REGENERIS

Sector Needs Assessment - Advanced Manufacturing and Engineering

A Final Report by Regeneris Consulting

28 July 2017

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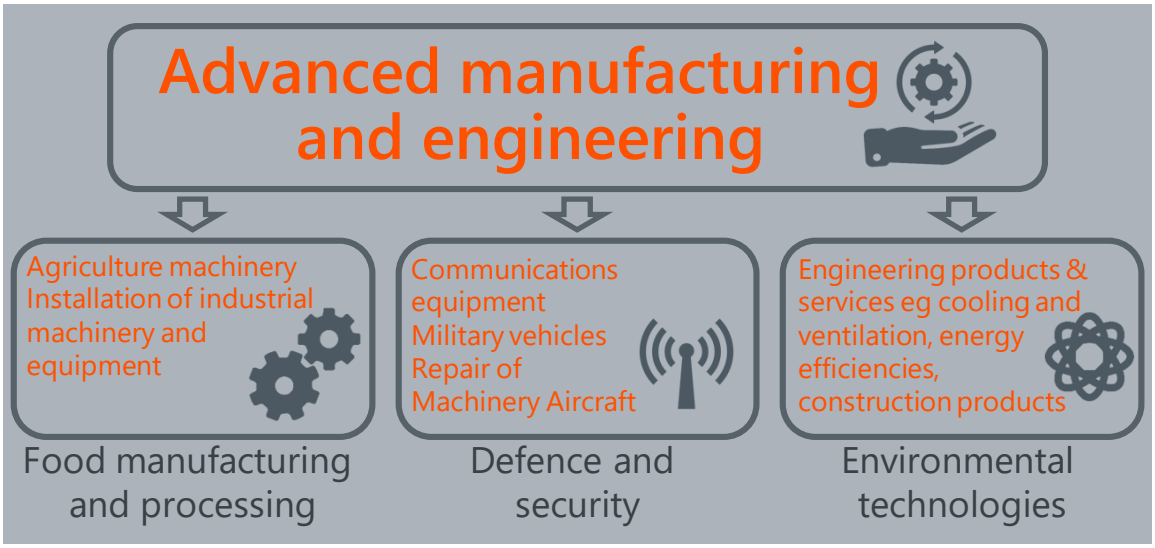
1. Introduction

1.1 This report focuses on the Advanced Manufacturing and Engineering sector in the Marches. The Advanced Manufacturing and Engineering (AME) sector is one of Marches LEP's priority sectors where the Marches has a strong specialism and potential for growth.

1.2 As well as being a priority in itself, Advanced Manufacturing and Engineering is an important enabler for other priority sectors: defence and securities, food manufacturing and processing, and environmental technologies. It underpins the technological capabilities of other sectors, and so performs a cross-cutting role.

Figure 1.1 Advanced manufacturing and engineering' relationship to the other priority sectors



Source: Regeneris Consulting

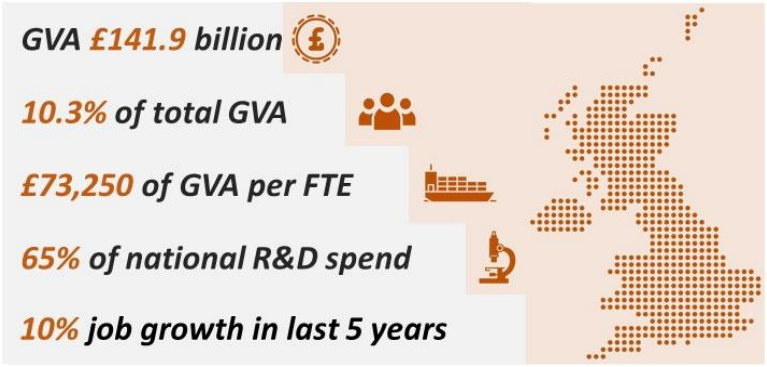
1.3 Advanced manufacturing makes intensive use of capital and knowledge and utilises a high level of technology and research and development. It can apply to all manufacturing industries but tends to be associated with medium and high-tech firms. Advanced manufacturing is more of a concept than a precisely defined sector, and it is useful to maintain a broad definition to ensure that the Action Plan is sufficiently flexible to respond to future changes. However, for the purposes of secondary data analysis it is useful to define the sector using the Standard Industrial Classification (UK SIC 2007)[1].

[1] AME sector definition is provided in Appendix A.

Trends and Drivers

1.4 Nationally, the broad manufacturing sector is highly productive, contributing £141.9bn in Gross Value Added (GVA), and achieving £73,250 GVA per Full Time Equivalent employee.

Figure 1.2 National Summary of the Manufacturing Sector



Source: Regeneris Consulting

1.5 Industrial digitisation, or 'Industry 4.0', refers to the trend by which new digital technologies such as 3D printing, sensor technologies and robotics are being introduced into manufacturing. The introduction of these new technologies and techniques are changing products, processes and supply chains in the manufacturing sector. These changes have the ability to create value across the manufacturing ecosystem, which will shift the balance of competitive drivers and will support:

- smarter supply chains (greater coordination, real time information sharing, better tracking of assets and inventory and integrated planning and production)
- smarter production (use of data analytics, new production techniques and technologies such as autonomous robots, multi-purpose production lines and augmented reality) to improve yield and speed up production and allows business models such as mass customisation to be pursued
- smarter products (rapid innovation and a faster time to market is enabled by data collected from products, remote diagnostics and remote/predictive maintenance).

Source: EEF, 2016, The 4th Industrial Revolution – A Primer for Manufacturers

1.6 EEF research has found that manufacturers are aware of the changes that were happening and the business benefits it could yield, but there is a mixed picture in terms of knowledge and application among individual businesses.

1.7 Other drivers of change in manufacturing include:

- regulation – an important driver setting international standards for manufactured goods but also more broadly such as health and safety requirements, or emissions targets imposed by government
- increased trend towards electrification of transport and calls for sustainable cities
- use of new materials in production and construction
- additive manufacturing or '3D printing' uses digital technologies to allow rapid transformation to the manufactured product. This process is changing the way we design and make products using new technologies and a range of products (metals, plastics, composites) leading to new business models and supply chains
- servitisation is a mode which is increasingly common across multi-nationals and SME businesses (eg Rolls Royce not selling aircraft engines but remain owners of engines and provide fully maintained service).

1.8 Many well-documented key drivers shaping the performance of the advanced manufacturing sector have a skills dimension. These include:

- translating innovation into growth
- increasing investment in R&D
- meeting low carbon policies and legislation
- maximising export opportunities
- taking advantage of potentially transformative enabling technologies.

Source: UKCES Sector Skills Insights Advanced Manufacturing

1.9 A shortage of skilled labour especially with STEM skills at all levels is already well documented and often cited by business when describing what is limiting its growth potential. This challenge will be exacerbated by an ageing workforce, the need for new skills (eg in data analytics), and potential reliance on more 'home-grown' talent. Government policy, such as the introduction of the Apprenticeship Levy, is aimed at alleviating this problem but culture and perceptions of manufacturing may mean that recruitment continues to be an issue. As well as the need to attract new talent to the sector the need to retrain, refresh and up-skill existing staff will also be vital.

1.10 A recent study from the Organisation for Economic Co-operation and Development (OECD) identified several emerging trends which will have a significant effect on manufacturing over the next decade. These include:

- **More responsive processes, closer to customers**: manufacturers will be quicker to respond to and adopt new technologies; products will be increasingly customised; new technology (for example, additive technology/3D printing and nanotechnology) will enable production away from factories; digital technology will increasingly alter supply chains, including in product verification, customer communication and logistics management.
- **Increased exposure to new markets**[2]: continued growth of consumer base in BRIC countries and 'next 11' countries will increase demand, but the UK's main export destination will probably remain as Europe and the US; high-tech and high value products will remain a UK strength in export markets; increasing personal wealth and the ageing population will influence the sort of products the UK produces; levels of foreign direct investment in the EU and UK may change, meaning funding for manufacturing may alter; continued fragmentation of production chain, with outsourcing and offshoring continuing as new manufacturing bases become viable, but some functions will be re-shored to the UK.
- **More sustainable means of production:** increased global populations and increased urban populations will put additional pressures on land, water, energy and materials; climate change will cause increased disruption to supply chains because of more extreme weather events; increased regulation of the environment will promote greater resource productivity; customers will demand more environmentally friendly production processes; emergence of 'circular economy' in which products are reused, remanufactured, recovered, recycled and increased 'cascaded use' (using products for lower value use, for example, using old computer hardware in less demanding applications).
- **More dependent on skilled workers:** a larger working population with increased skills levels will mean an increased talent pool for employers to choose from; future demand for STEM qualifications will outstrip supply; precise technical skills will be mixed with more general aptitudes for project management and problem solving as factories become more technologically advanced.

Source: OECD, March 2015, Enabling the Next Production Revolution

[2] Note this study was published before the results of the 23rd of June 2016 EU Referendum

1.11 The ability of manufacturing to respond to opportunities for growth will also be driven more broadly by the UK's institutional system. This includes both national and local government policies (including education) and national infrastructure projects in rail, energy and building and construction.

1.12 More recent research by EEF provides insight into manufacturers' expectations for the year ahead[3].

Trends

- Long term goals are still front and centre of manufacturers' minds - they are not laying low in the face of uncertainty.
- There is focus on process innovation, investment and ensuring flexible supply chains but it won't all be plain sailing - many actions remain challenging to deliver.
- Amid the concerns of volatile conditions manufacturers are taking a diverse set of actions to create their own opportunities.
- Firms expect sales growth whether in domestic or export markets.

Opportunities

- Innovation, investment and exporting, the three foundations of a successful and productive manufacturing sector.
- Manufacturing plays a key role in the UK innovation landscape. Manufacturing performs 69% of total business R&D expenditure, employs 59% of innovation personnel and has the largest share of innovative firms.

Challenges

- Volatile conditions - movements in the exchange rate, major markets (China), the uncertainty surrounding the United Kingdom's exit from the EU.
- Continued weakness in global demand, slowdown in major export markets.
- Mounting political uncertainties not only in the UK but in major partners.
- The falling price of sterling represents a major threat to the growth potential of UK manufacturers as increasing business costs squeeze profit margins.
- Rising cost of oil and commodity prices from a protracted two-year fall.

[3]EEF The manufacturers' organisation, Manufacturers' Expectations for the Year Ahead, 2017

1.13 The UK has fallen down the world rank of manufacturing nations in the last decade, from the 5th or 6th biggest manufacturer in terms of total output between 1970 and 2004, the UK is now 9th.[4] With an output of $247 billion in 2014, the UK's manufacturing sector accounts for around 10.3% of national output and ranks the UK ninth place internationally, behind European economies such as Germany, France and Italy. In fact, Germany's manufacturing output is more than double that of the UK. The UK accounted for 3% of the world's manufacturing output in 2014 while the top 5 countries (US, China, Japan, Germany and South Korea) accounted for 59% of the world's output.

1.14 The Deloitte 2016 Global Manufacturing Competitiveness Index still ranks the UK's wider manufacturing sector as the sixth most competitive in the world, and the second most competitive in Europe (behind Germany), however, increasing competition is expected to be from India and Mexico, which are expected to overtake the UK in the next five years.

Policy Drivers for Change

National drivers

1.15 The new government has placed a focus on improving productivity, strengthening of supply chains (particularly the SME base) pulling innovation through from research to industry and export growth as the means to secure a prosperous UK future.

1.16 The value of pulling innovation through from research was recognised in the Autumn Statement[5] when the Chancellor of the Exchequer announced additional R&D funding of £4.7 billion by 2020-2021. The funding will be delivered through a new Industrial Strategy Challenge Fund, modelled on the USA's Defence Advanced Research Projects Agency programme, and will support collaboration between business and the UK's science base. The fund will set identifiable challenges to be tackled by business and research in collaboration. Additional funding will also be allocated to increase research capacity and business innovation.

1.17 Other support for research and development announced in the Autumn Statement included: a review of the R&D tax credit environment; additional support for the Biomedical Catalyst to incentivise university collaboration in tech transfer and, further waves of science and innovation audits.

[4] Source: House of Commons Briefing Paper, August 2016, Manufacturing – International Comparisons

[5] Autumn Statement 2016 (November 2016 CM 9362)

1.18 Support for exporters was also announced, with the government committing to provide additional support through UK Export Finance (UKEF) to ensure that no export should fail because of a shortage of private finance or insurance. Other announcements to ensure businesses have the skills, finance and stable framework within which to invest included:

- an HM Treasury review to identify barriers to access to long-term finance for growing firms
- British Business bank to invest an additional £400 million in venture capital funds to unlock up to £1 billion of new investment in innovative firms planning to scale up
- Provide £13 million to support firms' plans to improve their management skills by implementing the Mayfield review of business productivity
- A new National Productivity Investment Fund (£23 billion to 2021-22) for housing, research and development (R&D), and economic infrastructure. The NPIF will take total spending in these areas to £170 billion over the period from 2017-18 to 2021-22, reaching 1.7% of GDP in 2021-22. The new spending includes:
  - £4.7 billion to enhance the UK's position as a world leader in science and innovation (as mentioned above)
  - £2.6 billion to tackle congestion and ensure the UK's transport networks are fit for the future
  - £0.7 billion to support the market to roll out full-fibre connections and future 5G communications
  - The Government will also continue to provide support through the local growth fund, via the LEPs

Industrial Strategy Green Paper

1.19 Since coming into power Theresa May has signalled a more active approach to industrial strategy, the centre piece of which is the Green Paper "Building our Industrial Strategy[6]". The underlying motivation of the strategy is "to improve living standards and economic growth by driving productivity and growth across the whole country."[7]

[6] Department for Business, Energy & Industrial Strategy, *Building our Industrial Strategy: 10 pillars,*2017

[7] Building our Industrial Strategy, January 2017, p.9

1.20 The Government identifies 10 pillars to spur economic growth and prosperity, which focus on investing in science, research, innovation and infrastructure, access to finance and promotion of trade, inward investment, and cultivating world-leading sectors.

1.21 The industrial strategy commits the government to a series of sector deals, where pioneering sector leaders work with government to help reduce regulator barriers, increase competition and innovation, increase exports and drive up commercialisation of research. The government will also foster internationally competitive sectors by:

- undertaking deep dives into emerging sectors
- building on existing sector relationships, updating strategies, strengthening existing institutions and making best use of existing funding, coordinating thriving supply chains and creating long term institutions as key drivers of sectoral success.

1.22 The £4.7 billion Industrial Strategy Challenge Fund (ISCF) will accelerate the commercialisation of technologies in key sectors, many of which align with the sectoral priorities of the Marches LEP. A series of consultations are being undertaken to explore which technologies the Industrial Strategy Challenge Fund could support. These include:

- smart and clean energy technologies (such as storage and demand response grid technologies)
- robotics and artificial intelligence (including connected and autonomous vehicles and drones)
- satellites and space technologies
- manufacturing processes and materials of the future
- transformative digital technologies including supercomputing.

1.23 The strategy also features a stronger place-based narrative than in previous policy pieces, with seven references to the Midlands Engine. This reaffirms the government's commitment to rebalancing the economy and ensuring a more inclusive approach to economic growth.

Brexit

1.24 The UK's decision to leave the European Union could have a profound impact on the economy and certain sectors. The nature of the UK's future relationship with the EU is subject to negotiation, however the government's negotiating objectives are that the UK will leave the single market and much of the Customs Union. This has implications for trade, as the UK would need to enter new agreements with the EU and will lose all its current trade deals which it enjoys as a member of the EU. Moreover, abandoning the free movement of people principle will make the UK government seek up new work permit or visa arrangements. These will inevitably have some impact on the workforce of many UK industries at a time when the labour market is already tightening, as unemployment has fallen drastically, and Britain's population is ageing.

1.25 The Midlands has received a large share of European Regional Development Funding over the various programme periods. The government has said that it will consider an alternative funding arrangement as part of a post-Brexit settlement[8].

1.26 Overall outcomes will need to be negotiated and a transitionary phase of Britain's departure could help to smooth the impact of such changes. Nonetheless, Brexit is likely to have an impact in the short and long term for many sectors.

High Value Manufacturing Catapult

1.27 Catapult Centres are a government initiative overseen by Innovate UK. These centres are a network of world-leading centres designed to transform the UK's capability for innovation in seven specific areas: cell therapy, digital, energy systems, future cities, high value manufacturing, offshore renewable energy, precision medicine, satellite applications, and transport systems. Catapults are not-for-profit independent physical centres which connect businesses with the UK's research and academic communities.

The High Value Manufacturing Catapult is the catalyst for future growth and success of manufacturing in the UK. Its long-term goal is to stimulate growth in the manufacturing sector and more than double the sector's contribution to UK GDP. It helps businesses and research institutions accelerate new concepts to commercial reality. The Catapult combines the strengths of seven existing centres across key manufacturing processes, with over £140m of government investment planned over a six-year period, matched by contributions from the private sector. Centres include the Advanced Forming Research

[8] Department for Business, Energy & Industrial Strategy, *Building our Industrial Strategy: 10 pillars,*2017

Centre (Glasgow), Advanced Manufacturing Research Centre (Sheffield), Centre for Process Innovation (Sedgefield), Manufacturing Technology Centre (Ansty), National Composite Centre (Bristol), Nuclear Advanced Manufacturing Research Centre (Sheffield), and the Warwick Manufacturing Group (Coventry). The Catapult has engaged with almost 2,000 businesses since 2011.[9]

Local and regional policy

The Midlands Engine

1.28 The wider Midlands region has developed an overarching identity founded upon sector strengths that are internationally recognised, and which strongly align with the Marches' key sectoral strengths:

- manufacturing
- engineering and transport technologies
- agri-food and drink manufacturing and production
- energy and low carbon technologies
- creative, digital and design.

"As a Midlands resident and MP, I know the importance of the region to the country's economy – the heartland of our manufacturing sector." Rt Hon Sajid Javid MP

1.29 The Midlands Engine Strategy[10] demonstrates the government's commitment to making the Midlands a powerful engine for economic growth. It builds on the Industrial Strategy and the Midlands Engine for Growth prospectus[11], the strategy sets out actions to remove barriers to productivity, create more jobs and export more goods and services.

[9] www.catapult.org.uk/high-value-manufacturing-catapult

[10] Department for Communities and Local Government, HM Treasury, Department for Business, Energy & Industrial Strategy, Midlands Engine Strategy, 2017

[11] Department for Business, Innovation and Skills & Department for Communities and Local Government, The Midlands Engine for Growth: prospectus, 2015

1.30 The strategy outlines five key objectives: improving connectivity, strengthening skills, supporting enterprise and innovation, promoting the Midlands and enhancing quality of life. The strategy is a step toward government ambitions announced in 2015 that the Midlands economy could grow by £34 billion by 2030, if it matched the predicted growth rate for the UK. A further 300,000 jobs could be created in the Midlands by the end of this parliament.

Strategic Economic Plan

1.31 The current Marches Strategic Economic Plan (2014) establishes a vision:

"Our vision for the Marches is of a strong, diverse and enterprising business base, operating in an exceptional and connected environment, where the transfer of technology and skills foster innovation, investment and economic growth"

1.32 The SEP identifies a number of important sectors which included food and drink, agri-tech, defence and security, advanced manufacturing, automotive manufacturing, visitor economy and environmental technology and services.

1.33 A SEP refresh is about to be embarked upon, underpinned by an updated evidence base published in 2016. This analysis sharpens the focus on 'priority' sectors for the LEP and includes:

- advanced manufacturing and engineering
- food manufacturing and processing
- defence and securities

1.34 The SEP refresh will build upon the four sector action plans which include the three priority sectors and the additional aspirational sector of environmental technologies.

1.35 Local Economic Development Strategies

Table 1.1 Relevant policies from local economic development strategies

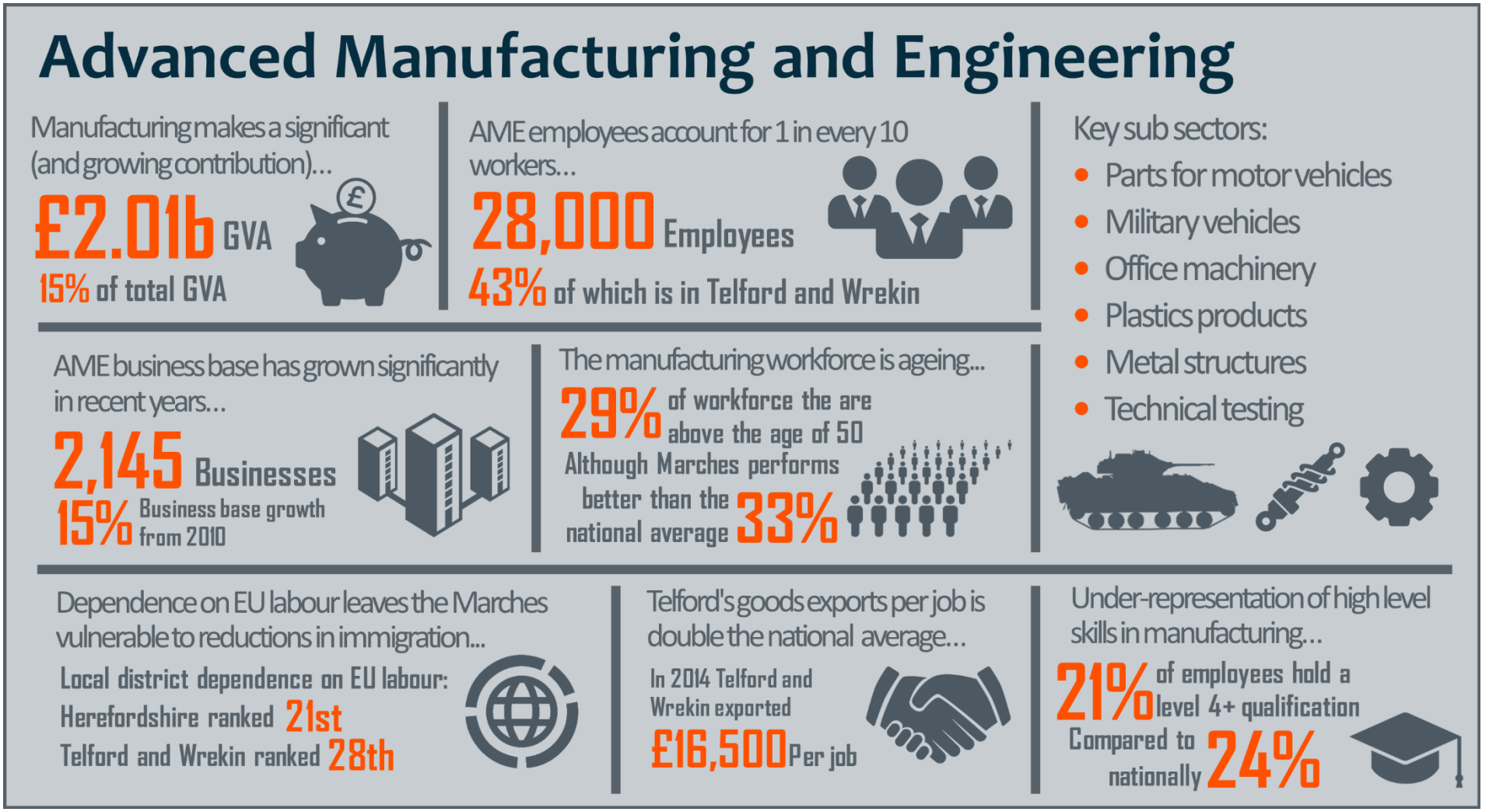
Shropshire Economic Growth Strategy 2017-21 DRAFT[12]	Herefordshire Invest Herefordshire Herefordshire's Economic Vision[13]	Telford and Wrekin Driving growth and prosperity: Economic Development Strategy 2016[14]
Six priority actions: 1. Target actions and resources where there are economic opportunities 2. Enable businesses to grow and succeed 3. Deliver infrastructure to support growth 4. Meet skills needs of businesses and people's aspirations for work 5. Promote Shropshire to investors 6. Build our reputation as a Council that is 'good to do business with'	Seven key aims: 1. A Great Place for Business - Creating the conditions in Herefordshire to encourage new business start-ups and an increase in productivity leading to higher value employment and greater innovation. 2. A Great Place to Learn - Increasing the range of higher education provision and improving the balance between business demand and the supply of skills and qualifications. 3. A Great Place to Live 4. A Great Place to Visit 5. Great movement and accessibility 6. Countywide Ambition 7. A Great Environment	Six key actions: 1. Create business friendly conditions to increase the number of successful businesses. 2. Grow sectors around opportunities and support sectors that underpin employment across the Borough. 3. Stimulate and support innovation across all business sectors. 4. Improve the skills and talent pool of the Borough to make it business relevant. 5. Transform physical and digital connectivity. 6. Optimise all the assets of the Borough to make it a first-class place to live, work and invest

[12] Shropshire Council, Draft Economic Growth Strategy 2017-2021

[13] Invest Herefordshire, Invest Herefordshire Herefordshire's Economic Vision

[14] Telford Enterprise, Driving growth and prosperity: Economic Development Strategy 2016

Figure 1.3 Sector Needs Assessment Summary Infographic – AME in the Marches



Source: Regeneris Consulting, see Appendix B - Glossary for other sources. *Shropshire data on EU labour unavailable.

2. Sector Needs Assessment

Productivity

The AME sector makes a significant (and growing) contribution to the Marches economy but there is scope to improve productivity...

Table 2.1 Economic output of the manufacturing sector, 2015

	The Marches	Midlands Engine	England
Manufacturing GVA	£2.01 billion	£34.49 billion	£138.65 billion
Manufacturing GVA (% of total GVA)	15%	16%	10%
Manufacturing GVA per FTE	£57,800	£63,800	£71,300
All sector (average) GVA per FTE	£60,400	£57,800	£68,000

Source: ONS, 2016

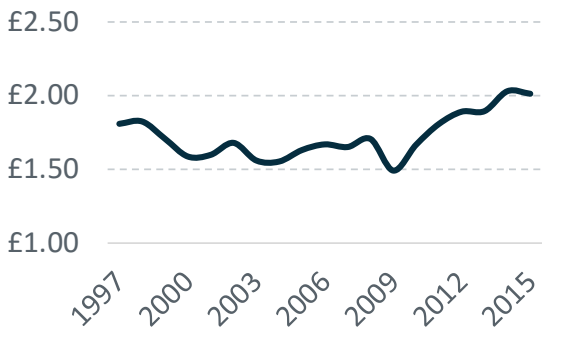
Note: Note: GVA data is only available at the level of broad sectors

2.1 Manufacturing plays a prominent role in the total economic output of the Marches constituting 15% (£2.01 billion GVA) of output compared to 10% nationally. Moreover, the sub-region accounts for approximately 6% of all manufacturing GVA in the Midlands Engine.

2.2 After a brief post-recession drop in output between 2008-09 growth has been strong with growth in output of 18% from pre-recession levels to 2015, compared to 16% nationally.

2.3 The sector is less productive in the Marches than regional and national benchmarks, GVA per FTE (manufacturing) is £57,800 compared to £63,800 in the Midlands Engine and £71,300 in England.

Figure 2.1 Marches Manufacturing GVA (billions), 1997-15



Source: ONS, 2016

Employment

Advanced manufacturing employees account for 1 in every 10 Marches workers...

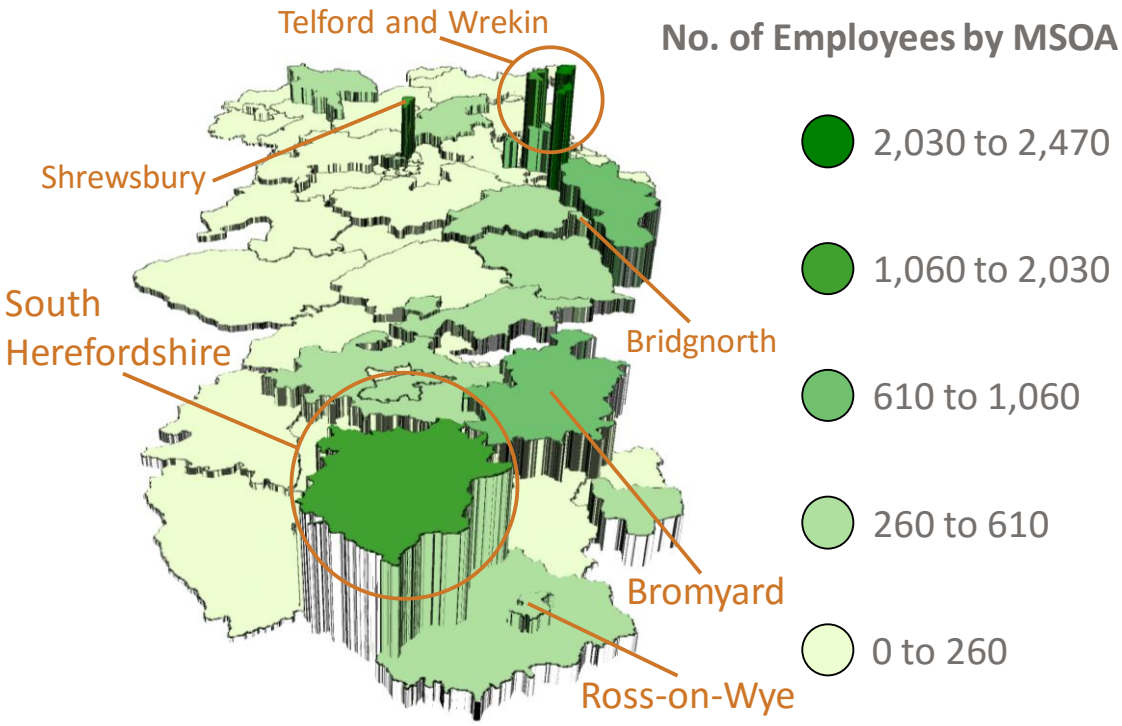
2.4 The advanced manufacturing sector is a significant employer in the Marches area. Currently, there are around 27,800 employees representing 10% of all employees in the sub-region and the Marches makes a substantial contribution to AME employment in the Midlands Engine area accounting for 6%.

2.5 Advanced manufacturing sector employment is relatively concentrated in the Marches area with a score of 1.34 on the Index of Specialisation[15] (IoS).

2.6 Taking a more granular view, employment in the sector is highly concentrated in Telford and Wrekin, it has an IoS almost twice the national average (IoS of 1.92) and account for 43% of all advanced manufacturing and engineering employment in the Marches. Shrewsbury, Bromyard, South Herefordshire and the area surrounding Bridgnorth contain notable clusters of employment.

[15] The Index of Specialisation (IoS) is a measure of how more or less important an industry is in a local economy than nationally (1 = national). Here, it is based on a measure of employment.

Figure 2.2 Map of Advanced Manufacturing and Engineering employment by MSOA[16], 2015



Source: ONS, BRES, 2015

2.7 Employment in the sector has fluctuated in recent years but has only grown by 1% (390 jobs) over the period 2009 to 2015. This is much lower than the growth experienced in other areas such as the Midlands Engine (7%) and England (3%).

Table 2.2 Employment and Businesses in the Advanced Manufacturing Sector

	Employment (2015)				**Businesses** (2016)	
	No.	Change 2010-15	IoS[17]	% of AME Marches	No.	Change 2011-16
Herefordshire	7,600	+2%	1.4	27%	620	+12%
Shropshire	8,100	+7%	0.9	29%	990	+20%
Telford and Wrekin	12,100	-2%	1.9	43%	470	+12%
The Marches	**27,800**	**+1%**	1.3	**100%**	**2,150**	**+15%**

Source: BRES (2015), UK Business Count (2016)

[16] Middle Layer Super Output Area (MSOA)

[17] Note: Index of specialisation is a measure of how more or less important an industry is in a local economy than nationally (1 = national).

2.8 The number of businesses in the sector has increased substantially over the past five years (15%) relative to 17% and 23% in Midlands Engine and England. This suggests automation is driving efficiencies in the sector, thereby reducing the demand for labour.

Marches boasts a diverse range of specialist AME sub-sectors...

2.9 Within the advanced manufacturing and engineering sector in the Marches are a diverse range of specialisms. The top 10 sectors in 2015 accounted for 47% of all advanced manufacturing and engineering employees in the Marches as seen in Table 2.3.

Table 2.3 Top 10 AME sub-sectors in the Marches by employment, 2015

Sub-sector	Number of employees	% of total	Change 2009 to 2015	Index of specialisation
Manufacture of other parts and accessories for motor vehicles	3,300	12%	(-) 190	4.7
Other engineering activities	1,800	6%	(+) 110	0.6
Technical testing and analysis	1,300	5%	(+) 770	1.6
Manufacture of metal structures and parts of structures	1,200	4%	(+) 70	1.8
Machining	1,200	4%	(+) 50	0.9
Manufacture of other plastic products	1,000	4%	(+) 610	1.7
Manufacture of plastic plates, sheets, tubes and profiles	1,000	4%	(-) 150	3.1
Manufacture of office machinery and equipment	1,000	3%	(-) 500	19.4
Manufacture of military fighting vehicles	800	3%	(+) 840	22.3
Manufacture of plastic packing goods	700	2%	(-) 20	2.4
Total	**13,200**	**47%**	**(+) 1600**	

Source: ONS, 2016

Note: The Index of specialisation is a measure of how more or less important an industry is in a local economy than nationally (1.0).

2.10 The largest sub-sector, *Manufacture of other parts and accessories for motor vehicle*, is a particular strength of the Marches economy, accounting for 12% (equivalent to 3,300 employees) of all advanced manufacturing and engineering employees, and an Index of Specialisation of 4.7 indicating that sub sector is considerably more concentrated than the national average.

2.11 There are other sub-sectors not featured in Table 2.3 that the Marches has relative strengths in even though their contribution to employment may not be as substantial. Examples of these sub-sectors are included in Table 2.4.

Table 2.4 Top 10 advanced manufacturing and engineering sub-sectors in the Marches by index of specialisation, 2015

Sub-sector	Number of employees	% of total	Change 2009 to 2015	Index of specialisation
Manufacture of power-driven hand tools	320	1%	(-) 70	40.4
Manufacture of military fighting vehicles	840	3%	(+) 840	22.3
Manufacture of office machinery and equipment	950	3%	(-) 500	19.4
Manufacture of ceramic insulators and insulating fittings	60	0%	(+) 20	17.8
Other non-ferrous metal production	550	2%	(-) 80	13.2
Manufacture of non-electric domestic appliances	590	2%	(+) 260	12.5
Aluminium production	450	2%	(-) 130	10.8
Manufacture of fibre cement	40	0%	(+) 10	9.5
Casting of light metals	530	2%	(+) 180	8.4
Manufacture of agricultural and forestry machinery	490	2%	(+) 60	6.4
Total	**4,820**	**17%**	**(+) 590**	

Source: ONS, 2016

Note: Index of specialisation is a measure of how more or less important an industry is in a local economy than nationally (1.0).

2.12 In summary, the top three sub-sectors in terms of specialisation, employment *and* recent growth are:

1) Manufacture of military fighting vehicles (+840)

2) Technical testing and analysis (+770)

3) Manufacture of other plastic products (+610)

2.13 It is also evident that there are a number of important sub-sectors to the Marches AME sector which have experienced significant employment decline, including:

- Repair of fabricated metal products (-1150)
- Manufacture of office machinery and equipment (-500)

Sub-sector strengths are concentrated geographically….

2.14 Looking at the spatial characteristics of advanced manufacturing and engineering sub-sectors in the Marches shows that certain sub-sector specialisms are concentrated within different local authority areas.

Table 2.5 AME sub-sector strengths and number of employees by local authority area, 2015

Shropshire		Herefordshire		Telford and Wrekin	
Sub-sector	**No**	**Sub-sector**	**No**	**Sub-sector**	**No**
Other engineering activities[18]	870	Manufacture of plastic plates, sheets, tubes and profiles	650	Manufacture of other parts and accessories for motor vehicles	2,480
Casting of light metals	530	Other non-ferrous metal production	550	Manufacture of office machinery and equipment	950
Technical testing and analysis	470	Manufacture of other rubber products	540	Manufacture of military fighting vehicles	840
Manufacture of other parts and accessories for motor vehicles	440	Manufacture of plastic packing goods	450	Manufacture of other plastic products	830

Source: ONS, 2016

[18] This sub class comprises the provision of architectural engineering services, drafting services, building inspection services and surveying and mapping services etc.

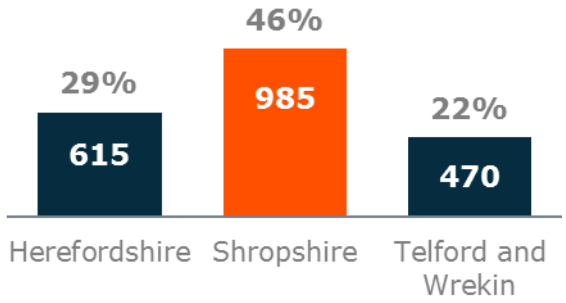
Business Base

The AME business base has grown significantly in recent years...

2.15 According to the latest figures, there are currently 2,145 advanced manufacturing enterprises in the Marches area, representing 11%, 6% and 1% of the advanced manufacturing business base in the West Midlands, Midlands Engine and England respectively[19]. The number of businesses has steadily expanded over the years and has grown by 15% (equivalent to 280 businesses) since 2010, this is just short of the growth experienced in the Midlands Engine (17%) and somewhat less than the growth observed nationally (23%).

2.16 The business size profile for the advanced manufacturing and engineering sector varies notably from local authority area to local authority area. Given Telford and Wrekin accommodates the largest share of employment and the smallest businesses base it follows that it is home to larger businesses than the other Marches local authority areas, 8% of AME businesses in Telford & Wrekin employ more than 50 employees.

Figure 2.3 AME business base by UA, 2016



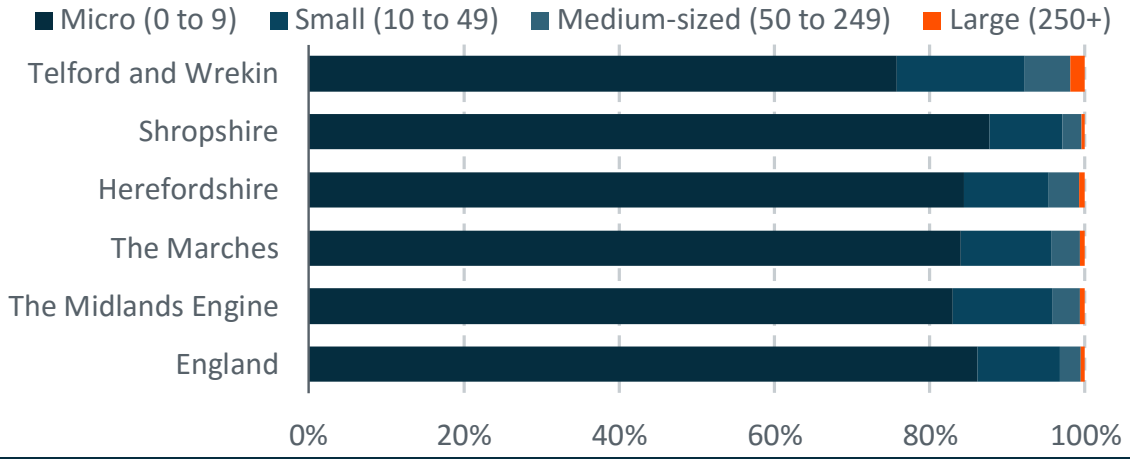
Source: ONS, UKBC, 2016

Note: Numbers may not sum due to rounding

2.17 The Marches' has a relatively smaller proportion of micro businesses (84%) when compared to the national structure (86%) and a marginally higher proportion than the Midlands Engine (83%).

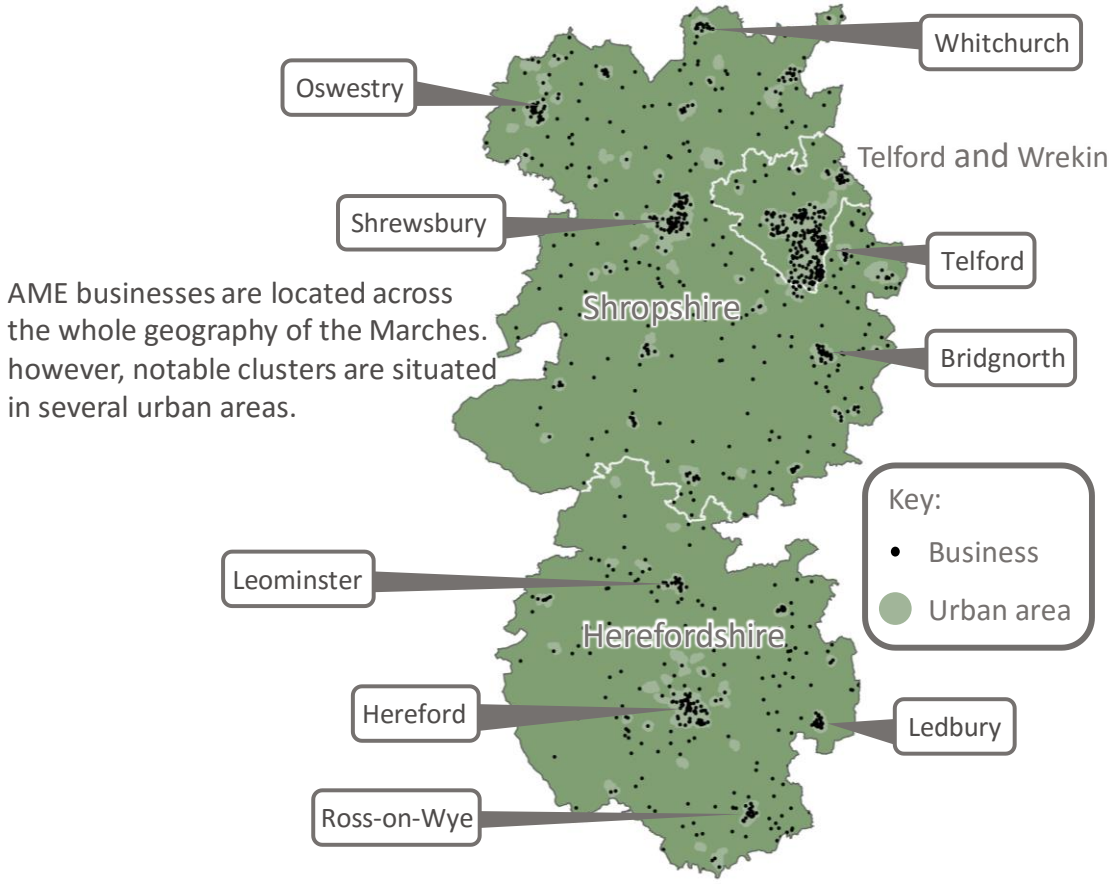
[19] Source: ONS, UKBC, 2016

Figure 2.4 Business size in AME businesses in Marches constituent UA's, 2016



Source: ONS, 2016

Figure 2.5 Location of Advanced Manufacturing and Engineering Active and Locally Registered Businesses, 2017



Source: FAME Data, 2017

2.18 There are a number of well-known businesses that are large AME employers within the Marches and support supply chain activity. A selection of these are provided in Table 2.6.

Table 2.6 Select AME businesses by local authority area, 2015

Shropshire	Herefordshire	Telford and Wrekin
• Caterpillar	• Kingspan	• BAE Systems
• Bridgnorth Aluminium	• Special Metals Wiggin	• Ricoh
• Grainger & Worrall	• TRP Sealing Systems	• Schneider Electric
• Muller UK & Ireland Group LLP	• Rehau - HQ	• Denso Manufacturing
	• Haygrove Ltd	• Whittan Industrial
• Hiab Limited	• Polytec Car Styling Bromyard Limited	• Xerox
• Esterform Packaging Ltd		• Alcoa Fastners
• Fullwood ltd	• Techtest Limited	• Johnson Controls
• Swegon Air Management Ltd	• The Helping Hand Co Ltd	• Stadco
	• Sequani Limited	• GKN
• Syspal Ltd	• Opella Ltd (Trading as Fluidmaster)	• Borgers
• T-T Pumps Limited		• Mahle Filter Systems
• Salop Design & Engineering Ltd	• Denco Lubrication Limited	• Makita
	• Gelpack Excelsior Limited	• Kiyokuni
• Curteis Ltd		• Maxell
		• Epson
		• NEC

Source: FAME, 2016

2.19 The following sub-sectors have the highest number of businesses in the Marches AME sector:

- Other engineering activities (440 businesses accounting for 20% of total)
- Machining (190 businesses accounting for 9%)
- Engineering related scientific and technical consulting activities (150 businesses accounting for 7%)
- Architectural activities (120 businesses accounting for 6%)
- Engineering design activities for industrial process and production (120 businesses accounting for 5%).

Labour Force

Marches' manufacturing workforce is ageing but has a relatively youthful profile in comparison to benchmarks...

2.20 Marches' manufacturing workforce has a relatively young age profile. In the year ending Jun 2016 71% of Marches manufacturing workforce was below the age of 50 compared to 68% and 67% in the Midlands Engine and England respectively. Consultations have indicated that the larger part of the workers within the age bracket 25 to 49 are toward the older end of the age bracket. A retirement bulge is expected to occur in Marches' manufacturing workforce in the next 20 years.

Table 2.7 Age profile of the manufacturing sector (workplace), Jul 2015- Jun 2016

Age Group	Marches	The Midlands Engine	England	Marches (all sectors)
16 to 19	2%	2%	2%	5%
20 to 24	8%	7%	7%	9%
25 to 49	61%	59%	58%	51%
50+	29%	32%	33%	36%

Source: ONS, Annual Population Survey, 2016

Note: The largest value of each row is highlighted

2.21 This is a sharp contrast to the age structure of the Marches workforce as a whole, which has a significantly older age structure when compared to the national average, with only 64% of its workforce below the age of 50.

Dependence on EU labour leaves the Marches vulnerable to reductions in migration...

2.22 A recent report[20] explores the extent to which local economies are exposed to the effects of Brexit, looking at:

1) Reliance on EU migrant labour

2) Local average earnings as areas with lower earnings will be hit harder by price inflation

[20] My Local Economy, *Brexit: Potential Impacts for Local Economies*, 2017

Table 2.8 LA Unitary dependence on EU labour (rank 1 indicates the most vulnerable)		
Rank	LA Unitary	Employment quotient for industries more dependent on EU labour than the all-industry average
21	Herefordshire	1.56
28	Telford and Wrekin	1.78

Source: My Local Economy, Brexit: Potential Impacts for Local Economies, 2017 *Detailed figures for Shropshire not available.

2.23 The report indicates that the Marches economy is somewhat vulnerable to Brexit. The main driver of this vulnerability is the area's dependence on non-UK migrant labour, with Herefordshire and Telford and Wrekin ranked 21st and 28th respectively in terms of vulnerability driven by dependence on EU labour. The report does not provide detailed figures for Shropshire as it only includes the 30 most vulnerable local authorities, however it is anticipated that this is a LEP-wide challenge.

Under-representation of higher managerial and professional occupations in Marches manufacturing sector…

2.24 At a broad level, around 31% of manufacturing employees in the Marches area work in higher managerial and professional occupations, four percentage points less than in the Midlands Engine and nine percentage points less than in England. Marches has a notably high proportion of manufacturing sector employees engaged in lower skilled occupations such as *Process, Plant and Machine Operative* and *Elementary* at 39% compared to the Midlands Engine (34%) and England (28%).

Table 2.9 Occupational profile of the manufacturing sector (Residents), Oct 2015-Sep 2016			
Occupation	Marches	Midlands Engine	England
Managers, Directors and Senior Officials	13%	12%	13%
Professional Occupations	6%	11%	13%
Associate Prof & Tech Occupations	13%	12%	14%
Administrative and Secretarial Occupations	9%	8%	8%
Skilled Trades Occupations	18%	20%	21%
Caring, Leisure and Other Service Occupations	-	0%	0%
Sales and Customer Service Occupations	3%	2%	3%
Process, Plant and Machine Operatives	27%	23%	19%
Elementary occupations	12%	11%	9%

Source: ONS, Annual Population Survey, 2016

Note: The largest value of each row is highlighted. Estimates have been censored due to group sample size sample size

2.25 The Marches manufacturing **workplace** population has a significantly lower proportion of workers engaged in high-level occupations i.e *Managers, Directors and Senior Officials.* It can be seen in Table 2.10 that 10% of manufacturing workplace population work as *Managers, Directors and Senior Officials* compared to the 13% for the residential population working in manufacturing. This suggests that a number of higher level professionals working in manufacturing live in the Marches but commute to other areas to work.

Table 2.10 Occupational profile of Marches manufacturing sector resident and workplace population, Oct 2015- Sept 2016

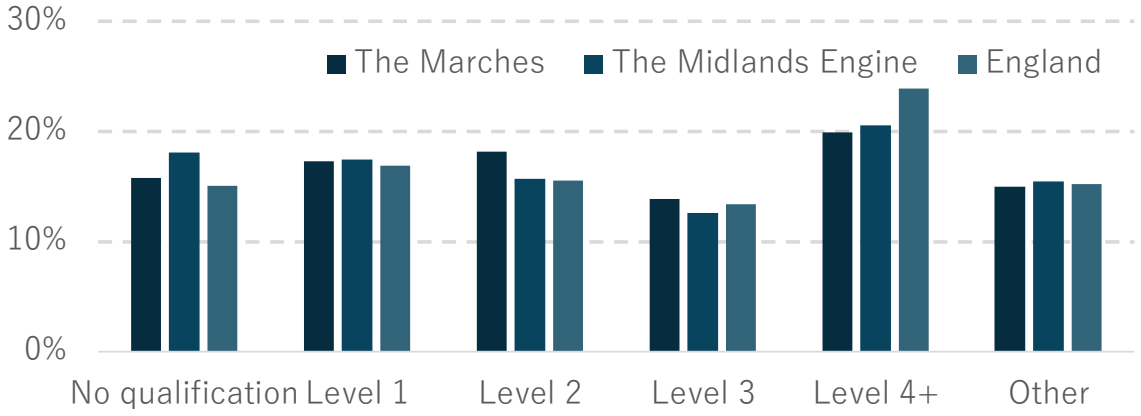
Occupation	Work Place	Residents
Managers, Directors and Senior Officials	10%	13%
Professional Occupations	6%	6%
Associate Prof & Tech Occupations	14%	13%
Administrative and Secretarial Occupations	9%	9%
Skilled Trades Occupations	18%	18%
Caring, Leisure and Other Service Occupations	-	-
Sales and Customer Service Occupations	3%	3%
Process, Plant and Machine Operatives	25%	27%
Elementary occupations	14%	12%

Source: ONS, APS, 2016

Higher level skills are under-represented within the Marches manufacturing sector...

2.26 The skills profile of Marches' manufacturing sector mirrors the occupational profile. That is Marches manufacturing sector has a relatively lower proportion of workers with Level 4+ qualifications as their highest held qualification compared to nationally. However, the Marches manufacturing sector is more highly qualified than the Midlands Engine.

Figure 2.6 Skills profile of the manufacturing sector, 2011



Source: ONS, Census 2011

Note: Data is based on a broader SIC code definition

2.27 The qualification profile further supports the view that a good number of highly skilled residents commute to other areas to work in manufacturing.

Table 2.11 Skills profile of Marches manufacturing sector, 2011

Highest held qualification	Workplace	Residential
No qualification	16%	15%
Level 1	17%	17%
Level 2	18%	18%
Level 3	14%	14%
Level 4+	20%	21%
Other	15%	14%

Source: ONS, Census 2011

Note: Data is based on a broader SIC code definition

2.28 Working Futures data indicates that the proportion of people working at higher skill levels in the Marches AME sector will increase over the period 2014 to 2024 but not to the same extent as the national picture and not to the same level as the all sector average in the Marches.

Table 2.12 Projected qualification profile in the marches, 2014-24						
Highest held qualification	All Sectors		AME (Marches)		AME (England)	
	2014	2024	2014	2024	2014	2024
Level 4+	32%	42%	24%	34%	31%	44%
Level 3	22%	21%	26%	25%	25%	22%
Level 2	21%	22%	22%	24%	22%	21%
Level 1	16%	12%	17%	13%	15%	11%
No qualification	9%	4%	10%	3%	6%	2%

Source: UKCES, Working Futures

Manufacturing wages in the West Midlands are above average, but the Marches lags behind...

2.29 The median wage of the manufacturing sector is £28,700 in the West Midlands which is significantly higher than the all sector average in the West Midlands (£26,400).

Table 2.13 Median wage by area and sector, 2016	
Area and sector	Median Wage
West Midlands (All sectors)	£26,400
West Midlands (Manufacturing)	£28,700
Marches residents (All sectors)	£25,800
Marches workplace (All sectors)	£24,800

Source: ONS, ASHE, 2016

2.30 The annual median wage of those who live in the Marches (£25,800) is higher than the median wage of those who work in the Marches (£24,800) pointing to a trend of out-commuting to access higher paid jobs outside the sub-region.

Telford's exports per job is double the national average...

2.31 The Marches has a value of exports per FTE employee below the national average, with a value of £7,000 compared to the national average of £10,900. Telford and Wrekin has a value of exports per FTE employee above the national average at £11,500 whereas the local authority areas of Herefordshire and Shropshire are significantly below with values of £5,300 and £4,800 respectively.

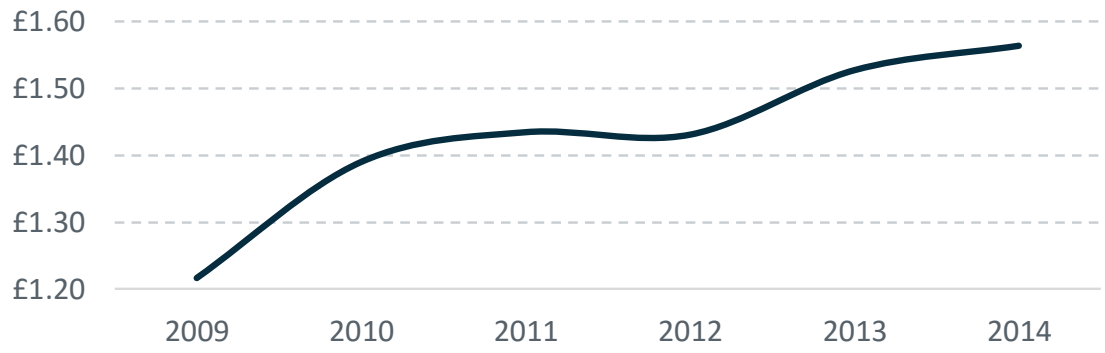
Table 2.14 Value of exports & value of exports per FTE employee, 2014

	Telford and Wrekin	Herefordshire	Shropshire	National Average
Value of Exports (£m)	£805	£312	£446	-
Value of exports per FTE employee	£11,500	£5,300	£4,800	£10,900

Source: HM Revenue & Customs, Regional Trade Statistics, 2016

2.32 While the Marches does not export as much in absolute terms compared to other areas the value of exports has increased significantly in recent years, 29% over the 2009-14 period.

Figure 2.7 Value of exports from the Marches (£billions), 2009-2014



Source: HM Revenue & Customs, Regional Trade Statistics, 2016

2.33 A recent study[21] indicates that the city of Telford is a significant exporter of goods. In 2014 Telford ranked 5th out of 63 cities in terms of value of goods exports per job. In 2014 Telford had an exports per job figure of £16,500 compared to a national average of £8,240, that is double the national average. However, this high value is possibly the result of one or two multinational firms producing high value specialist goods.

Table 2.15 Top ten cities by exports per job (£), 2014

Rank	City	Goods exports per job 2014 (£)
1	Sunderland	£35,420
2	Worthing	£23,400
3	Derby	£20,810
4	Coventry	£19,050
5	Telford	£16,500
6	Slough	£16,060
7	Aldershot	£15,260

[21] Centre for Cities, Cities Outlook 2017, 2017

Rank	City	Goods exports per job 2014 (£)
8	Burnley	£15,240
9	Plymouth	£14,160
10	Hull	£13,370
	National Average	£8,240

Source: Centre for Cities, Cities Outlook 2017, 2017

2.34 The importance of trade is a common narrative emerging from consultations with AME businesses. The significant industry players based in the Marches export a significant proportion of their goods, some as high as 95%. Countries in the European Union are a significant market for exporters, as well as USA and Asia. Since the referendum vote to leave the EU, the pound has weakened and exporters have (for now) become more competitive. However, the long term implications of Brexit place a lot of uncertainty on the trade arrangements after Britain leaves the EU. Businesses are anxious about the possibility of World Trade Organisation (WTO) tariffs being imposed on their goods, which would undermine their competitiveness.

The Marches attracted £92.5m of inward investment over the last year…

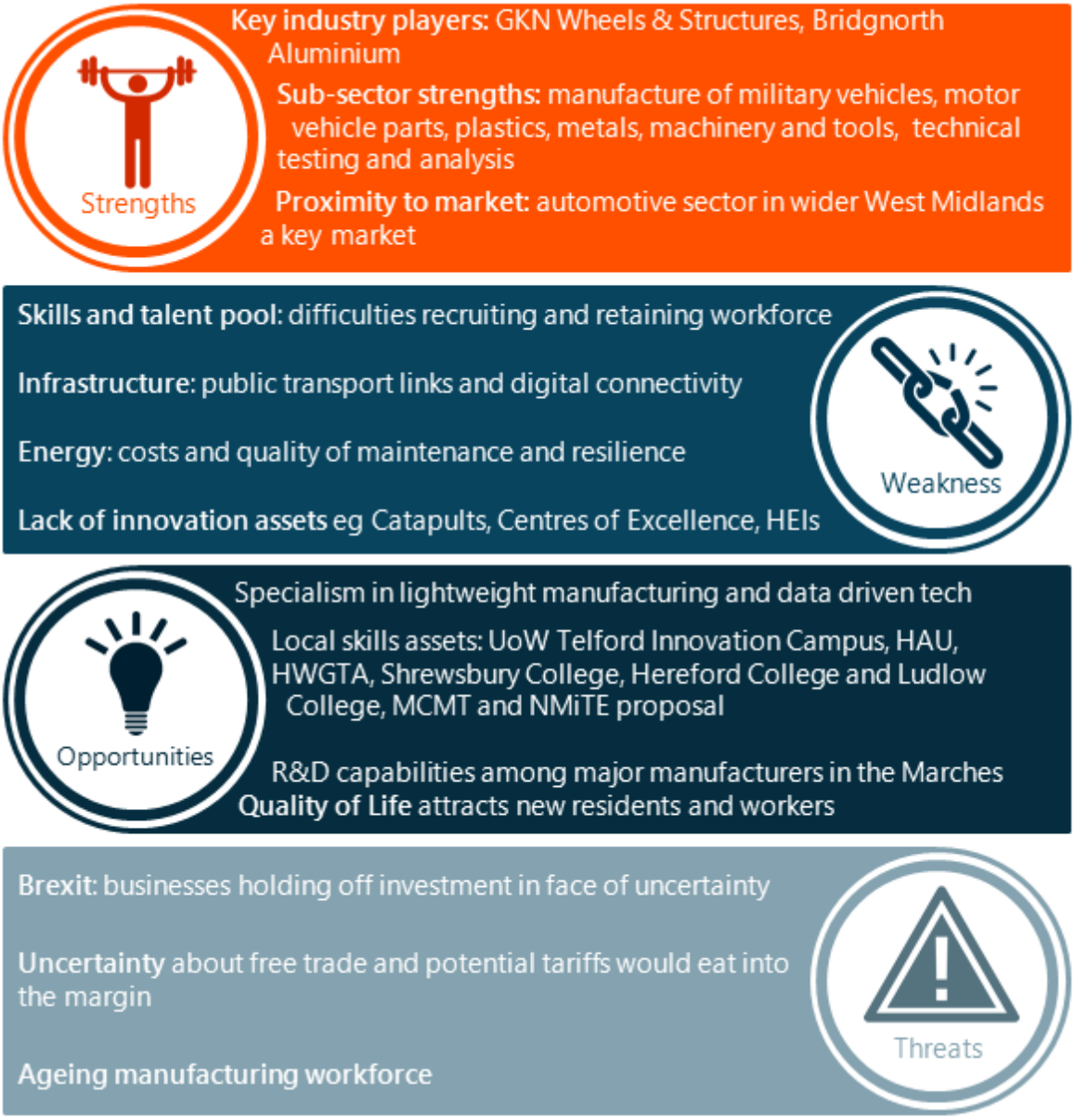
2.35 The most recent data held on inward investment activity in the Marches shows the sub-region attracted 13 inward investment projects between March 2016 to February 2017. To put this into context, this represents 18% of inward investment projects in the West Midlands and 9% of projects in the Midlands Engine.

2.36 Manufacturing and engineering accounted for 40% of the investments made. These projects represent £92.5m of investment and around 560 new jobs for the Marches. Much of this activity builds on previous successes, as the majority of investments are expansions by existing businesses.

SWOT

2.37 The following infographic summarises the strengths, weaknesses, opportunities and threats facing the advanced manufacturing and engineering sector in the Marches.

Figure 2.8 Summary SWOT for the Advanced Manufacturing and Engineering Sector



Source: Regeneris Consulting. Note: Herefordshire & Worcestershire Group Training Association (HWGTA), New Model in Technology & Engineering (NMiTE), Marches Centre of Manufacturing & Technology (MCMT)

Assessment of Competitiveness

2.38 This section builds on the earlier analysis of the sector, combining desk-based research and consultation messages to form a picture of Marches' performance in the sector.

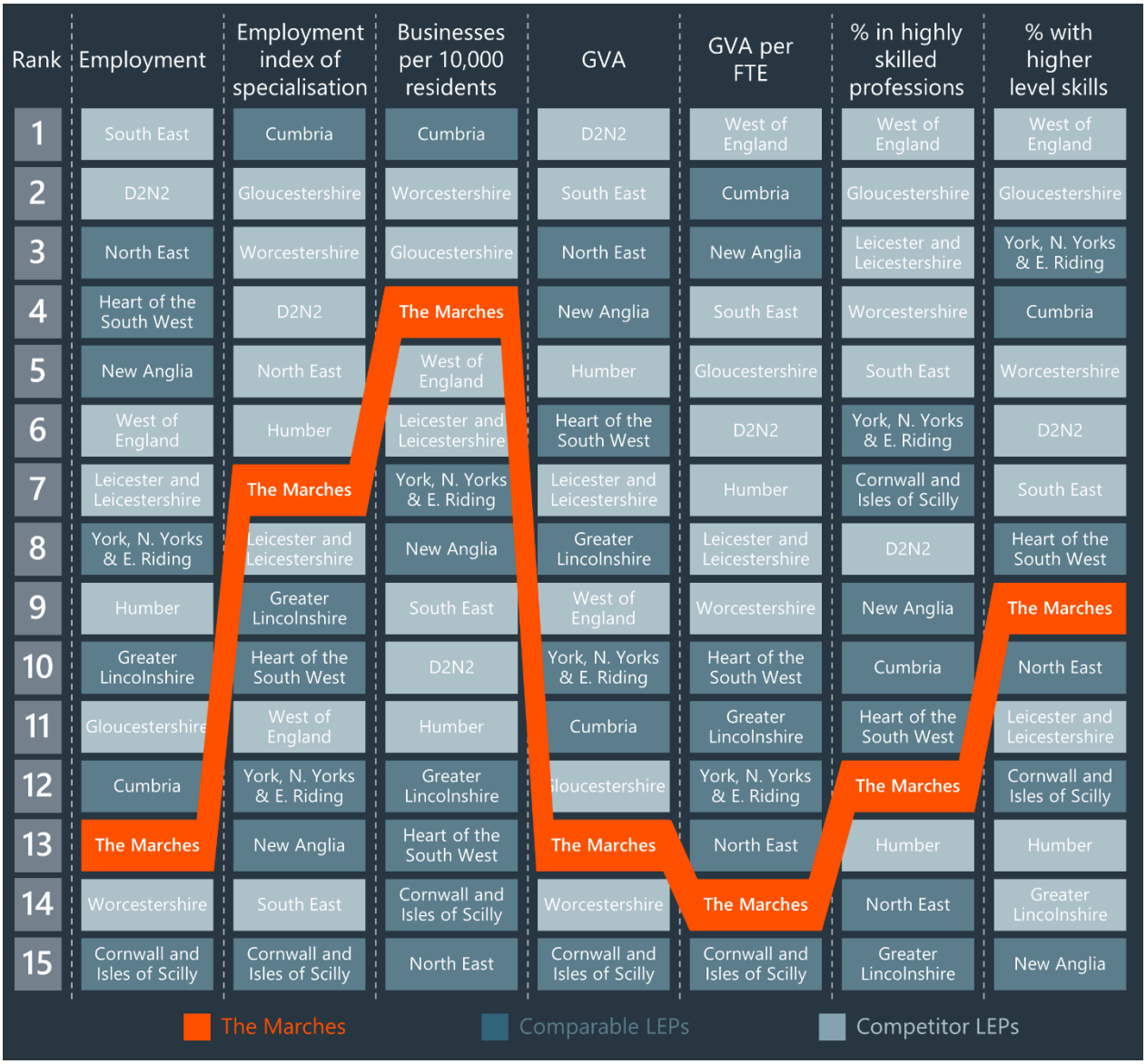
2.39 The following analysis shows the Marches' comparative performance with other LEPs to give an indication of its strengths and weaknesses. Comparator LEPs have been chosen based on several criteria:

- Firstly, comparators include other LEPs that Marches previously benchmarked itself against to account for similarities in demographics and challenges that come with a more rural context. These are: Cornwall and Isles of Scilly, Cumbria, Greater Lincolnshire, Heart of the South West, New Anglia, North Yorkshire and York, and North East.
- Secondly, LEP areas with advanced manufacturing and engineering strengths (based on sector concentrations) and which identify the sector as a strategic priority. The Marches could be competing with these LEP areas as a potential destination for investment. These LEPs therefore include: Leicester and Leicestershire, D2N2, Worcestershire, South East, West of England, Humber, and Gloucestershire.

2.40 Figure 2.9 summarises Marches' performance against comparators, and shows the Marches:

- ranks low on absolute employment in the sector, but higher in terms of specialisation (7th)
- 32 businesses per 10,000 residents, ranking 4th out of comparator locations
- is comparatively less productive, and ranks low in term of total GVA (13th) and GVA per FTE (14th)
- Has comparatively few highly skilled professionals.

Figure 2.9 LEP competitiveness in Advanced Manufacturing and Engineering



Source: ONS, 2016

Note: GVA, GVA per FTE, % in higher managerial professions and % with higher level skills are based on broad manufacturing definition

2.41 The following assessment of competitiveness provides a qualitative analysis of Marches position against comparator locations considering key attributes taking into account data analysis and consultation insights. The performance of Marches is categorised as follows:

- GREEN - to mark areas of competitive advantage in the Marches
- ORANGE - to mark no clear advantage or disadvantage
- RED - to denote a disadvantage.

Skills and labour market

Key attribute	Marches Performance
Manufacturing has an ageing workforce in the Marches in line with national trends. Between 2014 and 2024 a replacement demand for 10,690 jobs is projected by Working Futures data in the Marches. Despite a reduction in expansion demand, as a result of automation and efficiency gains in the sector, a total requirement of 8,800 jobs is estimated in the Marches.	
Skills shortages are reported at all levels of occupations. Consultations point to a shortage of soft skills, such as attitude and team work, for example. Technical skills, machine operatives and elementary occupations are also in short supply. Looking ahead employers recognise an increased demand for higher level skills capable of implementing new technologies and ways of working.	
A shortage of skills is a significant barrier to business growth in the Marches – employers report holding back investment due to their inability to meet the increase in capacity required to meet the demand for products.	
University of Wolverhampton has recently completed a £10m investment in engineering facilities at its Telford Innovation Campus, home to the School of Engineering. Harper Adams University also provides HE courses in engineering, with a specialism in agri tech.	
The Marches is home to the Herefordshire Group Training Association (HGTA), which is an employer-led organisation seeking to address employers' skills needs. HGTA historically provided engineering and manufacturing apprenticeships, with courses that are shaped by its business board members. Over time, courses have expanded to provide business and management qualifications.	
A new training school - the Marches Centre of Manufacturing & Technology (MCMT) - is in the pipeline for engineering apprenticeships in order to address the shortage of skilled engineers, and technicians. Initiated by three employers, GW Cast, Classic Motor Cars Ltd and Salop Design & Engineering, the initiative is funded by the LEP and private sector funding. Commencing delivery in September 2017 it aims to deliver 2020 learners by 2020 with apprenticeships of all levels, as well as developing the skills of existing professionals. The New Model in Technology & Engineering (NMiTE) project seeks to deliver a new generation of engineers.	

Shrewsbury College is a further education college based in Shrewsbury. Herefordshire and Ludlow college is a further education college based in Hereford with a separate sixth form college campus in Ludlow. Both colleges offer courses in engineering which equip candidate with the skills and experienced required to peruse a career in manufacturing and secured funding from the LEP to develop Advanced Manufacturing Hubs.	
Median annual wages in the Marches are below the national and regional averages, which make it attractive for employers as labour costs are cheaper.	

Innovating Firms

Key attribute	Marches Performance
The Marches has a strong base of manufacturing and engineering businesses that are at the forefront of technological advancements. Businesses are keen to capitalise on automation and digitisation trends and have invested capital over the last couple of years to take advantage of new technologies. For example, Bridgnorth Aluminium has invested around £65m in capital over the last four years. Stadco is to create around 300 new jobs with the opening of a new 225,000 sq ft aluminium casting facility in Telford. FAME data highlights other businesses with significant R&D spend, which includes: Denso Manufacturing, Schneider Electric, Kingspan Industrial Insulation, Haygrove and others.	
Businesses such as Cargill, Bridgnorth Aluminuim, and GKN Wheels & Structures have strong R&D capabilities internally. While there might be limited scope to share the technology, these organisations can encourage smaller firms to gain confidence to innovate.	
Lightweight manufacturing capability differentiates the sector in the Marches and presents an opportunity to capitalise on trends in the automotive sector towards lighter and more efficient vehicles. GKN are driving this forward working with partners through a £3.33m Innovate UK project to build a volume supply chain for affordable lightweight composite structures.	
Overall innovation indicators for the LEP are somewhat outdated and are based on the 2012 UK Innovation Survey. The findings show innovation among businesses in the Marches is lagging behind other Local Economic Areas (LEAs). This geography of analysis includes 45 LEAs including 39 LEP areas in England (as of 2012); three areas in	

Scotland (Eastern, South West and Highlands and Islands & the North East); two areas in Wales (East Wales and West Wales and the Valleys); and, Northern Ireland • The Marches ranks 38th out of 45 for product and service innovation, with 15% of businesses active in these activities • Marches came 35th for R&D engagement, with 14% of firms engaging in R&D. • Furthermore, 20% of firms engage in collaboration for innovation, and 8% engage in process innovation. The Midlands Engine Science and Innovation Audit is an important step in better understanding the Marches' sector assets. In tandem with the Midlands Engine Partnership, opportunities to strengthen the presence of innovation should be maximised.	

Assets

Key attribute	Marches Performance
Among **innovation and research assets**, the University of Wolverhampton's Telford Innovation Campus is based in the Marches. There are currently no established Excellence Centres, Advanced Manufacturing Centres or Catapults in the area. Businesses are having to leave the area to access this type of provision, for example some firms currently travel to the National Composite Centre in Bristol to do testing.	
Skills and training assets. Herefordshire Group Training Association, which has been in operation for 50 years. The HGTA was established to address engineering skills needs of local employers, having expanded to now provide manufacturing and business management qualifications. The Marches Centre of Manufacturing & Technology (MCMT) is currently in the pipeline aims to create an Engineering Powerhouse in the Marches. In addition to apprenticeship training, there will be capacity to work with 400 companies on developing existing manufacturing professionals up to Level 7 qualifications. The New Model in Technology and Engineering (NMiTE) is a beacon institution to address the skills shortage in engineering. NMiTE is currently in development phase and is expected to take on its first cohort of students in 2019. Recent investments by other HEIs strengthen the Marches offer including the University of Wolverhampton investment in auto sports	

engineering at the Telford Campus and the National Centre for Precision Farming at Harper Adams University.	
The Marches is home to **major manufacturing businesses**, which due to their supply chain pool and capabilities serve as assets for the area. These include: • Stadco – an international Tier 1 supplier of automotive Body-in-White products and services. Core capabilities are aluminium and steel stampings assemblies and facility design. • Caterpillar – Caterpillar Defence Products is based at Shrewsbury and is responsible for the marketing, sales, project management and logistic support of Caterpillar and diesel engines and transmissions to military and naval customers outside of North America. • GKN - GKN Structures is a specialist in the design, manufacture and supply of chassis systems, pressed steel, aluminium structural assemblies and modules to a number of key sectors including automotive, off-highway equipment for agriculture and construction, defence, rail and mass transit. • Bischof & Klein - one of Europe's leading full-service suppliers of flexible plastic and paper packaging and technical films • Cedo UK - Europe's largest manufacturer of polyethylene household disposables. • Craemer Environmental Systems - The production facility for plastics injection moulding in England • Bridgnorth Aluminium – a world-leading and UK's only producer of lithographic aluminium strip. • Doncasters Group Ltd - manufactures precision components and assemblies for the aerospace, industrial gas turbines, specialist automotive, petrochemical, construction, industrial, transportation and recreation markets. • Grainger & Worrall - working with all of the major car manufacturers, the company is a top class caster of both aluminium and iron complex parts • Holden Aluminium Technologies - specialist in the supply of aluminium formed and machined components to the automotive, aerospace, construction, medical/mobility and engineering sectors	

Business support

Key attribute	Marches Performance
In October 2015 the Marches LEP launched a Growth Hub as a gateway to support available in the area. More generally, businesses based in the Marches can benefit from advanced manufacturing-focused services in the West Midlands such as the Manufacturing Growth Programme Grant Scheme for SMEs, and Finance Birmingham. However, a lack of Centres of Excellence and sector assets means intensive sector-specific support is limited in the Marches.	
Business perceptions are mixed on business support. Some businesses report a lack of awareness of what services are available. Generally, businesses find the process of applying for support cumbersome (although this is not specific to the Marches). Funding competitions such as RGF can be overwhelming for employers. There is a demand for support with application process for funding. There is also a perception that support providers could be more proactive at engaging with businesses	

Infrastructure

Key attribute	Marches Performance
Mixed picture on connectivity depending on location within the Marches, Telford and Wrekin have good connectivity by road, closeness to airport, and proximity to the M54 which links to the rest of the national motorway network. Other areas are more difficult and report poor public transport links. Consultations suggest that the area may benefit from better transport and road links with South Wales to and from the steel cluster there.	
The Marches has a strong sites and premises offer in Telford and Wrekin, but less so in Shropshire. Herefordshire is home to the Skylon Park Enterprise Zone, which offers high quality sites for development.	
Digital connectivity is perceived as a barrier to growth, however some businesses report recent improvements. The average superfast broadband coverage across premises in England is 93%. In the Marches this is much lower, and there is significant disparity between	

the local authorities: from 77% in Shropshire, 81% in Herefordshire to 92% in Telford and Wrekin.[22]	

Supply Chains

Key attribute	Marches Performance
Marches has a relatively good proximity to markets for the businesses in the sector, many of which supply the automotive sector in the Midlands. Proximity to market aids the clustering of activities in the area.	
Many of the larger manufacturers are significant exporters, and are currently benefitting from the weaker value of pound sterling. However, the general uncertainty since the Brexit vote and the potential loss free market access is a concern for manufacturers. Consultations suggest that businesses are currently holding off investment in light of uncertainty about long term trade. The potential introduction of tariffs would harm the competitiveness of UK manufacturers.	
Building capacity around customers, suppliers and innovation assets. That local capability is developing in the Marches through the development of a composite research cluster at Priorslee Campus (University of Wolverhampton, Telford), a strong group of companies, and an alignment of skills through vocational pathways.	

Quality of Life

Key attribute	Marches Performance
One of the main attractions of the Marches is that it is a nice place to live, work and visit which is facilitating investment interest.	
The ONS Quality of Life Index shows the Marches local authorities have higher than average life satisfaction and happiness ratings: • Life satisfaction: average 7.7 compared to UK average of 7.6 • Happiness: 7.6 compared to national 7.5.	

[22] ThinkBroadband, Local Broadband Information, 2017

3. Conclusions

3.1 This study has further developed understanding of the scale, character and support needs of the Advanced Manufacturing and Engineering (AME) sector and reinforced the appreciation of the significant contribution it makes to the Marches economy, supplying 28,000 jobs within an extensive business base of 2,145 companies, and contributing £2.01bn to the Marches economy. The scale of this contribution highlights the important role Marches plays in economic collaborations such as the Midlands Engine through contributing to the growth and prosperity of a sector which is strategically important to the wider sub-region and the UK economy. The Marches needs to align its strategic response with these wider initiatives and take advantage of the ripple effect from major investment occurring both within, and outside, the sub-region.

3.2 The sector needs assessment provides a steer on the rationale for intervention to facilitate growth through targeted engagement, support and investment. This is summarised under four themes for intervention.

Supporting Business

Rationale

The AME sector makes a significant and growing contribution to the Marches economy but there is scope to improve productivity through supporting businesses to become lean and efficient. The focus should be on SMEs with a propensity to 'scale up'. We also have a number of strategically important businesses which are large AME employers and support supply chain activity. Ensuring these businesses needs are being met will further embed them in the sub-region and ensure their investment is retained and strengthened.

Employment and Skills

Rationale

A retirement bulge is expected to occur in Marches' manufacturing workforce in the next 20 years and there is an imperative to attract young and new entrants to the workforce to meet identified demands. The changing shape of skills needs and the disruption caused by the introduction of new technologies means the Marches must boost the productivity of the workforce and competitive position. This includes increasing the representation of higher level occupations and skills whilst maintaining a good stock of intermediate skills

to meet replacement demands. It also requires an emphasis on digital skills, and attributes such as adaptability and creativity.

Innovation

Rationale

The Marches' AME sector is comparatively less productive than other areas' and low levels of innovation may be a contributing factor. Only 15% of businesses are active in product innovation, 8% in process innovation, and 14% engaging in R&D[23].

The Midlands Engine Science and Innovation Audit (2016) identifies the AME sector as one of the Midlands Engine 'Enabling Competencies' and 'Next Generation Transport' is identified as one of its market driven priorities. The Marches has a clear role to play in driving up productivity in this sector. There is some evidence of R&D activity, particularly amongst larger companies, and there are emerging strengths in lightweight manufacturing capability which present an opportunity for the Marches to develop competitive advantage and play an active role in the Midlands Engine strategy.

There is a gap in our innovation assets currently as we do not currently have any established Excellence Centres, Advanced Manufacturing Centres or Catapults in the area meaning our businesses have to leave the area to access this type of provision.

Physical Infrastructure

Rationale

Physical infrastructure in the Marches varies considerably by location and infrastructure type, however common themes include:

- Poor internal connectivity within the sub-region by road.
- Digital connectivity for business is challenging, with mobile blackspots, poor broadband and very expensive ultrafast connectivity.
- Limited availability of good quality sites which are genuinely developable and shovel ready.

[23] 2012 Innovation Survey

- Viability challenges in both brownfield and greenfield locations due to the costs of delivering major infrastructure and the risks associated with speculative development.

3.3 The overarching Sector Action Plan provides a strategic response to the identified issues contained within the four Sector Needs Assessments and identifies broad areas for intervention which will be developed by Marches LEP in partnership with key stakeholders.

Appendix A - **Sector Definition**

A.1 The Standard Industrial Classification (SIC) definition of the Advanced Manufacturing and Engineering sector was provided by Marches LEP as follows.

Sub-sector	2007 SIC (2 digit)
Manufacture of chemicals and chemical products	20
Manufacture of basic pharmaceutical products and pharmaceutical preparations	21
Manufacture of rubber and plastic products	22
Manufacture of other non-metallic mineral products	23
Manufacture of basic metals	24
Manufacture of fabricated metal products, except machinery and equipment	25
Manufacture of computer, electronic and optical products	26
Manufacture of electrical equipment	27
Manufacture of machinery and equipment n.e.c.	28
Manufacture of motor vehicles, trailers and semi-trailers	29
Manufacture of other transport equipment	30
Other manufacturing	32
Repair and installation of machinery and equipment	33
Architectural and engineering activities; technical testing and analysis	71
Scientific research and development	72

Appendix B - **Glossary**

Table B.1 Glossary Table

Acronym	Definition
4IR	Fourth Industrial Revolution
AME	Advanced Manufacturing and Engineering
APS	Annual Population Survey
ASHE	Annual Survey of Hours and Earnings
BIS	Department for Business Innovation & Skills
BRES	Business Register and Employment Survey
BRIC	Brazil, Russia, India and China
D2N2	Derby, Derbyshire, Nottingham Nottinghamshire
DiT	Department of International Trade
ERDF	European Regional Development Funding
EU	European Union
FAME	Financial Analysis Made Easy
FDI	Foreign Direct Investment
FTE	Full Time Equivalent
GM	Greater Manchester
GVA	Gross Value Added
HMRC	Her Majesty's Revenue and Customs
HWGTA	Herefordshire and Worcester Group Training Association
IoS	Index of specialisation
ISCF	Industrial Strategy Challenge Fund
LA	Local Authority
LEP	Local Enterprise Partnership
LSOA	Lower Layer Super Output Area
MCMT	Marches Centre for Manufacturing and Technology
MGH	Marches Growth Hub
MSOA	Middle Layer Super Output Area
NEET	Not in education, employment or training
NMiTE	New Model in Technology & Engineering
NPIF	National Productivity Investment Fund
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
SIC	Standard Industrial Classification
SME	Small and medium enterprise

STEM	Science, Technology, Engineering and Maths
SWOT	Strength, Weakness, Opportunity, Threats
UA	Unitary Authority
UKBC	UK Business Counts
UKCES	United Kingdom Commission for Employment and Skills
UKEF	United Kingdom Export Finance
WTO	World Trade Organisation

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