

# **Skill Needs Assessment for the Metals, Mechanical Equipment and Electrical Equipment sectors**

## **United Kingdom Executive Summary**

**SSA Stage 1**

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Contact Details  
Research Department  
Sema  
14 Upton Road  
Watford  
Herts  
WD18 0JT  
[research@semta.org.uk](mailto:research@semta.org.uk)  
[www.semta.org.uk](http://www.semta.org.uk)



# Executive Summary

## Sector profile

Based on the Annual Business Inquiry 2005 there are an estimated 800,000 employees and 55,000 establishments<sup>1</sup> in the UK Metals, Mechanical and Electrical (MME) sectors<sup>2</sup>. The MME sectors represent 3% of total UK employment and 2% of total UK establishments. Britain's MME sectors represents 61% of total UK engineering employment and 76% of total engineering establishments.

The MME Sectors considered in this Report are:

- Basic Metals
- Metal Products
- Wholesale Metals & Scrap
- Mechanical Equipment
- Electrical Equipment.

The metal products sector accounts for half of all MME establishments and nearly half of total employment. Mechanical equipment makes up a third of total MME employment.

The majority of UK MME establishments are very small, with 94% employing fewer than 50 people. These small firms are vital to the MME sectors nationally as they account for 45% of all MME jobs. Only 1% of establishments are large (250+ employees), yet they make up a quarter of total MME employment.

The West Midlands has the greatest concentration of UK MME employment (18%). The West Midlands also has the greatest concentration of employment across all MME sub-sectors except electrical equipment where employment is concentrated in the South East (17%) and North West (11%). Wales has a greater proportion of basic metals employment when compared to employment in other MME sub-sectors in Wales.

The West Midlands has the greatest concentration of MME establishments (16%), followed by the South East (13%). The English regions account for 88% of total UK MME establishments. Northern Ireland (3%) and the North East (3%) have the smallest proportion of total UK MME establishments.

## Workforce demographics

About 93% of employment within the UK MME sectors work on a full time basis, compared with about 70% in the UK economy as a whole.

The UK MME workforce is heavily dominated by males. While 81% of the UK MME workforce is male, the respective proportion for the UK economy as a whole is about 56%.

The age profile of the MME workforce is an ageing one when compared to all sectors in the UK economy. 46% of the UK MME workforce is aged 45-64 compared with 39% in all sectors in the UK.

The three occupational groups of skilled trades (craft), managers and process, plant and machine operatives account for about 66% of employment in the sector.

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<sup>1</sup> an **enterprise** may have one or more **establishments**, and each **establishment** may have one or more '**sites**' ('**workplaces**', or ABI '**employment units**')

<sup>2</sup> the Annual Business Inquiry figures on employment excludes those self employed and casual labour, so is likely to under-estimate the total number of people working in the sector.

## **Employment trends**

The UK MME sectors have experienced a period of major restructuring over the last two decades. Over the period 1984-2004 there has been a net loss of jobs about -577,000 (or -37%) across the UK MME sectors. However, this compares with an average net employment gain of 17% across all UK sectors.

Bespoke economic projections commissioned by Semta point to a forecast net decline in employment in all three MME sectors over the period 2005-2014. Measured in terms of annual rates of growth these vary from -1.0% in the case of mechanical equipment to -0.6% in relation to metals and -0.7% for electrical equipment.

The projections indicate that although a net decline in employment is likely in all MME sectors over the period 2005-2014, significant numbers of staff will be needed in all MME sectors in order to replace those who leave their jobs because of retirement or other reasons. The projections point to the need for about 296,000 employees within the UK MME sectors as a whole over this period to replace employees leaving, implying a net requirement for labour over the period 2005-2014 of about 235,000.

In relation to each individual MME sectors the projections point to a net requirement for labour of nearly 132,000 within the metals sector, 67,000 within mechanical equipment manufacture and over 36,000 within electrical equipment manufacture over the same period.

The most significant positive net requirements for labour are expected to be in relation to managerial occupations (an estimated 45,800 people) and skilled trades (an estimated 45,300 people). Even in the case of both skilled trades and process plant and machine operatives, although a net decline in overall numbers is expected, the scale of expected replacement demand exceeds this, implying a positive net requirement.

Direct feedback from employers via the Semta Labour Market Survey (LMS 2007) point to significant optimism in relation to future employment prospects over the next 2-3 years. The analysis indicates that in relation to expected employment change over this period, a positive net balance of employment change is evident in relation to all occupational groups in the UK MME sector.

## **Competitiveness and productivity**

A thorough review of international comparisons of sector productivity and the influence of skills conducted for this Skill Needs Analysis confirmed certain issues about the UK's position and points to key priorities to strengthen the MME sector's international competitiveness.

Comparative work on Engineering Manufacturing by the Engineering Employers' Federation (EEF) confirms that the UK lags behind the US and Europe in terms of productivity on a number of key measures. EEF concludes that the complementary nature of many of the factors that contribute to productivity growth such as investment in skills, innovation and new equipment reinforce each other and a failure to invest on one front could undermine improvements from investment on another.

Greater investment requires more skilled people to operate and maximise the efficiency of new capital equipment. For innovation, firms need to be using the latest technology and have people with the right skills to generate and implement innovative ideas.

A cross country analysis of productivity and skills undertaken by the Sector Skills Development Agency (SSDA) augmented these findings. This incorporated sub-sector analysis of the engineering sector, and detailed econometric data are provided for the MME sectors enabling certain specific insights to be elicited. The main conclusion from this analysis was that workforce skills and training are positively related to productivity performance at sector and firm level. Although growth in human capital ('labour quality') contributes positively to productivity growth, particularly in terms of research and development and innovation, it will normally take a relatively long time period for these improvements to pay off.

In 2005 a combined team from the Institute of Employment Studies (IES) and the Science Policy Research Unit (SPRU) made a concerted attempt to gather and analyse for the SSDA (SSDA, 2005) comparable figures for Total Factor Productivity (TFP) - the residual component of productivity after capital and labour contributions have been accounted for - in relation to a number of skills variables, as well as TFP growth. This data was gathered, covering the years from 1992 and 2002, for 23 sectors for the main countries whose sectors would be viewed as competitive. The 23 sectors examined included *Manufacturing of basic metals and metal products*; and *Manufacture of machinery and equipment*. The analysis suggested that the UK has above average TFP levels in the *basic metals and metal products* sectors. However, the UK is behind the metals industries of Norway (which has the highest levels), Belgium, the US and France. In TFP growth terms, the UK ranks ninth out of 16. For the machinery and equipment manufacturing sector the largest significant positive coefficient is associated with high level education. Managers also appear to have a significant positive influence as well as intermediate-level education.

The UK MME sectors are very important to the economy, with a combined turnover of over £117 billion: about 4.5% of total UK turnover.

Analysis of Gross Value Added (GVA) provides one measure of productivity. It is also an important indicator of economic prosperity. It measures the contribution to the economy of each individual producer, industry or sector. GVA per employee measures this as an average contribution per employee.<sup>3</sup>

The MME sectors account for nearly 5% of total UK GVA. The average GVA per employee for the UK MME sectors was just over £45,300 in 2006, significantly higher than the figure for all UK sectors of just over £33,300.

The key strategies employed by the industries to maintain competitiveness include: promoting innovation and improving business planning and processes. Benchmarking of productivity for the UK MME sectors against key international competitors shows that the gap is closing slowly but significant skills upgrading needs to occur for MME in the UK to reach best in class.

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<sup>3</sup> GVA is the difference between gross output and intermediate inputs. Gross output of a production unit or service during a given period is equal to the gross value of the goods and services produced during the period recorded at the moment they are produced, regardless of whether or not there is a change of ownership. Intermediate outputs refer to the value of goods and services used in the production process/service provided during the accounting period.

In 2005, R&D expenditure for the UK MME sectors was £1.26 billion, equivalent to 12% of total manufacturing R&D expenditure. However, R&D expenditure by the UK MME sectors was only 6% higher in 2005 than in 1997. This compares unfavourably with the all sectors average of a 40% increase in R&D spend over the same time period. Some MME sub-sectors do not compare well with other engineering sectors and the manufacturing sectors as a whole, in terms of expenditure on R&D as a percentage of sales ('R&D intensity').

## **Skills issues**

### **Key drivers of skills**

MME employers highlighted the key drivers of skills change in their sector. In order of importance, these included:

- The introduction of new technologies or equipment.
- Development of new products and services.
- New legislative or regulatory requirements.
- Introduction of new working practices.

A slightly lower proportion of MME establishments are expecting skills to change in the next 2-3 years compared to the past 2-3 years (54% of establishments compared to 59% of establishments). Establishments in the *electrical equipment* sector report that they are most likely to see a skills change in the next 2-3 years due to all of the drivers listed and *wholesale metals and scrap* the least change.

31% of MME establishments had seen no real skills change over the last 2-3 years and did not expect any skills change over the next 2-3 years. This perceived lack of skills requirement change ranged from 37% of micro MME establishments to only 15% of large MME establishments.

### **Current skills and qualifications**

A relatively high proportion of those working in the UK MME sectors have no qualifications. An estimated 12% of the UK MME workforce has no qualifications (121,600), which compares with an average of 10% across all UK sectors. This figure increases to 14% within the metals sector.

A lower proportion of those working in the UK MME sectors (22%) have attained S/NVQ Level 4 and above, as compared to the average for all UK sectors (32%). This figure decreases to 17% within the metals sector. By contrast, the proportion of those working in the electrical equipment sector that have attained S/NVQ Level 4 or above is 29%. However, this is still below the average for all UK sectors and underlines the need for continued upskilling within the UK MME sector.

### **Recruitment**

Half of all UK MME establishments recruited new staff in the previous 12 months. It is estimated that just over 62,000 people were recruited in the last 12 months, representing 7.5% of total employment.

Of those MME establishments that recruited, 10% recruited a recent graduate, 40% recruited a worker aged over 45 years old and just over half recruited a young person (aged 16-24 years old). Nearly half of large MME establishments recruited graduates.

17% of all UK MME establishments reported hard to fill vacancies and it is estimated that these establishments had over 13,000 hard to fill vacancies in total. When taking into account the lost GVA per employee related to these 13,000 hard to fill vacancies, it is estimated that the total GVA loss to the UK economy could be as much as £570 million.

Hard to fill vacancies vary by MME sectors and sub-sector. While 20% of mechanical equipment establishments reported hard to fill vacancies, the figure for electrical equipment was 14% and only 6% for wholesale metals and scrap establishments.

Amongst those UK MME establishments reporting hard to fill vacancies, the most frequently cited occupational groups were skilled trades (46% of such establishments), process plant and machine operatives (26%), professionals (11%), technicians (9%) and managerial staff (8%).

Hard to fill vacancies were mainly due to a lack of applicants with required qualifications and skills, a lack of applicants with required work experience and a general lack of applicants.

Specific skills lacking in applicants included experience (21% of those establishments with hard to fill vacancies), job specific skills (7%), specific qualifications (7%), welding (4%), basic skills (3%) and CNC machine operation (3%).

Employers with a general lack of applicants felt that this was mainly due to *not many applicants, poor image of sector* and that there were *only a few people left in trade/ small pool of skilled workers*.

Nearly half of those employers with recruitment difficulties had to increase their recruitment efforts. Other remedies included retraining existing staff, subcontracting work and starting to look at foreign applicants/overseas.

Although nearly a third of MME establishments felt that recruitment difficulties would have no or little effect on their business, other establishments were suffering from a loss of business orders, increased work in progress, restrictions to business development and missed deadlines. All of these factors have a negative impact on productivity and ultimately profitability of MME establishments.

## Skills gaps

20% of UK MME establishments reported a gap between the skills of their current workforce and the skills required to deliver their business objectives in 2007.

The incidence of reported skill gaps ranges from 23% of mechanical equipment establishments to 18% of electrical equipment establishments. Within the metals sector much wider differences are evident, ranging from 23% of metal products establishments reporting skill gaps to 13% of wholesale metal and scrap establishments.

Skills gaps occurred across all sizes of MME establishment, ranging from a fifth of micro establishments to nearly half of large establishments.

The main skills cited as lacking in employees were technical and engineering skills at all levels (a problem in 70% of those UK MME establishments reporting skill gaps).

The most frequently cited technical and engineering skill cited as deficient was CNC machine operation (13% of UK MME establishments reporting such skill gaps). Other technical skill gaps reported by at least 2% of such establishments were:

- Tool Setting
- Welding skills
- General engineering skills
- Fabrication
- Metal workers
- General machining
- Computer Aided Design (CAD)
- Assembly line/ production robotics
- Materials Requirement Planning (MRP-II)
- Computer Aided Manufacture (CAM)
- Computer Aided Engineering (CAE)

The main generic skills that were lacking were key or core personal skills (10% of those UK MME establishments reporting skill gaps), management skills (5%), IT/computer skills (5%) and marketing or selling skills (3%).

MME establishments were asked to identify those occupations with skill gaps that would have the most significant effect on their business and these included craftspersons (24% of such establishments), professionals (20%) and technicians (19%).

Table ES.1 provides a summary of key skills and workforce employment indicators.

**Table ES.1: Summary of skills and workforce employment indicators for the UK**

	% workforce that are female	% workforce aged 45+	% workforce that are Non-White	Gross Value Added per employee	% change in employment 1984-2004	Projected annual average % growth rate in employment 2005-2014	Projected net requirement 2005-2014	Projected annual net requirement 2005-2014	% workforce with highest qualification S/NVQ Level 4 or above	% workforce with no qualifications	% establishments reporting hard to fill vacancies over the last 12 months	% establishments reporting skill gaps over the last 12 months
Metals	18%	49%	4%	£44,510	-38%	-0.6%	131,600	14,600	17%	14%	16%	20%
Mechanical Equipment	19%	45%	5%	£47,300	-39%	-1.0%	67,000	7,400	24%	12%	20%	23%
Electrical Equipment	26%	43%	5%	£44,160	-33%	-0.7%	36,700	4,100	29%	9%	14%	18%
MME	19%	46%	5%	£45,370	-37%	-0.7%	235,300	26,100	22%	12%	17%	20%
All sectors	44%	39%	8%	£33,340	+17%	+0.7%			32%	10%		

Sources: Annual Population Survey 2006, ABI 2006, Semta LMS Survey 2007, Semta/IER employment projections 2007

# Conclusions

## Key themes

Various skills indicators, including those in assessments based on international studies reviewed in the report, confirm that managers and intermediate-level skills and qualifications have a particularly strong positive impact on productivity levels. This, and the wide range of evidence of demand-side issues presented in this Skill Needs Assessment for the MME Sectors, has been reviewed with employers at a number of consultation events and a number of priorities, under four *Key Themes*, have been identified to address these issues:

### Key Theme 1: Leadership & Management

**Rationale:** If managers are not interested in upskilling then the rest of the organisation will not do it. Specific leadership and management training is considered to be a foundation stone of good management practice required for any company to build a more robust and competitive business. Effective leadership and management are also essential to stimulate R&D and innovation.

Large MME establishments are most likely to cite skills gaps for professionals and managers as having the biggest impact on their business.

Various skills indicators suggest that managers' actions have a positive impact on productivity levels and that investment in management and leadership and improvements in management structures, resource planning and staff training and development can have a positive impact on 'bottom line' business performance. Some MME employers (particularly Small and Medium-sized Enterprises<sup>4</sup> - SMEs) do not currently have a business plan, training plan or assess their employee skills gaps.

### Key Theme 2: Process Improvement (Productivity and Competitiveness)

**Rationale:** Just over half of UK MME companies appear to be using Process improvement techniques. This has to change over the next five years. It is essential that all MME companies are utilising accredited process improvement tools and techniques to compete in a Global Economy to survive, grow and sustain their position. Implementation of Lean manufacturing processes will enable companies to create quality products, high productivity and excellent customer service. This will directly improve bottom line performance.

The introduction of lean manufacturing techniques and skills, and increased use of automation technology has given some manufacturers substantial productivity gains enabling them to compete with overseas manufacturers. Other than with large MME establishments, the concept of '*lean*' manufacturing is not as well advanced in the MME sectors compared to other engineering sectors such as automotive and aerospace. A greater understanding and uptake of process improvement must occur within SMEs in the MME sectors to drive productivity improvements for the overall sector.

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<sup>4</sup> companies with less than 250 employees

### **Key Theme 3: Technical Skills**

**Rationale:** 70% of skills gaps reported by MME companies are in core technical, engineering, craft and production skills.

Hard to fill vacancies are concentrated in technical roles, particularly craft, operator, professional and technician occupations. The main reasons cited for these difficulties were lack of skills and qualifications and specifically a lack of NVQ-qualified applicants and applicants with GCSEs, GCE A-levels and HNDs.

MME employers felt that skills gaps for those currently working in these occupations will have the most significant effect on their business.

### **Key Theme 4: Apprenticeships**

**Rationale:** In light of technical skills gaps in the current workforce, difficulties in recruiting technical occupations and the large numbers required to fill replacement demand requirements it is vital that employers within the MME sector, particularly those in SMEs, look at introducing or increasing the number of apprentices they have.

This will ensure that the MME sectors have a steady stream of appropriately qualified and experienced workers, with the actual technical skills required by sector. The theme of apprenticeships is covered in greater detail in the SSA Stage 2 document.

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The key issues arising from this Skill Needs Analysis are summarised in the table overleaf, structured by their relevance to possible *Private* or *Public* Sector response, and by the relevant broad time-scale.

## Key Skill Needs Analysis Issues

	<b>Private Sector</b> (for possible <i>Employer</i> , or non-governmental <i>stakeholder</i> response)	<b>Public Sector</b> (for possible <i>policy</i> response)
<b>Short Term</b>	<ul style="list-style-type: none"> <li>• One fifth of UK MME establishments report Skill Gaps (within the current workforce), of which 70% relate to technical skills. This can only be addressed by employers themselves, and in principle the up-skilling could be a major focus in business downturn conditions.</li> <li>• Need for recognition by stakeholders of the sectors' overwhelming prevalence of SMEs: this emphasises the need to identify clusters and strengthened supply chain collaboration.</li> <li>• Commitment by stakeholders and individual companies to strengthened productivity and competitiveness must continue, in particular to tackle the gap with enterprises in competitor nations.</li> </ul>	<ul style="list-style-type: none"> <li>• Public policy in relation to the business climate and regulatory environment matters to MME businesses as it does to other businesses. Thus MME employers continue to appreciate, and need: interest rates as low as possible, continued pressure on all forms of regulation, tax burden reduced to internationally-competitive levels, support for export efforts</li> <li>• Public funding to support productivity and competitiveness initiatives, as well as training during downturn periods, are most likely to make a difference.</li> <li>• Government needs to continue to monitor and support increased productivity in the MME sectors, through relevant measures for skills and the other four productivity drivers.</li> </ul>
<b>Medium Term</b>	<ul style="list-style-type: none"> <li>• Since current levels of qualifications at level 4 or above in the MME workforce are some 10% below this fraction for the UK economy as a whole, it is likely that increased graduate recruitment would be worthwhile. Such recruitment could start directly, but would take time to begin to raise the overall higher-level-skill figure</li> <li>• At the lower skills levels there are also comparatively poor levels of qualification achievement. This suggests that relevant vocational training investment is likely to be desirable in order to reduce this weakness in the medium term.</li> <li>• While expansion demand is limited, the MME workforce demographic means that recruitment will be needed in the next 5-6 years to tackle significant <i>replacement demand</i>.</li> </ul>	<ul style="list-style-type: none"> <li>• Public policy on skills needs to continue efforts to improve the effectiveness and positive impact of measures relevant to the MME sectors. Encouraging experience with the use of targeted tools like PACMAN should be built on: critical success factors with such approaches should be identified and strengthened, with a view to refining interventions to further improve the impact of public investment in MME skills.</li> <li>• The impact of the Semta SSA would be expected to emerge into the medium term around the <i>four key themes</i>: <ul style="list-style-type: none"> <li>- Leadership and Management;</li> <li>- Process Improvement</li> <li>- Technical Skills</li> <li>- Apprenticeships</li> </ul> </li> </ul>
<b>Long Term</b>	<ul style="list-style-type: none"> <li>• Building a more diverse Workforce: the fractions of the current MME workforce that are <i>non-white, female, disabled or young</i> are comparatively low. It is likely that these social groups contain people with the skills needed in the Sectors.</li> </ul> <p>In some cases such people may choose not to apply for MME jobs, and the image of the sectors in terms of their 'friendliness' to these groups may need reviewing, and (continuing) work on improving the attractiveness of the MME workplace undertaken.</p> <p>However, broadening the recruitment base may well draw on untapped resources, and so help to reduce observed skill shortages. Such broadening can start in the short term, though significant impact on the overall workforce distributions would take some years to work through.</p>	<ul style="list-style-type: none"> <li>• Public policy would need to support development of a more diverse workforce by facilitating entry to MME-relevant publicly-funded courses of all kinds by those from <i>non-white, disabled and female groups</i>.</li> </ul>