CHAPTER 7

Growing skills to meet the challenge

UK electronics companies need to be more strategic in addressing skills if they are to raise productivity and compete effectively. This means a step change in management and leadership skills, technical and engineering skills, general business skills, procurement and supply chain management skills, all of which are essential for the future survival and success of the industry. Government also needs to target the available resources better to stimulate the take-up of people development activity.

The employee image of the sector has deteriorated substantially since the late-1990s. UK electronics companies have reduced work placements and connections with education establishments. The lack of diversity and the increasingly aged workforce pose significant future challenges to the sector.

There is a cyclical disconnect between the skills and labour needs of the UK electronics industry, the business cycle, and the provision from the education sector, which need to be addressed. We also need much better alignment and industry responsiveness for the UK's electronics workforce to thrive. Business also needs to take a more strategic approach to its skills needs and engage better with key skills stakeholders both nationally and regionally.

SKILLS CHALLENGES

The electronics manufacturing workforce is forecast[1] to reduce slightly overall but with demand for professional and associate professional staff rising (see *Table 7.1*). The data has been supplied by SEMTA, and the figures are based on collating existing forecasts from the Institute of Employment Research and the Manufacturing 2020 Report, the results of which were discussed with industry. (Note: The figures in *Table 7.1* exclude the electronics distribution workforce).

[1] Forecasts for 2014 assume stable of falling numbers of employees for most occupations except Professionals and Associate Professionals

Table 7.1: Electronics occupation distribution (2002 and SEMTA forecast)

	2002		2014*		
Occupation	Employees	%	Employees	%	% Net change from 2002-2014
Managers	45,600	18	42,900	18	-6
Professionals	35,100	14	35,500	15	1
Associate Professionals	36,700	15	38,900	16	6
Admin/Clerical	26,500	11	23,800	10	-10
Skilled trades	46,500	19	43,700	18	-6
Personal service staff	2,900	1	2,900	1	0
Sales/Customer Service	4,000	2	3,800	2	-5
Machine Operatives	32,500	13	29,300	12	-10
Elementary staff	19,800	8	19,200	8	-3
All occupations	**249,600**	100	**240,000**	100	-4

Source: *SEMTA

Within these figures some skills will have different renewal rates. For example, the productive life of an electronics designer is about 10 years. But other skills challenges are growing. Technical, regulatory, structural and extended supply chain changes have brought new challenges to the skills requirements of the electronics industry. New products are introduced every six months or so, requiring flexibility in manufacturing and marketing skills.

Regulations are challenging the use of traditional materials and require new supply chain management, process and testing skills. Customers demand the availability of e-business from their suppliers. Whilst environmental pressures to reduce energy use, encourage re-cycling and re-use, bring new demands on design skills and end-of-life management. This creates new market demands, as well as new networking and business culture skills. Unless the electronics sector has the skills to embrace these challenges it will not be able to compete successfully.

MANAGEMENT AND LEADERSHIP SKILLS

With only a few exceptions, the EIGT interviews confirmed a pattern of management and leadership behaviour that was generally short-term, risk averse and tactical rather than strategic. A large electronics manufacturer called for a healthy balance between vision and drive in senior managers and leaders. *"UK companies are driven by the profit and loss account and boards are broadly stuffed with accountants. This makes them short-termist and risk averse, so companies eventually run out of steam. In the US, a success rate of one in three is good, whereas UK companies will only attempt something if they think they can get it 100% right."*

An SME claimed, *"The rest of the EU is no better at management than the UK. Lack of leadership is the main issue, and the UK is at best average. A key problem is the shortage of entrepreneurs not PhDs, and the right climate to operate in. We need a climate that enables new business to race away rather than one that protects the old."* Another SME was of the opinion: *"UK electronics managers are tactical and are driven to this by the climate. For example, the banks force entrepreneurs to mortgage their houses. US guys are more driven upfront. We've also got poor industry leaders. They knew how to manage PCB businesses when there was a rising market but lack the management skills to make money now."*

Currently much of UK industry lacks the world-class management and leadership skills to cope with all the new challenges. The EIGT's findings suggest that management and leadership challenges have increased significantly in recent years, as the business environment grows more competitive, and markets and supply chains become more global and complex. Evidence from other sections of this report (e.g. the lack of strategic approach to networking, regulation and investment) suggests that leadership is weak. The EIGT was unable to identify even a handful of individuals who were seen as visionary champions by their contemporaries.

> 'The rest of the EU is no better at management than the UK. Lack of leadership is the main issue, and the UK is at best average. A key problem is the shortage of entrepreneurs not PhDs, and the right climate to operate in.'

The electronics sector is not atypical in this respect. A recent Engineering Employers Federation (EEF) report[2] suggests that UK managers are more tactical than strategic when making investment decisions. The Skills Strategy white paper[3] also highlighted the need to enhance management and leadership skills for improved business performance. It is generally recognised that organisations achieve world-class performance when innovation, communication and rewards are aligned to business strategy.

According to a recent study commissioned for the Dutch Ministry of Economic Affairs[4]: *"Top managers of UK-owned firms have rarely trained as scientists, in contrast with US and French executives, which often have both PhD and MBA diplomas. There seems to be a gap between the research community and senior management in firms. Firms tend to have insufficient capability to absorb science, reflecting the low level of R&D carried out in most companies. Foreign subsidiaries also show a greater propensity than domestic firms to collaborate with universities. Senior management often shows little interest in R&D activities."*

2 EEF Report 'Catching up with the Continent – EU/UK manufacturing productivity' http://www.eef.org.uk/

3 www.dfes.gov.uk/skillsstrategy/pdfs/whitepaper

4 Draft study, www.apps.ez.nl/bestel

> 'There seems to be a gap between the research community and senior management in firms'

Trade associations were (unsurprisingly) reluctant to criticise the management and leadership qualities of members. Indeed, some companies have taken management and leadership development seriously, and can match the best anywhere in the world. But most EIGT interviewees were openly self-critical of the sector's leadership capability. The absence of any electronics company from the list of *'UK Top Companies To Work For'* also suggests weakness extends to people management.

Venture capital companies emphasised a preference for recruiting CEOs from the US, because UK CEOs do not have the experience and capabilities necessary.

"Managers in the US are hungrier and more ambitious than those in Europe who are content to stop at their first million dollars," remarked a venture capitalist. *"UK managers often lack the impetus to want to grow from a small to medium or medium to large company. We are very cautious about hiring UK CEOs for our companies. For six out of eight of our last investments we brought in American CEOs. Things like the 'fat cats' campaigns have discouraged entrepreneurs, but the climate seems to be improving and some of the university entrepreneurship initiatives are beginning to help."*

> 'Managers in the US are hungrier and more ambitious than those in Europe who are content to stop at their first million dollars'

The right balance

One of the key issues is to get the right balance between technical skills and business skills at board level. Too much of one to the exclusion of the other is a problem, so the education system needs to train PhDs for business and not just academic research. Companies like ARM are taking this challenge seriously but many are not.

A large company remarked, *"We don't value PhD or MBAs in the UK. In the US, PhDs are geared to business start-ups. In the UK they are geared to academia, so research stays in the universities. Look at what has come out of the US PhD venture capital start-up route – Sun Microsystems from Stamford, Cadence from MIT, and Synopsis from Carnegie Mellon."*

The EIGT found it difficult to obtain up-to-date international comparisons of the skills mix in the electronics industry, but NIESR productivity data[5] for 1993 and 1995

[5] NIESR productivity data, http://www.niesr.ac.uk/research/nisec.htm

shows that the UK electronics skills mix appears to be a hybrid between that of the US and Germany. In the UK and US, electronics workforces have around 50% low skilled employees. The US tends to have a significantly higher proportion, with about 25 – 40% higher skilled workers than the UK. Germany, on the other hand, has a high proportion of intermediate skills workers 55 -70%, with far fewer low or high skilled workers. The EIGT views these figures with some caution because of the age of the data. Other data, including DTI benchmarking data, suggests that the UK has a more hierarchical management structure than its competitors, featuring a high proportion of middle managers.

Recruitment into the sector comes largely from other electronics companies. Therefore, experience from other business areas tends to be limited. This contributes to a proliferation of traditional management practices and excludes much learning from outside the industry.

Vision 2015

The UK has electronics leaders with vision and the ability to communicate it, as well as technologists with strong business skills, academics who understand business, and an education system that delivers this vision.

The electronics sector gains new business insights and raises its innovation and productivity by embracing diversity, and adopting best practice from other sectors. The sector recognises and continually responds to the challenge of re-skilling and growth.

Recommendation

The Government's skills strategy has already placed emphasis on management and leadership skills. The EIGT recognises that most of the responsibility for addressing this problem rests with business itself, and recommends:

7.1: Members of the Electronics Leadership Council should be exemplars in management and leadership and should create a mechanism for recognising outstanding leadership. Working through both its skills working group and the Electronic Alliance, it should promote a leadership challenge to senior managers in the sector.

7.1.1: RDAs and Business Links should help to promote management and leadership training opportunities to electronics companies in their regions.

ARM – an effective learning organisation

ARM was winner of the National Business Award's *'Employer of the Year'* award in 2003, and is proud to be a learning organisation. The company has a continual learning culture at all levels, with about 5% all time devoted to training. ARM's strategy is to strike a balance between specialist and generalist skills.

Well-rounded generalists are developed by a deliberate policy of moving graduates around the business so that marketers can understand and interact well with engineers. Being technically brilliant is important but not sufficient. Specialists are also moved round to gain wider experience, and are encouraged to participate in conferences where they can network with global thought leaders.

Succession planning and real life experience play an important role in identifying and developing those who will fill future senior positions in the company. ARM runs its own leadership programme. The top-level team attends Henley Management College for corporate governance training. They continually learn through such practices as having non-executive directorships, and give keynote speeches at conferences to stretch themselves and hear from a wider audience.

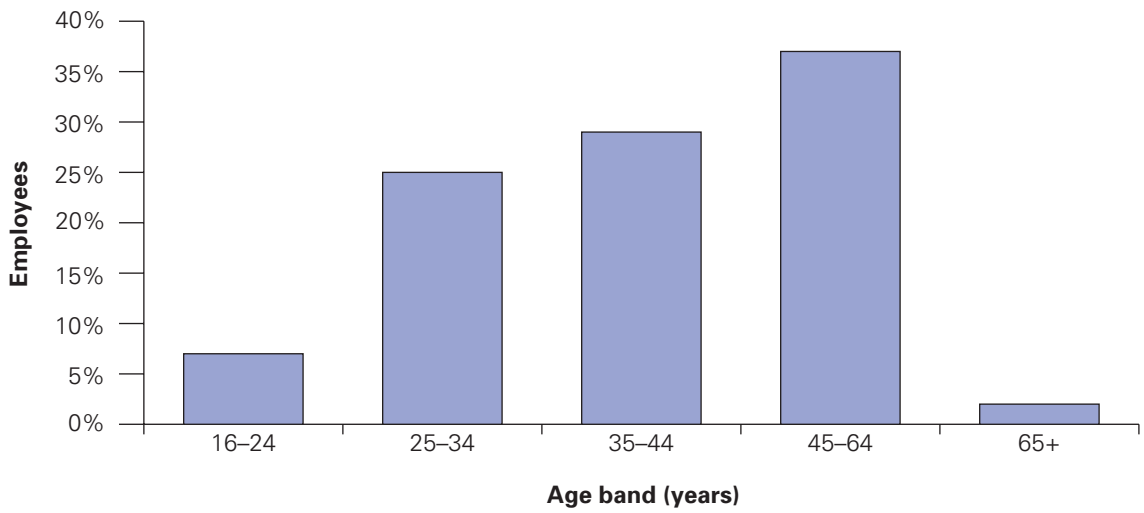
Training is validated by measuring the retention and promotion of its employees, and by benchmarking against international standards – such as the Good Corporation Standard for Corporate Social Responsibility. ARM also looks to the future by working closely with universities to foster the graduate and post-graduate talent.

Diversity

The sector also faces demographic challenges. The electronics workforce is ageing, and more than 45% are due to reach current retirement age in the next 10 -15 years (see Fig 7.2). The sector has failed to attract and retain new blood in sufficient quantities over the last 10 -15 years. Many companies expressed the following concern: *"We have an ageing workforce in key areas such as technicians and skilled diagnostic engineers. We are finding it very hard to fill good shop technician positions. School leavers are not interested, trained or motivated in a manufacturing environment."*

> 'We have an ageing workforce in key areas such as technicians and skilled diagnostic engineers'

Fig 7.2: Age distribution within UK electronics industry (2003)



Source: Labour Force Survey (LFS) 2003

The sector is over 70% male. Notably, the sector has failed to attract and retain women into the workforce, partly because of the gender mix in supply subjects from which it recruits, but also due to the low provision of flexible work arrangements that are likely to attract both men and women. In addition, many employees in the sector come from sectors where traditionally there have been regulatory barriers to employing women. The sector has tended to recruit in its own image.

These factors combine to threaten the sustainability of the electronics industry. The lack of diversity in the industry has wider implications for productivity and innovation. The 2002 census showed that by 2014 there will be more people over-65 in the UK than under-16. In just seven years, only a third of the workforce will be male and under-45. Women now make up nearly half the workforce, double the numbers of 25 years ago. Projections show that in less than 10 years' time there will be two million more jobs in the economy – 80% of which will be filled by women.

The workforce is also changing in other significant ways. A recent Government report estimated that the working age population will increase by a million in the next 10 years, and that minority ethnic communities will account for more than half that increase. Generally it will become a seller's labour market, and unless the electronics industry positions itself to attract from this diverse labour pool, it will not survive.

This poses challenges at all levels, including the boardroom. The more diverse the vision, the more companies are likely to be able to recognise potential new markets, attract a much wider customer base, and gain a competitive edge. Research[6] shows that organisations with high quality human resource/personnel systems – in which equality plays its part – deliver better products and services and ultimately better

6 www.womenandequalityunit.gov.uk/research/

shareholder value. Such companies have a wider portfolio of skills at the top of the organisation. They also have a better feel for customers and are able to provide a more responsive service to meet their needs. They provide role models for younger people in the organisation, encouraging them to stay and become the leaders of tomorrow.

Most electronics businesses are not rising to the challenge. Research undertaken for the DTI showed that the electronics sector had been slower to embrace part-time and flexible working than other manufacturing sectors. The EIGT can see no valid reason why this should be the case. The recent DTI Best Practice[7] publication describes several case studies where companies have improved performance through more flexible working. Other exceptions include National Semiconductors, for example, where the introduction of more flexible working has increased both the age and gender diversity of its workforce. The outcome has been a 15% increase in productivity.

Vision 2015

Electronics companies have workforces that are more representative of the UK working population at all levels. Electronics companies are recognised as among the best employers in the country and so are able to retain talent. As a consequence, they get higher returns from training costs and reduce recruitment costs. This means the sector can attract a higher proportion of the best talent and gain a more diverse outlook, driving innovation, growth and improved customer satisfaction.

Recommendation

Changing culture is a significant task and the EIGT does not underestimate the challenge. The past has been littered with well-intentioned attempts to raise this issue, but it has been difficult to secure business engagement. There is currently an impasse. Women will not be attracted to the sector unless the culture and working arrangements are right, and the sector will not make an effort to change unless it recognises the need to recruit suitably qualified women. Advice and best practice case studies already exist. The EIGT recommends:

7.2: Businesses should review their recruitment and employment patterns and practices in order to attract and retain a more diverse workforce.

7.2.1: The Electronics Alliance should establish a high profile and challenging diversity award for companies in the sector to reflect effort and progress in achieving diversity.

[7] www.dti.gov.uk/work-lifebalance/publications

Specific skills weaknesses

The EIGT study highlighted some specific skills challenges for the electronics industry. In the long-term, new technologies will present new skills challenges and attention needs to be given to helping employees become proficient. The advent of carbon electronics, for example, could bring about more distributed and local manufacturing, making maintenance of small-scale printing equipment a priority.

Currently, the most pressing current gaps are in:

- Top level commercial leadership;
- Procurement, supply chain management, logistics and e-business skills (as explained in *chapter 6*);
- Global marketing and sales; and
- High-level technician skills.

BUSINESS RESPONSE TO THE CHALLENGES

Training and development

The EIGT consultations revealed that training is often seen as a non-strategic activity. Many electronics companies claimed they did not have a skills problem because they were not recruiting at the moment! This seems to reflect confusion between labour supply and skills development. A typical response was: *"We are too busy getting products out of the door to get involved with training."*

According to SEMTA's Electronics Sector Strategy Group, training budgets (particularly for soft skills) were the first to be cut when business conditions toughened. Some senior managers claimed that training remained a priority, and did not support this view. There is clearly a difference in perception at senior level compared to experience at lower levels. The trade unions pointed out that senior staff generally receive a higher proportion of training budgets. Particular concerns were expressed about the failure to train employees as they reach new responsibility levels. It is often assumed that the best operator makes the best supervisor or the best first-line manager.

> 'We are too busy getting products out of the door to get involved with training'

Skills strategy

The *Skills Strategy White Paper '21st Century Skills: Realising Our Potential'*[8] aims to strengthen the UK's position as one of the world's leading economies by ensuring that employers have the skills to support the success of their business, and that employees have the necessary skills to be both employable and personally fulfilled. SEMTA, the Sector Skills Council, has been charged with developing a Sector Skills Agreement for the electronics industry. This agreement should reflect the demand-side requirements of the sector, and in turn influence the Regional Skills Partnerships and the Learning and Skills Councils in their provision of skills support to the sector.

Despite this important opportunity, engagement by senior level leaders from the electronics industry has been weak. In contrast with the advisory board for the IT sector, which was represented by the CEOs of all major IT companies, the electronics industry mostly fielded HR specialists. Electronics trade associations have also been absent from this work. The absence of senior level strategic input reinforces the reactive approach to skills in the sector, and the focus on recruiting to solve problems rather than developing the workforce.

Vision 2015

All UK electronics companies aspire to be learning companies and are listed among the best employers for continuous up-skilling of their workforce. Skills are a strategic priority at board level, and senior industrialists engage in helping to define the Sector Skills Agreement. Training budgets reflect this priority.

Recommendation

7.3: The Electronics Leadership Council should establish a skills working group, which should be led by SEMTA.

The skills working group should be an evolution of, and not a substitute for, SEMTA's existing Skills Strategy Group. Enhanced senior executive membership will ensure that long-term strategic challenges are addressed effectively, and that the ongoing skills implications of all of the ELC's workstreams are also addressed.

ACCESS TO GOVERNMENT FUNDING

Funding for training is available from various Government and agency sources. But take-up of such support is very sparse. Businesses consulted consistently reported confusion about what is available and who to contact. *"There are many conflicting training programmes and too many different initiatives from Government"*, was a common comment.

8 http://www.dfes.gov.uk/skillsstrategy

> 'There are many conflicting training programmes and too many different initiatives from Government'

SEMTA's Electronics Sector Strategy Group attempted to contact various agencies in the regions and were misdirected or given confusing advice. As a result, few electronics companies are taking up existing Government support for training and skills. Therefore, there is a pressing need to develop relationships between the industry and the regional skills network in order to tackle the most pressing skills challenges. The greatest challenge is to address the needs of the SMEs in this sector who are outside the trade association networks, and need technically competent advisers. The EIGT recommendations on access to Government support in chapter 3 are relevant to this issue.

Recruitment and image

The electronics sector has a weak reputation among young people as an employer. In addition to its lack of diversity, employment practices tended to be short-termist. Organisations tend to recruit to fill skills gaps, rather than developing the existing workforce, and short-term employment contracts are used to meet cyclical trends. This reputation has been particularly strong since the downturn in the late-1990s, and concern is shared by parents at careers exhibitions, who regularly question whether there is any future in electronics engineering. These views are fuelled by 'bad news' stories in the media, whereas 'good news' rarely makes the headlines.

The sector also shares some of the problems generally associated with manufacturing and engineering. *"Engineering is more respected in France and Germany as a profession than it is in the UK"*, was typical of comments from a wide range of companies and stakeholders. The problem is made more acute by headlines that often highlight high-tech companies' collapse and closure.

Recommendation

The invisibility of the industry means the failure to attract much career interest is not really surprising. The EIGT recommends:

7.4: The Electronics Alliance, SEMTA and the professional institutions should work closer together to represent the exciting career opportunities in the sector for both women and men.

This cooperation should not just focus on the engineering opportunities. As a driver for change across all sectors, and operating in global markets, the range of jobs and opportunities offered by the electronics sector should be a unique selling point. The sector needs to gain a better understanding of the target market and re-evaluate the impact of existing recruitment methods.

ENGAGING WITH FURTHER EDUCATION

The EIGT consultation exercise showed that outside R&D collaboration, the sector is poorly engaged with further and higher education establishments. The NEISR report[9] found that the most successful way of reducing skills gaps is to engage with local education establishments. Research[10] undertaken for the DTI to track graduate destinations shows a clear link between the availability of work placements, degree results and the likelihood of graduates taking up employment in the sector after graduation. Despite this, colleges and universities report a continuing gap between work placement opportunities and demand for such places.

During the EIGT interviews we encountered many companies who saw such placements as a cost. Few appreciated the wider benefits that such experience gave in marketing the sector to the wider student population. Similar problems were encountered by the Shell Technology Enterprise Programme (STEP) programme which helps SMEs by screening potential students. Evaluation[11] suggests that companies who do engage more than cover their costs from the business contribution made by students.

There is also concern about the long-term provision of skilled electronics and embedded software engineers both at graduate and technician level. Many companies expressed concern about basic skills levels of numeracy and literacy, as well as softer skills like communication and team working. The number of students taking the feeder subjects (maths, physics, and computer science) has declined significantly. In 2004[12] there were only 28,000 A-level physics entries and just 8,000 computer science entries.

Between 1996 and 2003 there was a steep decline in the number of students taking A-level maths from 67,022 to 55,917, a 16.5% decline in just over eight years[13]. These figures include students taking both pure and applied maths. To add to the concern, over 60% of current maths teachers are due to retire in the next 10 years. The take-up for initial teacher training placements in maths and science is still low compared to other subjects. Although recruitment to courses increased between 1998 and 2002, it has since fallen back to the same level at 1995[14].

These factors all contribute to the decline of UK students studying electronics and related subjects at university. As demand has fallen, courses have been cut in an uncoordinated way, and without any apparent regard for the wider economic impacts on business.

The EIGT's consultation also exposed extensive concern about the methodology of science and maths teaching in school. Some observations were commonly voiced. There was a belief that current teaching no longer produces students with rigorous intellectual skills, especially the ability to think and apply logic. These are skills

9 NIESR productivity data www.niesr.ac.uk/research/niscc.htm

10 www.engc.org.uk/publications/pdf/graduate_experiences-_-2002

11 Shell Technology Enterprise programme (STEP) www.step.org.uk

12 Joint Council for Qualifications www.jcgg.org.uk

13 www.jcgg.org.uk

14 Making Mathematics Count, www.dfes.gov.uk/mathsinquiry/

which industry considers have been the past drivers for success of the UK science and technology base. Instead, too much emphasis is placed on learning techniques for passing exams or opting for less intellectually stretching subjects in order to boost league tables.

Creativity has also been stifled by providing too many computers and not enough computing teachers; and too much standard software that drives students into application mode rather than original thought. *"Teachers need to understand that they are preparing people to work – not just to pass exams"*, said an SME. "We don't specialise our school children too quickly. Sixth formers are not coming out with maths and science at the appropriate standards. Secondary schools are not serving the electronics sector well", echoed a large multinational.

There has also been a failure to capture the enthusiasm generated in primary school science teaching, and translate it into secondary schools. Many interviewees attributed loss of interest to the decline in practical teaching of science. Many schools and school governors are seen as risk averse to practical experiments (and are said to have been restrained by health & safety issues), with the result that the fun and excitement has been taken out of science.

Electronics teaching has also declined in the technology syllabus, largely due to the shortage of teachers with the necessary skills, and the non-competitive salaries offered for these teachers. It is not unusual for the technology A-level to have no electronics content.

> 'Teachers need to understand that they are preparing people to work – not just to pass exams'

Electronics in Schools (EiS)[15], a programme originally supported by the DTI under the umbrella of the Sector Skills Council SEMTA, is already stimulating interest in schools, which the EIGT strongly endorses (*Table 7.3*). But supporting electronics itself is insufficient by itself unless maths and science teaching is also stimulated and enlivened.

[15] www.electronicsinschools.com

Table 7.3: Electronics in Schools 2002/3

New EiS teachers trained	248
Phase 1 teachers that received further training	42
Number of new schools involved	129
Phase 1 schools involved in Phase 2	97
Key stage 3&4 pupils that received electronics training	39,586
Primary School pupils that received electronics training	2,770
EiS schools that now offer electronics qualifications	105

Source: EiS

The Science, Engineering, Technology and Mathematics Network (SETNET)[16] promotes Science Technology Engineering and Mathematics (STEM) awareness, especially among young people. SETNET aims to help ensure there is a flow of well-motivated, high quality people going from schools into Science Technology Engineering and maths careers, and prepares young people for the technological world they live in.

Through its regional organisation SETPOINT serves as single, authoritative source of information for teachers about what local and national STEM materials and activities are available. In particular, using Science and Engineering Ambassadors (SEAs) as the interface with young people. However, neither the electronics supply chain nor its trade associations are well represented among SETNET's membership.

The universities and further education colleges also play an important role in the provision of trained people at vocational, graduate and post-graduate level for the electronics sector. There is concern that insufficient students are following the vocational route. The decline in school children studying the appropriate feeder subjects has resulted in declining numbers studying physics, electronics engineering and related subjects. Such has been the decline that only 25% of undergraduate places are now filled by UK students, and in some universities no post-graduate students come from the UK.

EPSRC provides a range of flexible funding opportunities at Masters and Doctoral level, both full-time and part-time and for continuous professional development (CPD) of those already employed in the industry. These include:

- Engineering Doctorate Programmes in system-on-chip technologies.
- Collaborative training awards linked to industrial needs, and industrial CASE awards for PhD students to work on specific projects identified by companies.
- Masters level training, e.g. Continuing Education in Electronics Systems (CEESI)[17].

[16] http://www.setnet.org.uk/

[17] CEESI, www.ceesi.ac.uk

- In October 2004, EPSRC identified electronics design research and training as priority for the new Science and Innovation Awards. These will lead to significant long-term funding (typically £3-5m) to enable the appointment of new academics, post-doctoral research assistants and students.

Vision 2015

The UK education system produces students in sufficient quantity and quality to sustain an innovative and growing electronics sector. School students are enthused in key feeder subjects of maths and science by inspirational teachers who have a good understanding of what industry needs. Electronics grows to be a popular part of the Craft Design Technology (CDT) syllabus. The learning experience includes hands-on experience, and is put in the context that makes electronics relevant for today and stimulating for young people.

Demand from UK students wishing to study electronics-related subjects increases, so that by 2015 they form the majority of undergraduates and post-graduates studying in UK universities.

Recommendations

7.5: DfES, HSE and teacher representatives should address the barriers to practical science teaching, and produce guidance for teachers and school governors that encourages more practical work to be undertaken in schools.

7.5.1: More electronics companies and trade associations should engage with SETNET activities.

CONNECTING INDUSTRY AND EDUCATION

There is a lack of engagement between the sector and the further and higher education community on skills issues, and particularly business skills. SMEs have found it particularly difficult to engage, and several commented that universities seem only to be interested in talking to companies with budgets for collaborative research rather than for their output of skilled people. *"When people leave university they generally have few business skills, or even an understanding of business, and it can take between six months and two years for them to acquire these,"* is typical of SME experience.

> 'When people leave university they generally have few business skills, or even an understanding of business, and it can take between six months and two years for them to acquire these'

School teachers need to improve their understanding of the electronics sector, in order to make their teaching relevant and offer better careers advice. But this will not happen without industry help. From September 2004, there is a requirement that all young people should experience some work-related learning at Key Stage 4. This activity is designed to use the context of work to develop knowledge, skills and understanding that will be useful in working life. This is a real opportunity for the electronics industry to showcase itself to prospective employees. Therefore, the sector needs to grasp the opportunity by working closely with local schools to offer work placements and to resurrect activities like open days (which were curtailed in the 1990s), and inspire children by demonstrating how the tools of everyday life (e.g. mobile phones and computers) depend on electronics and embedded software.

Education targets

The EIGT considers it is vital to get the balance between academic and vocational qualifications right. There is widespread agreement among those consulted that the balance is not right at the moment. Many students are unwisely advised to pursue an academic route, when the opportunities from the vocational route are greater and more suited to their potential. Modern apprenticeships and foundation degrees could provide a better level of training and should be promoted and encouraged.

The problem, however, is that opportunities in electronics are largely invisible to students, teachers, parents and other peer pressure groups. The sector has mostly lost the large UK-owned companies that provided a major resource of trained technicians, and ultimately supplied the rest of the industry. Therefore, there is a critical need for the various stakeholders in the sector to cooperate to provide a highly visible picture of career opportunities.

> ‘There is scope for the re-introduction of apprenticeships as these schemes are beneficial to all concerned with them’

During the EIGT consultation exercise some policy decisions were also criticised. For example, the capping of modern apprenticeship programmes at Level 3 by the Learning and Skills Council has meant a reduction in the training at Level 4 leading to a shortage of Level 4 technicians. *“There is scope for the re-introduction of apprenticeships as these schemes are beneficial to all concerned with them. A variety of roles within the company would suit apprentices and this could also reinforce links into local further higher education colleges”*, said a medium-sized manufacturer.

Disconnect in skills demand and supply

The electronics industry is subject to considerable cyclical trends. Electronic products often come and go in a six-month period. The timetable from innovation to commoditisation continues to shorten, so businesses can swing quickly from skills feast to skills famine. Various initiatives have been taken to address skills crises in the late-1990s. For example, the DTI-funded course on Electronic Design Realisation (EDR)[18] was developed to provide skilled professionals capable of creating optimum designs for electronic products. But demand had fallen by the time appropriate courses came on stream. This was largely because the time taken to develop training material is up to two years. Consequently, investment in course material is often wasted because it needs a complete refresh by the time that demand returns.

There is an inherent disconnect between the short-term business cycle and the long-term education cycle. The EIGT also encountered academics that claimed they couldn't alter a syllabus once advertised. This means students could have seriously out-of-date skills by the time they graduate. This approach seems a ludicrous way to respond to a fast-moving technical sector.

The EIGT does not underestimate the challenge of trying to bring about more responsive curricula provision. Unless supply chain management skills in the industry improve, sudden changes in demand will continue to come as a surprise, and such is the severity of commercial pressure that these changes can occur practically overnight. But business must act more strategically, identifying long-term skill demands. This requires almost counter-cyclical attention to training, and requires a training supply-side that is more responsive to the rapidly changing pace of the sector.

If skills provision is to become truly demand-led, training provision must break away from traditional academic timetables and qualification-based approaches. Funding provision also needs to follow demand rather than qualifications. And professional institutions must acknowledge the value of having more diverse and flexible routes to address the requirements for professional status. In addition, more flexible teaching methods need to be deployed, including distance learning.

In theory, the student market responds to market opportunities for skills when they can see clear career opportunities. This should send signals to training providers to step up appropriate courses. The market for electronics skills fails to respond in this way largely because of the invisibility of the sector and its cyclical nature.

Vision 2015

Training provision is in step with the business cycle and the strategic direction of the electronics sector. Business and training providers understand each other's requirements and work together to secure the best economic outcome. Training material reflects global best practice. Training is undertaken before demand takes off, rather than afterwards. Reliance on unskilled temporary staff reduces.

[18] www.edrcentre.org.uk

Recommendations

The market failure to match skills supply to demand in the electronics industry calls for intervention. There is a need for some self-help measures that could start to address this mis-match. Improved supply chain management and the use of e-business should improve business understanding of labour market trends. Steps to improve the visibility of the sector will help, but in themselves will be insufficient – at least in the short-term.

The EIGT believes there would be merit in exploring fiscal and other mechanisms to address counter-cyclicality so that the downturns in business cycles are used for up-skilling rather than lay-offs. In this way, the UK electronics industry will be better positioned when each upswing arrives. The EIGT also suggests that temporarily surplus/laid-off industry people could be redeployed to fill electronics-related teaching vacancies. The EIGT recommends:

7.6: DfES and the Treasury should work with the industry to consider innovative mechanisms so training provision is closer aligned to the needs of the electronics business cycle.