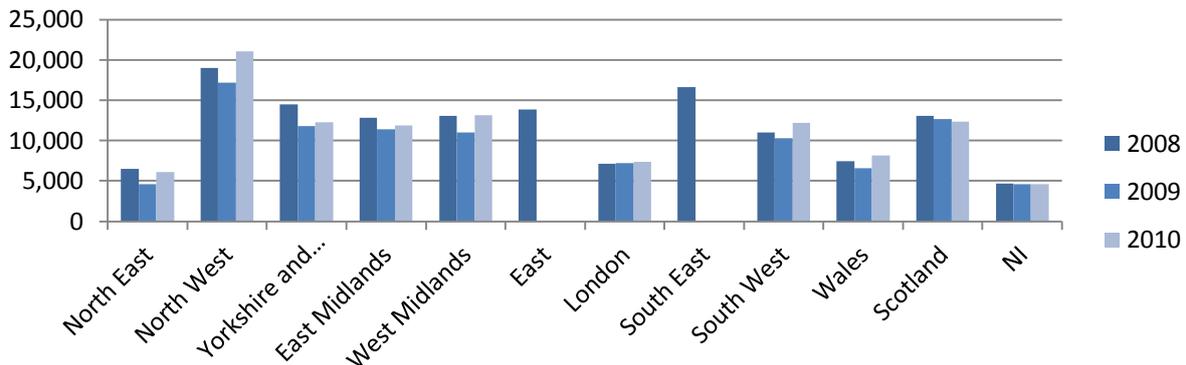
Looking at the two years for which data is incomplete: Scotland recorded the second highest level manufacturing GVA in 2009, after the North West (£17,200m); and the third highest in 2010; the North West was again the highest (£21,055m). In each of the years Northern Ireland recorded the lowest manufacturing GVA (2009 – £4,574m; and 2010 – £4,580). The second point that can be made about this data is that, of the available regions, Scotland was the only region not to experience growth in its manufacturing GVA between 2009 and 2010.⁸

⁶ *Ibid*

⁷ Basic prices refers to the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable, and plus any subsidy receivable, on that unit as a consequence of its production or sale; it excludes any transport charges invoiced separately by the producer <http://stats.oecd.org/glossary/detail.asp?ID=189>

⁸ Scottish Government *Annual Business Statistics* (September 2012)
<http://www.scotland.gov.uk/Topics/Statistics/Browse/Business/SABS/SABS-PDF>

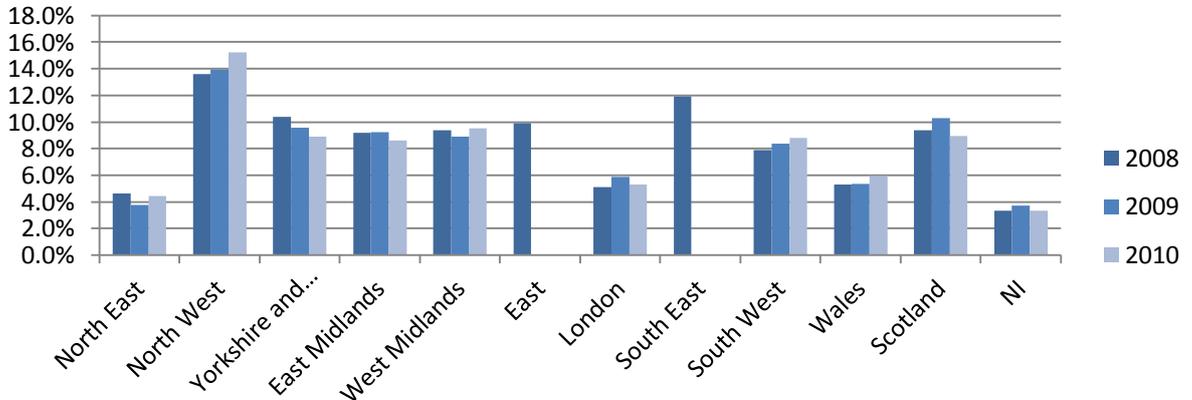
Figure 1: Manufacturing GVA at basic prices (£ million) 2008-2010



Source: Scottish Government

Figure 2 plots regional manufacturing GVA as a proportion of total UK manufacturing GVA. Again, data for the East and South East regions of England is not available for the latter two years. Scottish manufacturing’s contribution to total manufacturing GVA was the joint fifth highest in 2008, the second highest in 2009 and the third highest in 2010 of all UK regions (excepting the missing data in the years two and three). In all three years the North West contributed the most to total UK manufacturing GDP (13.6%, 14% and 15.2%) and Northern Ireland the least (3.3%, 3.7% and 3.3%).⁹

Figure 2: Manufacturing GVA % UK total 2008-2010



Source: Scottish Government

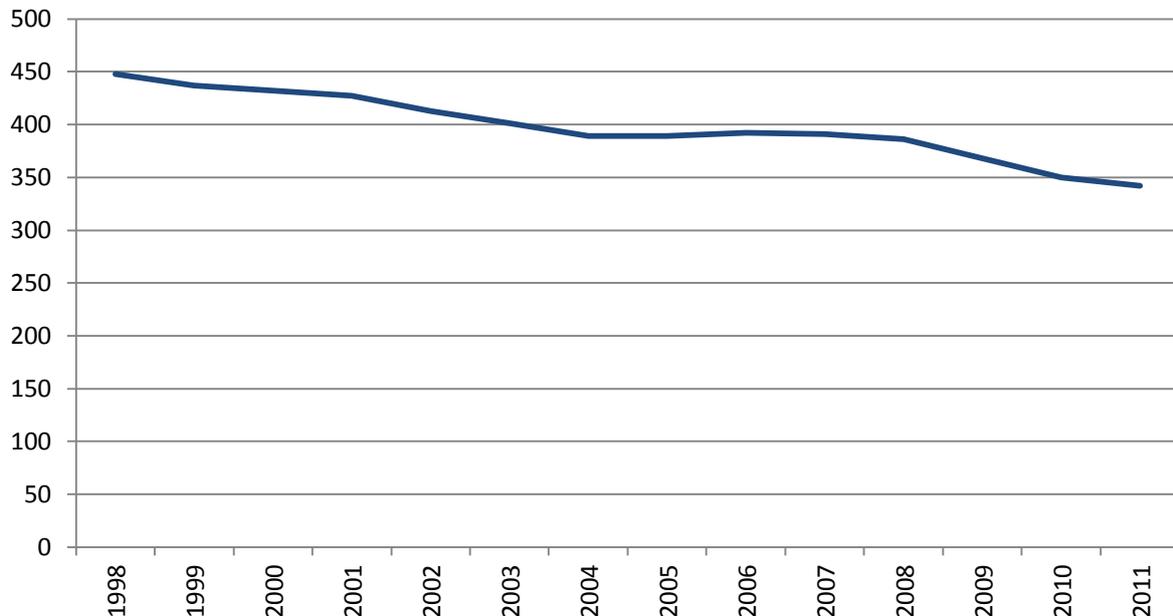
3.3 Employment (historical)

Figure 3 provides a historical overview of employment in Scotland’s manufacturing sector. The figure measures full-time equivalent employment, a different measure than that used above. This measure includes both part-time and full-time and calculates the hours worked of each to establish an equivalent to full-time hours (for example, a part-time worker who works a 20 hour week, in an industry where the standard full-time week is 40 hours, would be counted as 0.5 on this measure). The source data for this

⁹ *Ibid*

has not been seasonally adjusted. The figure shows that, despite a period of relative stability between 2003 and 2007, the overall trend has been downwards since 1998. The total decline in the year's measure was from 448,000 in 1998 to 342,000 in 2011, equivalent to a 24% decrease.¹⁰

Figure 3: Full-time equivalent employment in manufacturing, 1998-2011



Source: Scottish Government

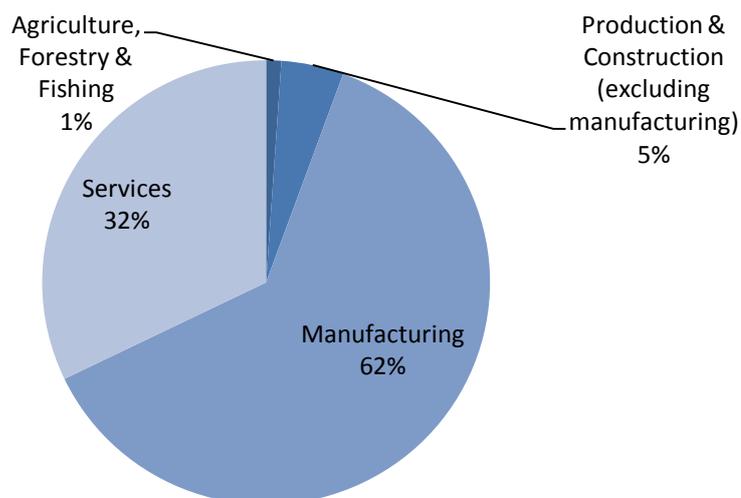
3.4 Exports

Scottish manufacturing contributes significantly to Scotland's exports. In 2010 total Scottish exports were £21.98bn¹¹ (excluding sales to the rest of the UK), the manufacturing sector contributed £13.68bn, or 62% of total exports. Of manufacturing exports, 50.04% went to the EU, whilst 49.56% went to non-EU regions. Figure 3 illustrates the contribution of manufacturing and provides comparisons with other broad industry sectors. Table 2 provides further details of the value of exports by sector and by destination.¹²

¹⁰ Scottish Government *Scottish National Accounts* (Q1 2012) <http://www.scotland.gov.uk/Resource/0039/00398837.pdf>

¹¹ Please note: Excludes the value of oil & gas extracted from the UK Continental Shelf; Includes manufacturing, mining & quarrying and electricity/gas/water supply; excludes water transport, air transport, financial intermediation, insurance and pension funding, and sewage and refuse disposal. Also, figures here are based on SIC 2003 (RU) classification, whereas GVA figures have been based on SIC 2007 (LU) disallowing direct comparison.

¹² Scottish Government *global Connections Survey 2010* <http://www.scotland.gov.uk/Resource/0038/00385828.pdf>

Figure 4: Scottish Exports by sector as percentage of total exports 2010¹³

Source: Scottish Government

Table 2: Scottish Exports by sector and trade area (£m), 2010¹⁴

	EU27	Non-EU	Total
Agriculture, Forestry & Fishing	125	75	240*
Production & Construction (excluding manufacturing)	260	730	990
Manufacturing	6,900	6,780	13,680
Services	2,510	3,525	7,065**
Total	9,795	11,115	21,980***

*Figure includes £40m of exports which could not be allocated to a region.

** Figure includes £1,070m of exports which could not be allocated to a region.

*** Figure includes both of export figures that have not been allocated to a region.

The top five export industries in Scotland during 2010 were:

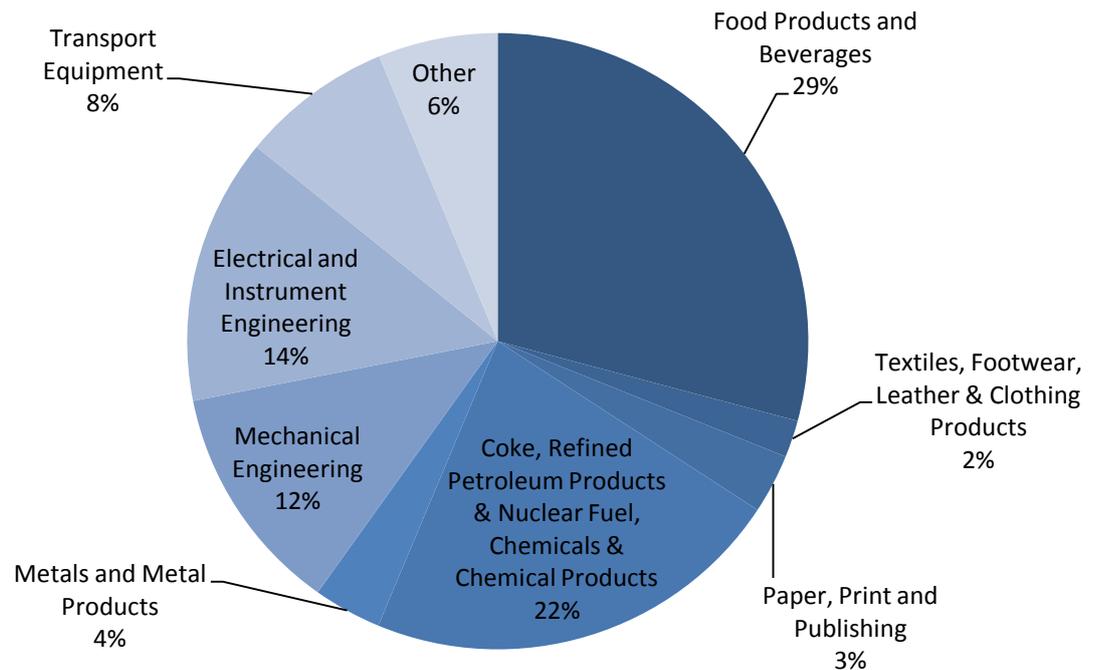
- Food and beverages (£4.0bn);
- Chemicals (including refined petroleum products) (£3.0bn);
- Business services (£2.5bn);
- Electrical and instrument engineering (£1.9bn); and,
- The mechanical engineering sector (£1.6bn).¹⁵

¹³ *Ibid*¹⁴ *Ibid*¹⁵ *Ibid*

Of these five industries, all but business services is classed as a manufacturing industry. A closer look at the figure for food and beverages shows that the £4bn figure is dominated by the whiskey industry which contributed £3.3bn in 2010.¹⁶

Figure 5 provides a more detailed breakdown of manufacturing exports for 2010.

Figure 5: Scottish manufacturing exports by sub-sector as proportion of total manufacturing exports, 2010¹⁷



Source: Scottish Government

Figure 6 shows annual growth in exports since 2007, up to the first quarter of 2012. The information is based on the Index of Manufactured Exports. Some key points on this figure include:

- The annual rate of growth in manufactured exports (4Q-on-4Q) has slowed in the latest quarter, from 4.9% to 4.2%. This reflects the slowing of quarterly growth in the second half of 2011, following strong results at the start of the year.
- The index of manufactured exports fell more than 13 per cent during the recession in 2008/9. Since then the trend in the results shows a recovery in export volumes, although the quarterly growth rates have been relatively volatile.
- The latest results show that export volumes remain around 6.4 per cent below their pre-recession level.¹⁸

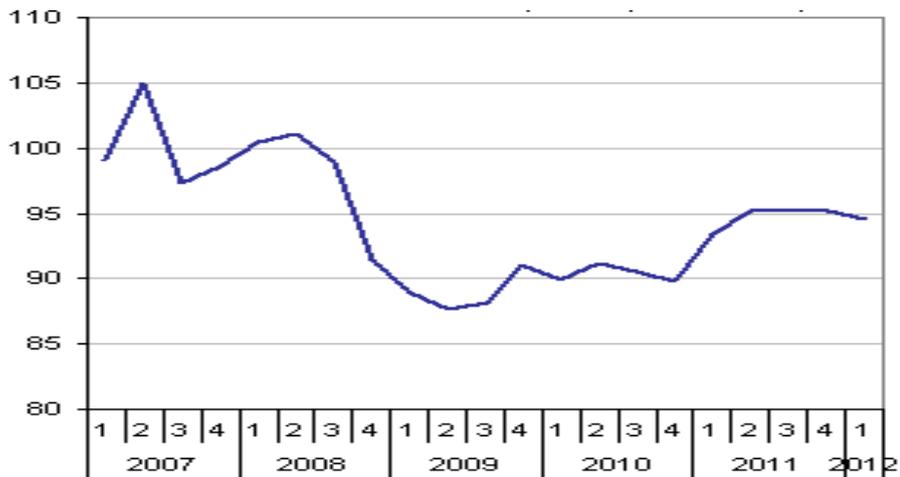
¹⁶ *Ibid*

¹⁷ *Ibid*

¹⁸ Scottish Government *Index of Manufactured Exports* (July 2012)

<http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Exports/IMEIntroduction>

Figure 6: Index of Manufactured Exports (2007=100)¹⁹

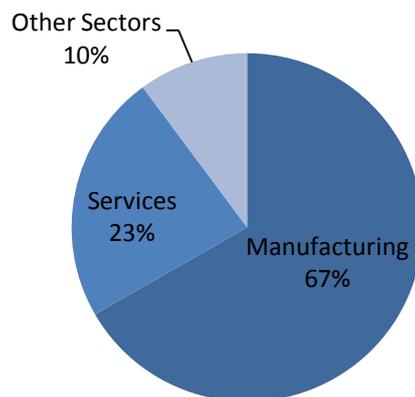


Source: Scottish Government

3.5 R&D expenditure

Figures 7 and 8 provide an overview of manufacturing’s contribution to Business Expenditure on R&D (BERD) in 2010. The figure shows that manufacturing contributes 67% (£415m) to total BERD (£622m). Within the manufacturing sector the biggest contributor was chemical manufacturing, which contributed £158m or 38% of total manufacturing BERD.²⁰

Figure 7: BERD by sector as proportion of total, 2010

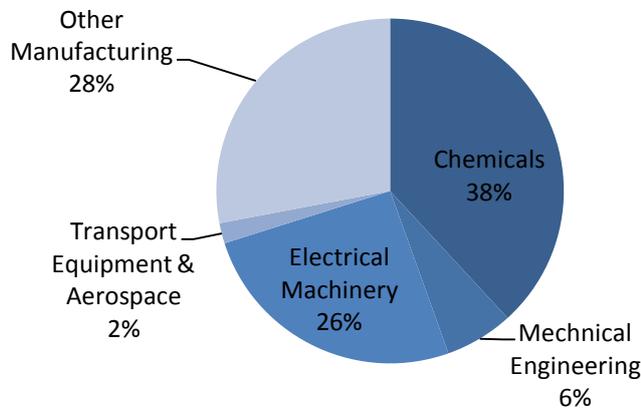


Source: Scottish Government

¹⁹ *Ibid*

²⁰ Business Enterprise Research and Development Scotland 2010 (November 2011)
<http://www.scotland.gov.uk/Publications/2011/11/BERD2010>

Figure 8: Manufacturing BERD by sub-sector as proportion of total manufacturing BERD, 2010²¹



Source: Scottish Government

4 Strengths and weakness of Scottish manufacturing

A number of strengths and weakness in the Scottish manufacturing sector have been identified in the figures above. For example, the region's manufacturing industry contributes significantly to exports, with the traditional sub-sector of whiskey distilling being the major contributor. Manufacturing is also the largest contributor to the region's BERD spend, with the chemical and electrical machinery sectors performing strongly.

The manufacturing sector has not however, been immune to the effects of the global downturn and to historical patterns of deindustrialisation in western economies. Over the last three years the GVA contribution of manufacturing has been in decline. Similarly, whilst manufacturing exports remain strong relative to other sectors, they remain significantly below pre-recession levels. Finally, as identified in Figure 3, the overall trend in full-time equivalent jobs has been downward since 1998.

Some further strengths and weaknesses are identified in the literature. The Institute of Mechanical Engineers, for example, highlights positives in the region's:

- Educated workforce – Scotland has a number of '*excellent universities*' which maintain and create skills '*vital to the success of the broader definition of manufacturing*';
- Ideas in Universities – In addition to providing an educated workforce, the university sector is key to carrying out R&D;
- Traditional resources – the region has historically had '*excellent resources*' in coal, oil and gas, although these resources are depleting;

²¹ *Ibid*

- Renewable resources – the region has potentially world leading levels of wind and marine energy, the exploitation of which could offer a boon to manufacturing by offering product and energy; and
- Historical Infrastructure – the region has ‘*significant infrastructure*’ from its manufacturing past, although the region is moving beyond more traditional forms of manufacturing.²²

The same report notes a number of weaknesses:

- Whilst the university is strong in R&D and in idea creation, deficiencies in the commercialisation of these ideas are noted;
- The region lacks a major PLC base;
- Scotland’s manufacturing cannot compete on labour cost, which may be a weakness within a globalised economy;
- Scotland currently has a number of issues with transport infrastructure, e.g. the M8, airport rail links and the Aberdeen bypass. Furthermore ‘*no clear route map for future infrastructure investment has been developed. Such a route map would help manufacturers plan and ensure correct resources are in place*’.²³

Annex 1 contains the findings and recommendations of a University of Strathclyde study into Scottish Manufacturing SMEs conducted in 2009. The study charted the changing face of the manufacturing industry (from an SME perspective) and recommended ways forward. Key findings can be summarised as follows:

- Move away from price as the basis of competition;
- A lack of capability in generating and enacting strategy;
- A lack of understanding of the capabilities and competencies needed to support a new business model;
- A ‘*worryingly low number of young manufacturing companies*’ with the effect the intellectual property is exploited elsewhere;
- A shift in operations toward increasing levels of design and service;
- Companies are focussing on improving manufacturing efficiency. There is less of a focus on improving processes that deliver value such as customer services;
- Many companies see potential in developing a manufacturing presence overseas. There are some sectors where activity will continue to be viably located locally due to proximity to markets or resources;
- There is a lack of appreciation on the potential of innovation, with innovative behaviours limited to product design;
- Companies are short of human resources in key high skill areas and (more so) in basic operations; and,

²² Institute of Mechanical Engineers *Manufacturing – Securing Scotland’s Future* (accessed 30 August 2012) http://www.imeche.org/Libraries/Position_Statements/IMechE_Scottish_Manufacturing_Report.sflb.ashx

²³ *Ibid*

- Some companies lack confidence in finding support or believed that it would take too long to do so.²⁴

²⁴ Strathclyde University *Manufacturing in Scotland* (2009)

http://www.strath.ac.uk/media/departments/siom/documents/SIOM_Manufacturing_Report_Jan2009.pdf

Annex 1: University of Strathclyde – Manufacturing in Scotland: findings and recommendations (summary)

Theme	Finding	Effect	Ramification	Recommendation
Strategic	The primary basis of competition for Scottish manufacturing SMEs is no longer price.	Migration towards different value propositions such as lifecycle support and integrated solutions.	Companies must ensure they have sustainable and efficient processes that deliver value on all of the activities that comprise their value proposition.	Support must be provided to help companies develop and improve processes and capabilities that deliver value (beyond manufacturing).
	There is a lack of capability in generating and enacting strategy.	Restriction in the ability of companies both to develop a future direction for their business model and to move towards it. Lack of vision restricts both investment and confidence.	Growth is restricted as companies continue to focus on their historical core activities rather than invest in future capabilities and markets.	Support in strategic methods needs to be provided in the same way that there is currently support in operational methods.

	<p>There is a lack of understanding of the capabilities and competencies needed to support a new business model.</p>	<p>Activities in areas crucial to delivering customer value (eg. product development and customer service) are sub-optimised.</p>	<p>Expansion of the scope of company activity is carried out in a random and unplanned manner</p>	<p>Support in establishing design and service operations needs to be provided in the same way that there is currently support in manufacturing efficiency</p>
	<p>The research suggests a worryingly low number of young (< 5 years old) manufacturing companies.</p>	<p>Intellectual property is exploited elsewhere.</p>	<p>The lack of new manufacturing enterprises may result in the long-term erosion of Scotland's manufacturing base. There is a concern that as traditional industries decline they are not replaced with new industries. Reliance for growth is then on more established companies who are growth limited by the aforementioned reasons. There are also implications in terms of developing a competitive environment.</p>	<p>Further work needs to be done to investigate the low level of manufacturing start-ups.</p> <p>More advice for entrepreneurs – not just in developing a business plan but on more practical aspects of building a sustainable business.</p>

Operational	<p>There is a shift in the nature and scope of operations, with evidence of increasing levels of design and service. However there is less evidence of processes to support design and service activity.</p>	<p>Increasing resource involved in areas allied to manufacturing and needed to support the value delivered to the customer. However there is a lack of efficient processes in these areas.</p>	<p>Early evidence suggests that whilst companies may feel increased servitization is imperative. Many servitized companies are less profitable and not sustainable long term (most likely because of lack of strategy and efficient processes to support new value propositions).</p>	<p>Continued support is needed in the area of manufacturing efficiency. However, support is also needed to help companies develop sustainable and efficient processes in other areas, particularly in the areas of product development, innovation and customer service.</p>
	<p>Companies are continuing to focus on improving manufacturing efficiency as it delivers more immediate returns and is within their comfort zone.</p>	<p>Whilst there are benefits to improving manufacturing efficiency, many companies are not spending the resource improving the processes that deliver value - including design processes, customer service, etc.</p>	<p>Restricts the amount of resource applied to expansion of scope of company activity.</p>	

	<p>Manufacturing activity exists on a continuum differentiated by complexity of product, repeatability of process and skill level.</p> <p>There are some sectors where manufacturing activity will continue to be viable regardless of complexity e.g. that based on proximity to markets or natural resources (localisation).</p> <p>Study suggests many companies saw significant potential to exploit opportunities overseas.</p>	<p>Manufacturing characterised by high complexity, high-skill operations can be efficiently carried out in Scotland. There is now less manufacturing characterised by low complexity and highly repeatable processes being done in Scotland. However it is still viable in some situations (eg. localisation)</p> <p>For many manufacturing SMEs exploiting opportunities overseas will mean a manufacturing presence in other countries.</p>	<p>The type of manufacturing and the location of manufacturing facility should be the result of a conscious decision-making process based on the stated contingencies and economics of the specific situation. In some cases off-shoring manufacturing activity may be the best option for both company and country.</p>	<p>A set of priorities is needed that identifies the types of manufacturing activity that can be competitively carried out in Scotland. Skills and investment strategies should be developed to support this identified type of activity.</p> <p>Further work is needed to understand this in terms of supply side and demand side localisation.</p> <p>Support should be available to companies that need to establish manufacturing facilities overseas.</p>
	<p>There is a lack of appreciation of the potential importance of innovation in delivering value as innovation tends to be understood in relation to technology and product development.</p>	<p>Innovative behaviours are limited to the design of products</p>	<p>Although there is an appreciation of the importance of support and service little creativity is applied in this area with enhancements resulting from experience rather than up-front creative thought</p>	<p>The scope of innovative practice needs to be applied to all areas of the product lifecycle.</p>

Support	It is difficult to secure human resource with the skills and motivation to work in manufacturing	Companies are short of key resources to work in key high skill areas and also in more basic operations	Growth is limited due to lack of resource and lack of management confidence resulting in further concentration on historical core activities and current business needs	Skilling strategy must be created that is coherent with the needs of industry in all phases of the product lifecycle and matches the type of manufacturing activity that will be carried out in Scotland in the future. Media campaign required to re-energise enthusiasm in manufacturing illustrating the variety of 21 st manufacturing activity
	Some variability in the operation and overall quality of the support services provided	Wasted time in accessing and navigating the support network.	Some companies lacked confidence in finding support (or had a perception that it would take too long) and so did not try to access support.	Simplification of support – a single entry system. Building a community of support.