The Sector Skills Council
for Science, Engineering and
Manufacturing Technologies

An Assessment of Current Provision in the Metals, Mechanical Equipment and Electrical Equipment sectors

United Kingdom Executive Summary

SSA Stage 2

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Executive Summary

The SSA Stage 2 report covers the current position of UK learning provision relevant to the Metals, Mechanical and Electrical (MME) sectors. It examines the offering, take up and quality of relevant engineering-related learning at all levels from secondary education to graduate and postgraduate level, as well as the very substantial amount of training provided by sector employers. This summary highlights the main features of this provision in relation to the MME sectors.

This report covers provision in the United Kingdom as a whole: detailed assessments for the four home nations and the English regions are provided in the accompanying reports.

Mapping Learning Provision

Employers in the Metals, Mechanical and Electrical sectors draw on people from a variety of educational backgrounds for their recruits, and make significant investments into the training and development of their workforces. This report examines in detail the current state of the different skills 'supply channels', and recent trends in the flows of people through them.

As with all labour markets it is important to take into account that not all recruitment is 'fresh from' publicly-funded *education* or training provision. Employers understandably seek as much relevant experience as possible in those they consider taking on, so that much recruitment is of people in their twenties, thirties and beyond, for which current provision institutional structures and qualifications are not necessarily so relevant. However, it is natural for policy analysis to focus on assessment of current provision, with a will to explore refinements to today's arrangements and practices that could improve the relevance of what is learned to employer needs, and so raise the value to employers of those coming out of the massive UK learning provision infrastructure that consumes very large amounts of taxpayers' money.

There are a wide range of publicly-funded courses of relevance to the skill needs of the MME sectors beyond secondary education, and – although many traditional boundaries are being adjusted through innovative approaches – these can be broadly divided into ***Higher Education*** and ***Vocational Education and Training***. In addition, MME sector employers raise skill levels in the sectors by making very considerable investment in the training and development of their own staff.

Overall Trends

As the numbers of young people going into universities has grown, and the complexity and sophistication of technological development has risen over recent decades, it is natural that MME employers, like those in most other sectors of the UK economy, have generally recruited more young people with Higher Education qualifications. Overall, however, the evidence gathered for this report suggests that the Metals, Mechanical and Electrical sectors do not recruit particularly high numbers of graduates from courses of direct relevance to the (technical) skills used in their business. Work in the MME sectors might be viewed as representing some of the more traditional fields of engineering. However, as generally in a dynamic economy with growing international competition, UK enterprises in these sectors must continue to innovate in order to survive and prosper.

The presence of leading-edge technical skills and insights that tend to come from those who have benefitted from Higher Education are as likely to prove as strategically important here as elsewhere.

Nevertheless, learning pathways through Vocational Education and Training provision remain of considerable importance for the MME sectors, and this includes Further Education and Work Based Learning. However, the major changes in market practices over recent years, not least the outsourcing trend, has affected many of the traditional company practices with respect to Human Resource Development (HRD) in particular the scale of previous apprenticeship programmes. This underlines the importance of finding approaches to HRD at different levels that 'fit well' within today's competitive marketplace & make best use of the available public investment.

Higher Education provision and supply

The main Higher Education courses of potentially direct relevance to the technical skill needs of the MME sectors are:

- General Engineering;
- Mechanical Engineering;
- Electrical and Electronic Engineering, and
- Production and Manufacturing Engineering.

In addition, Materials Science and Metallurgy courses are of potential relevance, in particular to the Metals sector, although numbers taking these are considerably smaller.

Higher Education Provision and Uptake are examined in Section 2 and Section 5. The latest figures show that 16,700 students enrolled on First Degree courses in engineering subjects relevant for the MME sectors. 39% of these were in electronic and electrical engineering, 33% in mechanical engineering, 22% in general engineering and 6% in production and manufacturing engineering. First destinations data show that most engineering graduates do not go into engineering sectors, and this also applies to graduates from MME-relevant courses and the MME engineering sectors.

The falling level of interest in engineering and technology over recent years has taken a toll on student numbers on these courses. In general, the picture of the flows of students into, through and out of Higher Education in these technical subjects is not particularly encouraging. There are falls over recent years in the numbers of *graduates* in both Electrical/electronic- and, particularly, Production/Manufacturing-engineering, though flows of new graduates in Mechanical and General engineering increased slightly from 2003 to 2006. More worryingly for the future, First Degree *enrolments* in these engineering courses have fallen over recent years, except for Mechanical Engineering, as have student numbers on 'other undergraduate qualification' courses (including HNDs), with the minor exception of a slight rise from 2003 to 2004 in Mechanical and Electrical/Electronic Engineering.

Where the MME graduates go

While these trends are worrying in relation to UK engineering as a whole (and not unique to the UK), what is most relevant to the MME sectors is the trends in ***the numbers of graduates from these courses that are going directly*** into employment in the sectors.

- over 500 ***First Degree*** graduates enter the MME sectors each year from courses in the four key types of engineering. The flows are relatively steady, although there is a *small reduction* in numbers coming from electrical and electronic engineering courses, and a *certain growth* in numbers from mechanical engineering – in which the largest numbers were educated (over 200 per year).
- A more significant trend is evident in the numbers of those who leave HE with ***other Undergraduate*** qualifications (including in particular HNCs, HNDs and Foundation Degrees) in the four most relevant types of Engineering. The total numbers of these has fallen from nearly 250 to some 150 in the last three years. This fall has occurred in all four disciplines, although numbers of Mechanical Engineering leavers have leveled out, and 2005/6 showed a small increase in flows into the MME Sectors.

- The third element of flows into the Sectors comes from ***Postgraduate*** courses in the key Engineering disciplines. The majority of these are likely to be *taught Masters* courses. Between 70 and 90 people with such qualifications enter the Sectors each year, and 2005/6 showed a fall, following growth in the previous two years. The contribution of flows from the four Engineering disciplines show greater variation over time, with Electronic and Electrical Engineering numbers growing and then falling sharply, and General Engineering playing an increasing role. In principle, these flows are likely to be particularly important in relation to influencing innovation in the sector, as Postgraduate courses generally enable students to focus more thoroughly on the 'leading edge' technologies that can enable innovation within the industry.

However, while falls in these numbers might appear at first sight to be worrying, it is necessary to clarify whether the flows are determined by (any limits on) supply or demand. Given that the numbers of these graduates entering the MME sectors represent a very small fraction of those graduating in the subjects, there is no evidence of there being any obvious constraint on the supply of such people. This suggests that – to the extent that recruitment of increasing numbers of graduates and postgraduates is strategically important in relation to stimulating innovation – the challenge is likely to be of *raising employer demand* for such skills, unless work in the sectors is particularly unattractive to these graduates.

International comparisons of enrolments and graduations in relevant university subjects do not suggest any uniquely British problem arising from the falling interest of young people in engineering.

VET Provision

Evidence on supply from Vocational Education and Training Provision also flags some concerns and opportunities for improvement.

There are a number of qualification types relevant to, and pathways into, work in the MME sectors.

National and Scottish Vocational Qualifications:

- These awards, based on the National Occupations Standards developed by Employers, are competence-based and involve very thorough assessment well beyond the testing of knowledge through written examinations.
- The most significant *technical* N/SVQs (for which Semta led the design) are:
    - Engineering Production, at NVQ Levels 2 & 3
    - Engineering Maintenance, at L2 & L3
    - Performing Engineering Operations (PEO) at L1 & L2
    - Performing Manufacturing Operations (PMO) at Levels 1 & 2
    - Engineering Management at L4
- In addition Semta has developed an N/SVQ that assesses competence in handling *Quality Management* – in particular Lean Manufacturing – for improved Business Efficiency: the Business Improvement Techniques (B-I T) qualification. This is available at Levels 2, 3 and 4, and has been very favourably received in the marketplace.
- Data on Registrations (entry) and Certifications (achievement) for the most significant ones confirm that:
    - Strong growth from 2002 in take up of the N/SVQ in Performing Engineering Operations (PEO) at level 1, with less interest over recent years in the Performing Manufacturing Operations (PMO) qualification;
    - At level 2, PEO N/SVQ registrations and certifications have also grown strongly, while PMO N/SVQ registrations have recently eased from a sound base. Registrations and Certifications of Engineering Production have faded into insignificance as the qualification has been superseded by PEO/PMO. B-IT Registrations grew strongly from 2004, and Certifications are on the increase.
    - At Level 3 Certifications of the Engineering Production N/SVQ have declined over recent year (take up of the qualification was valuable for 6-7 years). Certifications of Engineering Maintenance are continuing to be steady.
    - As is generally the case in most sectors, overall take up of N/VQs at the higher levels is disappointing: however the trend at Level 4 is upwards for B-IT and Engineering Management, albeit from a low base.

Apprenticeships:

Although major engineering industry Apprenticeships were phased out some years ago, 'Modern Apprenticeships' have been designed in the last 10 years which fit well to today's market conditions, and enable some public investment support to strengthen employer training. Apprenticeship branding varies around the UK, but Semta has led the development of a range of frameworks that enable a very effective entry to engineering work. There are frameworks for the Metals Industry, Engineering, and Industrial Applications.

The proportion of company sites[1] that have apprentices or other recognised trainees in the MME sectors is similar to that in engineering as a whole. However, the fraction of sites with apprentices has fallen from 28% in 2002 to 25% in 2007.

Employer establishments in North East England, Northern Ireland and Scotland are most likely to employ apprentices, whereas in the West Midlands only 15% of MME sites had apprentices (the lowest of any region except for London). This seems surprising given the importance of the West Midlands in terms of employment and number of workplaces in the MME sector.

The main occupations where apprentices are employed are at craft level (35% of apprentices) and technician level (33%). On average, apprentices account for about 4% of employment in the MME sector, the same as for all engineering. It is estimated that there are over 17,000 apprentices or recognised trainees in the MME sector at any one time.

Learning and Skills Council (LSC) figures indicate that there are some 27,000 apprentices in training in England and Wales in engineering and it is intended that this number will double by 2013, in response to the aspirations of the Leitch review of Skills[2].

- Metals Industry Advanced Apprenticeship

  There was very strong growth in the percentage of apprentices achieving the outcome between 2004-5 and 2005-6, with over 70% success rate being maintained – for both the NVQ and the whole framework – into 2006-7.

- Engineering Apprenticeship

  Progress over recent years has been steady for the Apprenticeship achievement rate, rising from some 40% for NVQ achievement in 2002-3 to over 70% in 2006-7, and a similar rise (from under 30% to over 60%) for achievement of the whole framework.

- Engineering Advanced Apprenticeship

  After a fall from 2002-3 to 2003-4, performance for the Advanced Apprenticeship in Engineering has risen encouragingly, with both NVQ and whole framework success rates around 70%.

- Industrial Applications Apprenticeship

  Progress in achievements in this framework has also been good over the last four years, with particularly strong growth from 2003-4 to 2004-5 and 2005-6/ 2006-7.

[1] each ***company*** ('enterprise'/'employer') may have one or more ***establishments***, each of which may have more than one ***site*** (or 'workplace')
[2] Her Majesty's Treasury (2006): 'Prosperity for all in the Global Economy: World Class Skills'

Secondary Education of relevance

The career of a skilled technical worker generally starts with the choice of mathematics, science and technology-related subjects in secondary education. The report examines the relevant provision arrangements in some detail: there are certain differences between arrangements in the four 'home nations' in particular in Scotland. The seeds for young people's career choices are sewn in the secondary schools, and engineering careers generally need to be based on a more rigorous and technical set of subjects taken (in England, Wales and Northern Ireland) at GCSE and GCE 'A' Levels and the equivalents in Scotland. In particular, flows of young people chosing science and technology-oriented subjects are the major source of (young) people taking engineering-related HE and VET.

Certain trends here are also somewhat discouraging:

- While numbers passing GCSE in *Physics*, *Mathematics* and the *Science single award*, as well as in *Applied Science*, have been growing healthily over recent years, numbers achieving GCSEs in *Design and Technology*, *Science Double award*, *Engineering* and *Manufacturing* have all fallen. The fraction of passes with the best grades (A*-C) has grown for nearly all relevant subjects.

- At GCE 'A' Level, there are also issues about the trend. Passes in *Mathematics* and *Further Mathematics* have grown over recent years, but those in *Physics* and *Technology Subjects* have not. Again, the percentage of those achieving the award with A or B grades has also generally risen over recent years. This – together with the corresponding rise at GCSE – does raise a question about whether standards are being fully maintained. If they are, then this is encouraging for the emergence of 'greater talent' than in the past – increases in *quality*, even if not in *quantity* of young people with a relevant secondary education base.

Overall, in spite of a wide range of reforms to science teaching over recent years, the general fall in interest in science and technology subjects in Secondary School remains a real issue for engineering skills policy, though it is not unique to the United Kingdom. A recent OCED Study on the evolution of student Interest in science and technology studies (OECD, 2006[3]) found a comparatively consistent decline in interest in most industrialised economies – including evidence of significant falling participation in S&T university courses in Japan, France, Germany, the Netherlands and the USA.

[3] see http://www.oecd.org/dataoecd/16/30/36645825.pdf

Professional Engineering Qualifications

The Engineering Council (ECUK) maintains the UK national register of professional engineers and technicians. As at 31 December 2006 there were 35 professional engineering institutions licensed by ECUK to submit for registration those of their members who met the UK Standard for Professional Engineering Competence (UK-SPEC). To gain registration, individuals must demonstrate competence underwritten by education, training and responsible experience, as set out in UK-SPEC. Subject to licence, institution members can be entered in one of three categories on the register:

- Chartered Engineers (CEng),
- Incorporated Engineers (IEng), or
- Engineering Technicians (EngTech).

The key trends are as follows:

- The total number of registrations continues to decline having fallen 8.1% (21,500) over the last decade.
- The category of IEng has experienced the most significant decline, but both CEng and EngTech categories have experienced some stabilisation in numbers.
- Despite a decline in volume the category of CEng remains the largest and its share has grown three percentage points from 1997 to 2006.
- The increase in the proportion of female new registrants over the decade has been slow, even from a very low base.
- An ageing profile may store up some problems in the next ten years unless there is a significant rise in new registrations.
- The average age of registered engineers continues to increase.

Learning Provider Perspectives

A full assessment of learning provision cannot be made without some understanding of the situation of Providers themselves. While there may be issues with the *quality* of provision (see Section 7), the realities of provision, in particular in the public sector where funding and bureaucratic constraints can be significant, need to be understood. Section 6 presents insight into how provision looks from both *Vocational Education and Training* and *Higher Education* provider perspectives.

70 Further Education and other ***Vocational Education and Training providers*** participated in Semta's Provider Survey in October 2007. Over 80% of these offer provision in both Mechanical and Electrical Equipment-related skills, with smaller fractions providing courses in Basic Metals and Metals Wholesale. Some 2/3 of these providers have at least 50 learners on courses related on one or more of the MME Sectors, and the total number of learners as over 14,000. Nearly 80% of respondents offer training to Apprentices or other ecognized trainees (excluding graduates), and 44% provided training to other students/trainees aged 25 or over. The key trends in supply and demand for provision are:

- 41% of respondents expected demand to increase in the coming year;
- 24% of the providers surveyed had courses at risk due to falling demand;
- 46% had under-utilised spare capacity;
- 42% were unable to provide training that was in demand (barriers to increased capacity were reported as cost of equipment followed by a lack of experienced/qualified staff and lack of space); and
- 71% of the providers had drawn on LSC funding in the past 12 months, with 29% using European Social Fund (ESF) Funding.

Semta also carried out, as part of the 2007 Provider Survey, a survey of ***Higher Education*** providers. The survey was sent to universities across the four nations that offer courses related to the MME sectors. 16 Higher Education Institutions responded. Of these, 13 institutions offer courses relevant to the mechanical equipment sub-sector, 10 relevant to electrical equipment and five relevant to both basic metals and metal products.

- All but one institution has more than 50 students on these courses, four have between 200 and 500 and three over 500. Undergraduates make up at least 40% of students in every case and over 80% in half the institutions.
- The types of courses offered were mostly Mechanical Engineering (43 courses), Electrical and Electronic Engineering (42 courses) and Computer Aided Design and Computer Aided Manufacturing (CAD/CAM) (28 courses). Most courses were offered at NQF level 6 (BSc/Beng) or above. The majority of institutions also offered training/courses in; Communication Skills, Problem Solving, Team Working and IT User Skills (e.g. MS Word). Comparatively few Customer Relations courses were offered.

Quality of Provision

There are two separate components of quality issues with the provision of education and training for the MME Sectors:

- Direct Quality Assurance (QA) of provision 'in its own terms' – e.g. through inspections and various audit mechanisms assessing performance against specified criteria;

- Relevance: Assessments of the usefulness and value to the two types of customer who make use of the provision: employers (who often pay for it) and the learners who attend the course(s)

Section 7 of the Report examines key aspects of both of these:

Apprenticeships

The Semta review of *Apprenticeship Frameworks* in 2006 found that employer satisfaction was generally very high, although in some cases it was felt that contact between employers and training providers could be improved. The vast majority of Apprentices on these frameworks (70% or over) were employed at the start of their programmes. Employers were agreed that an initial sound *Introduction to Engineering* was the most valuable component of these apprenticeships, and for this reason confirmed the importance of the Performing Engineering Operations N/SVQ.

Young Apprenticeship Programme

Semta carried out a review of employers' views on the comparatively new *Young Apprenticeship* programme in early 2006 and early 2007. 76% of respondents expressed themselves very satisfied and 54% were fairly satisfied. 23% of responding employers had already taken on Young Apprentices following completion of the programme, and another 32% were intending to do so. 76% of employers (more than in 2006) felt that the Young Apprentices had a good, or very good, chance of entering an Advanced Apprenticeship at the age of 16.

Overall, as elsewhere in engineering, apprenticeship programmes appear to be well respected by employers, so that the major boost to public investment in this area proposed by the Leitch review is ecognized to be positive, and Semta will be playing an important part in that.

The UK HE Quality Assurance Infrastructure

The very major growth in numbers of people entering universities over the last 15-20 years has inevitably produced pressures on the ability of Higher Education Institutions (HEIs) to deliver the same level of quality to more and more students. Quality issues in HE are the responsibility of the Quality Assurance Agency for Higher Education QAA, and it approaches this by a rolling Audit programme for both Teaching and Research. The results of these audits are published, and this information strengthens the operation of the HE 'market' as the ranking of courses influences demand from the best applicants. Audits are largely carried out on a 'peer review' basis, and Employers' views of the comparative value of different degrees courses are generally influenced by things beyond the formal QA processes.

Employer Engagement in Engineering Foundation Degrees

Two-year Foundation Degrees (FDs) are comparatively new, and their effectiveness as a shorter, more vocationally-oriented HE offering is being refined in the light of early experience. Employment engagement in Engineering FDs was investigated by the Engineering and Technology Board in 2007. This engagement is clearly crucial, given the fundamental aspiration behind these courses for strong relevance to employment. Both FD providers' (HEIs') and employers' perspectives were surveyed, and ecognized e variation in employer engagement levels was identified. It emerged that employers are not yet seeing enough clear benefit to them of such involvement. Employers were found to be more positive than providers that Foundation Degrees are providing the necessary skills. Existing links between providers and employers were ecognized to be valuable in ensuring adequate engagement. It was felt that providers need to take into account the needs of local employers as well as those nationally identified, and that providers need to show as much flexibility as possible. Overall, all parties agreed that employer engagement in FDs needed to be strengthened.

Learner Satisfaction in Further Education

The National Learning and Skills Council carries out from time to time large-scale surveys of learners about their experience in Further Education. The fourth *National Learner Satisfaction Survey*, with over 40,000 students interviewed in 2007 (and before that in 2004) distilled a number of key findings about experience with courses at Further Education Colleges (FECs), sixth form colleges and Work Based Learning-delivered FE. Overall, satisfaction with the experience was mixed, with learners in Engineering, Technology and Manufacturing less likely to be very or extremely satisfied than learners in other areas. These learners were more likely than FE learners generally (29% c.f 15%) to cite concerns with providers as reasons for leaving courses. These findings for England suggest the need for serious commitment to improving the quality of Engineering, Technology and Management courses. Experience with Engineering FE in Northern Ireland[4] appears to be rather better, and reports on Further Education in Wales and Scotland are often encouraging.

Employer experience with training provision and support

And finally, employers themselves commission training for their own staff, and Semta's own surveys in 2007 (the Labour Market Survey (LMS) for all Engineering, and the Workforce Development Survey (WDS) for the MME sectors) gathered a wealth of evidence about the current situation. The majority of the findings are reported in Section 8, but quality aspects of training provision were also covered. Employers used a range of 'external' learning providers in addition to their own training resources, including Commercial Training Providers, Equipment Suppliers/Vendors, Employer associations/professional bodies, Further Education Colleges, and Universities. Quality was assessed in terms of six main factors, and, after *in-house provision*, employers rated *vendor training* and *employer associations* best overall followed by *commercial providers*, with *Further Education providers* performing least well.

[4] SSDA (2007)

Employer Investment in Workforce Skills (Section 8)

Three significant Semta surveys[5] carried out in 2007 enable, with the cross-reference of relevant parts of the most recent National Employer Skills Survey (NESS), sound insights into a range of aspects of employer training in the MME sectors, and their relationship with such aspects elsewhere in the economy.

In terms of training initiated by employers, overall activity across all engineering establishments is generally slightly lower than across all sectors in the economy. Training activity in the MME sectors is similar or slightly lower than for engineering as a whole. Where training activity is lower than in other areas of engineering, it is likely that this is related to the size distribution of the companies in the sector. Smaller companies tend to undertake less training than larger companies and micro-establishments (those with fewer than 10 employees) generally have much lower levels of training activity or formal business planning and HR training processes.

On average, 28% of MME establishments had not trained their employees in the previous 12 months.

The Surveys have produced a considerable amount of additional detail:

- Employment of Apprentices:

  Generally, between 15% and 30% of the MME sector employers used apprentices, with Metal Products employing the highest fraction (27%) and Wholesale Metal and Scrap the lowest (at 6%). As was to be expected, the larger the employer, the more likely to have apprenticeship programmes (7% for micro-enterprises (<10 staff) up to 59% for large companies – above 250 employees). Difficulties in recruiting apprentices were reported to arise from problems of *attitude/willingness to work or (perceived) quality of the candidates* (reported by 34% of employers), with the second most reported reason (22%) being *General lack of skills for the job*. Employers were asked what would encourage them to recruit apprentices in the coming years: a quarter responded that nothing would, a fifth felt they would consider it if the business workload increased (i.e. that there was demand for an apprentice), and 13% expressed interest if financial support were forthcoming.

- Other training-related activities

  46% of respondents provided work-placement, while 16% made school visits. 15% offered summer placements, while 12% offered industrial placements, and 11% of those responding provided materials for schools.

- Training plans, and related planning

  Employers in the MME sectors are generally less likely to have a training plan (46%) than the average for the UK economy as a whole (55%). Within MME, few employers within Metals (at 46%) than within Mechanical or Electrical Sectors have plans, although within the Metals sector, Basic Metals achieved the 55% national average. As might be expected, the larger the employer, the more likely it is to have a training plan (the average ranges from 28% for micro-enterprises to 79% for large enterprises (250+ employees). The same patterns pertain to training *budgets*, with employers from MME sectors running several percentage points below the UK economy average.

[5] Engineering *Labour Market Survey* ('LMS'), and two MME-sector Surveys – the *Workforce Development Survey* ('WDS)' and the *Five Stage Model Pilot Survey*.

- Training activity in the previous year

  A quarter of MME establishments had offered both on- and off- the job training to their employees in the previous year. In addition, 19% more on the job (only) and a further 11% offered off-the-job training only. Only 45% of responding employers offered neither type of training. There was comparatively little variation between the different MME sectors on this, other than the fact that Wholesale Metals and Scrap companies were most likely to offer neither type of training.

- Training commitment by occupation

  Managers within MME companies were most likely to receive training (36%), followed by Operators (31%) and Admin/Clerical occupations (27%). Fewer than a quarter of Technicians and Craftspersons received training, and only 9% of Assemblers. Generally, there has been more *on-the-job* training than *off-the-job* except for Managers, with Craftspersons, Operators and Assemblers more than twice as likely to have on-the-job training.

- Training spend

  Some two thirds of respondents to the WDS provided information on their training spend over the previous year. The total spend of respondents (183 sites) was just under £11m, with the average per site amounting to nearly £60,000 in the year. This worked out to a figure of some £580 per employee. The distribution of spend across respondents was comparatively broad, with over 8% of the sample in each of 6 'spend bands' up to £100,000. The greatest fraction of respondents (13.6%) spent between £2,500 and £5,000 in the year. Across different sizes of employers, the distribution was as would be expected – the larger the employer, the larger the training spend.

- Types of provider used

  The WDS found that the greatest number of responding establishments (52%) used their own in-house training arrangements, followed by Commercial Training Providers (43%), with FE providers third, used by 26% of respondents. The ranking was similar for the findings of the 'LMS', with 34% of respondents 'Very Likely' to use Company In-house facilities, followed by Commercial Training Providers (15% Very Likely), and Vendor Training third, with 13% of respondents Very Likely to use them.

- Barriers to training

  A range of factors were cited as barriers to more training: the most significant were the *cost of training* (14% of respondents) and the *lack of time availability* (13%).

- Delivery methods

  A range of different methods were used to deliver training, but the most popular to MME employers were *in-company trainers* (51%), *external trainers* (42%), followed by *college/training centres* (28%), and *in-company workshops* (25%).

- In-house Training Programmes

  72% of respondents develop their own training solutions in-house. The content of training programmes and solutions developed in house are Health and Safety Training (cited by nearly 8% of respondents), Job-specific training (~6% of respondents), followed by basic/induction training (4%). The most often cited reason for in-house training development was 'tailoring to our specific needs' (10.4% of respondents), and 'it's cheaper/more cost effective' (9.6%).

- Funding and Funding Mechanisms used

  25% of responding employers reported making use of funding from public sources to support training. The fraction varied a little by location, with 31% of companies in the North East drawing on this support, down to 12% in London. The fraction in Scotland and Wales was a little higher than in England and Northern Ireland. In total some 36% of sites had accessed external funding to help with the cost of training. The majority of this funding was accessed either for staff undertaking N/SVQs or apprenticeships.

Employer Commitment: perspectives structured around the MME SSG *Five Stage Model*

The evidence of typical training activity collected from 500 companies in two English Regions and Northern Ireland, Wales and Scotland shows the majority of companies surveyed (353 or 70%) within the Metals, Mechanical and Electrical sectors to be ***operating at stage 2 of the model*** – i.e. *training to meet legislative requirements with managers seeing training as a cost rather than a benefit*. Overall, 82% are operating at stage 2 or above with only 18% doing little or ad hoc training only.

- Larger companies are generally at a higher stage of development. However, implementation of the typical training activity in the model appears to be less well defined in smaller companies with less than 50 employees.
- 213 (43%) of the MME sector businesses in the survey have implemented some form of process improvement training, with problem solving being the most popular process. However, take up of '5S'[6] and 'lean' manufacturing techniques feature significantly across all sizes of business.
- The largest area for improvement in skills development within the MME sector is to advance businesses at stage 2 to stage 3 or better. The improvement action required by most stage 2 businesses is to develop training plans that assist in meeting business objectives; closely followed by developing supervisors / team leaders. Taken together, these two actions have the potential to move 70% of stage 2 businesses to stage 3.

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The key issues concerning current learning provision that have emerged from this analysis are shown in the table overleaf. While these are important, the overall priorities for the Sector cannot be distilled from the *supply* side alone. The Sector Skills Agreement priorities are shown, structured by four *Key Themes*, in the ***Stage 3 Report***, that analyses the *gap between current provision and sector skill needs*, in the light of Semta's considerable understanding of the sector and what works and what does not, in terms of policy and employer responses to the most serious gaps.

The findings of this assessment are being disseminated in various ways: in particular the analysis relating to the individual home nations and English regions has been made available to the relevant policy authorities in the nations and the RDAs through the accompanying reports. However the major thrust of dissemination of the SSA work will focus on the later stages, in particular through implementation of the agreements on the collaborative work programmes represented in the Stage 5 report.

[6] The 5 Japanese S's Seiri, Seiton, Seiso, Seiketsu and Shitsuke can be roughly translated into English as Sift, Sort, Sweep, Sustain and Self-discipline and they describe the 5 stages of the '5S' process. They are regarded as the 5 pillars of the visual workplace. The 5S have a broad application, from complex manufacturing facilities right through to the simplest of clerical operations. They are now used world-wide to some degree or another in most large and medium sized organisations.

Key Current Provision Issues

	Private Sector (for possible ***Employer***, or non-governmental ***stakeholder*** response)	**Public Sector** (for possible ***policy*** response)
Short Term	• Current MME employer recruitment of graduates from relevant Higher Education courses represents a comparatively ***minuscule*** fraction of those graduating in these subjects. While this is likely to reflect the apparently limited attractiveness of MME work (an image that it is up to the sector to tackle) it is likely that greater efforts to recruit such graduates could have a worthwhile return.	• Employers continue to report concerns about the '***work-ready***-ness' of 'fresh' graduates. In principle approaches like graduate apprenticeships would help tackle this, but it appears that employers are unlikely to attempt these without funding support, not least since they often view such activity as 'making good inadequacies in the education system'.
Medium Term	• The Pilot Survey of the Semta MME Sector Strategy Group *Five-stage Model* confirms that most employers are taking Human Resource Development seriously, but there remain many opportunities for strengthening commitment to employee learning, with the benefits of the greater productivity and motivation that can result. • The falling off of applications for Science, Engineering, Technology and Mathematics (STEM) courses – at secondary schools, and particularly at Higher Education Institutions - is a serious issue, though not unique to the UK. In principle, this would only be arrested/ turned round if the image of such work were improved. This is not easy to do, and impact will take a while, but in principle, tackling the image (in a way that will increase the flow of 'attractive' applicants to MME employers) can ultimately only be the responsibility of the sector. • Numbers of professional engineers and technicians on the UK National Register are falling steadily. This arises from the falling numbers of new (young) professional engineers and technicians applying to be registered, and this relates in turn to the falling interest in engineering careers. • The effectiveness and take-up of Foundation Degrees (FDs) in Engineering appears likely to benefit from increased employer engagement.	• Various surveys (for this SSA and beyond) confirm suspicions that there are definite quality concerns about Engineering learning provision at some Further Education colleges • The falling off of interest in STEM subjects is an issue beyond just the MME Sector, and there are various public sector initiatives attempting to address the problem. • Apprenticeships appear to be generally both well-appreciated and successful. In principle therefore increasing the numbers of apprenticeships would be likely to be effective. The Leitch targets support this aspiration, but levels of support from public funding can be crucial to employer take-up. • National and Scottish Vocational Qualifications have generally been well received and successful in Engineering Manufacturing, though take up at the higher level has been more disappointing. This suggests that, although the competence assessment model is sound in principle, refined implementation approaches, probably drawing on what is done by the Professional Engineering Institutions, could prove valuable. • (there is also a role for policy development in increasing FD employer engagement, by structuring an overall proposition that is more attractive to employers)
Long Term	• Improvement of the image of work in Metals, Mechanical and Electrical Engineering is accepted as being a long term challenge. While policy will be broadly supportive, the only way in which attitudes to MME work will significantly change is likely to be for the Sector itself to work on the image problem. Part of the challenge is likely to involve the modernisation of the workplace culture, and it would be understandable for the sector to doubt whether it could make any difference on its own. However, unless there is a specific MME element to the messages going out about attractive opportunities in this work, then the traditional engineering sub-sectors like these are unlikely to benefit from any general recovery in attitudes towards STEM work in general.	• Substantial under-representation of females in MME-related courses (in all parts of the learning system). This arises from a comparatively negative perception by women (and in particular girls) of Engineering work (particularly of more traditional types), and is not expected to change quickly. There are various bodies active in this area (e.g. WISE and WES), and it would be important this work continues.