West of England Local Enterprise Partnership Workshop
Workshop F

Sector Skills & Competitiveness Statement
Microelectronics

Definition

1. The emphasis of the West of England skills strategy is on specific sub-sectors prioritised for their growth potential and / or the scale of the sector. Key sub-sectors of microelectronics include chip design, optoelectronics, wireless and closely related fields across the wider microelectronics, photonics and digital communications areas. Chips also require software to operate.

2. These sub-sectors are represented by the following SIC codes:
   - 367   Electronic components and accessories
   - 722   Software consultancy and supply

3. There is a high degree of crossover with the Advanced Engineering sector.

Background

4. The UK electronics industry is currently the fifth largest in the world with UK companies leading electronic design in many niche applications, such as communications and microprocessors.

5. The South West region is home to the largest concentration of silicon designers in Europe and is second only to Silicon Valley in the USA. The region is characterised by an exceptional level of innovation with local firms leading the world in semiconductor and wireless technology. Of an estimated 400 companies in the South West, many are clustered around Bristol (30 companies) and Bath (12). For example, ST Microelectronics based in Bristol developed the processing technology that powers more than half the set-top boxes in the world, whilst the Bath based company, PicoChip provides the technology used by 80% of the top mobile phone networks.

6. The sector has significant opportunity for growth with prime design and development companies, research capability from leading academic institutions, system integrators, and an extensive supporting infrastructure.

7. Bristol is one of six UK cities to be granted Science City status in recognition of its work in science and technology. A new Science Park is being developed in South Gloucestershire which will provide accommodation to technology and knowledge based businesses.

8. The sector is dominated by SMEs involved in high value work.

9. Local businesses responding to the recent Key Business Sector survey indicated a very high level of clustering, networking, collaborative supplying, and supplying to others within the sub-sector.

10. Major employers include Hewlett Packard, PCS, Amdocs Systems Group Ltd, IBM UK, SEA Systems, and ST Microelectronics.

Outlook

11. The microelectronics sector has grown strongly and its continued growth is predicted.

12. The wider ICT sector is strategically important to the West of England. Looking ahead, the sector will have the stimulus of new products in the pipeline and new delivery platforms for communications, information and entertainment. Other developments will include 'cloud computing' and the exploitation of social networking sites such as Facebook and MySpace for marketing. There are also opportunities for advertising messages on mobile devices sent to consumers as they pass retail outlets. Various smart systems are likely to spread in energy consumption applications, in security industries and in retailing. However there is also some suggestion that a lack of demand for ICT services signals a risk that the sector could grow beyond the sub-region's capacity to support it.

13. There is a high degree of inter-dependence with the Creative Industries sector, predominantly in consumer content. Mobile devices require increasingly sophisticated graphic design input, particularly in gaming. There is a fast growing area in nanotechnology particularly in the development of Wii devices and accelerometers.

14. There is significant opportunity for collaboration with other sectors, for example between microelectronics and biotechnology in the development of bio-sensors and low powered testing devices. Microelectronics also crosses over with environmental technology in the emerging smart grids and smart metering.

15. Particular barriers to growth identified by ICT employers include skills and training, suitable premises, networking and support for SMEs. There is an urgent need to penetrate further down the supply chain and connect early stage suppliers with the end-user market requirements.

16. The sector may benefit from the creation of the £300m Science Park in Emersons Green, South Gloucestershire, due to be finished in 2020. It will provide 6,000 new jobs in skilled research and development throughout the 54 acre site. Most importantly it will create a business eco-system of like-minded companies with the attendant benefits of stronger interaction with advisors, investors and suppliers.

Local Support Infrastructure

17. The relevant Sector Skills Councils are:
    - E-Skills UK, which covers software, Internet & web, IT services, telecommunications and business change
    - SEMTA for microelectronics.

18. Silicon South West is a network organisation representing the world-class cluster of silicon design companies in the South West. It provides regular events, news, and promotion of the sector on a national and international stage.

19. The South West Microelectronics iNET provides an effective arena for innovation by providing network activities, supporting new company and new product development, and assisting with transitional phases in company growth. The iNET serves the Microelectronics, Photonics and Digital Communications sub-sectors. It is being delivered by a consortium led by UWE and comprising Bristol University, ST Microelectronics and the National Microelectronics Institute (NMI).

20. A South West Microelectronic Leadership Group is being established to oversee the iNET and will act as the voice for the industry in the region.

21. The UK Electronics Skills Foundation (UKESF) was established early in 2010 by the NMI to address the declining skills base in the microelectronics industry. Bristol University is amongst the founding members. The Foundation aims to raise awareness of the sector and careers opportunities by engaging with schools, running summer schools to attract students to electronic engineering degrees, and offering a scholarship scheme to improve the work experience of under-graduates.

22. A National Skills Academy for IT is being launched towards the end of 2010 and is backed by 15 major employers including Accenture, BT, HP, IBM, Logica, Microsoft and Oracle.

23. The SETsquared partnership between Bristol, Bath, Southampton and Surrey universities supports the growth and success of new business opportunities through spin-outs, licensing and incubation. It also works with industry through research collaboration and consultancy. A recent success on the world stage has been the development of a high-tech cryptographic key by a SETsquared entrepreneur that improves Internet security.

Inward Investment

24. ICT is a critical sector and target for inward investment in the West of England which continues to be a key hub for ICT companies and has one of the largest ICT clusters in Europe.

25. The cluster has attracted investment from major global companies such as Toshiba and Hewlett Packard. There is also a wide range of smaller international and internationally active companies located across the sub-region.

26. Primary attractions for international investors are:
    - Existing cluster of well regarded companies
    - Inter-linkages with other major key sectors – in particular Advanced Engineering and Creative Industries
    - Close proximity and strengths of research intensive universities
    - Availability of reasonable cost, good quality office space and incubation / acceleration centres, which include particularly high speed and security enhanced Internet access
    - Key road and rail infrastructure and international links at Bristol Airport.

Skills Issues

27. Occupational distribution across the wider ICT sector is characterised by high proportions of highly skilled staff working at skilled trades, technical, professional and managerial grades. The microelectronics sub-sector employs a minimum skill level of a first degree with no call for technical or professional grades.

28. Skills are identified by the sector as a key business driver alongside economic conditions, markets, quality and delivery performance, and ways of working. Despite an apparently adequate labour supply currently in the West of England, there are workforce development issues and future skills needs that need to be addressed in this highly-paced sector. For example, micro-electronics employers will increasingly want to recruit people with specialisms such as nanotechnology and those that exist will be in high demand.

29. Innovation is the key to staying ahead of global competition. The microelectronics sector needs young people who are regular users of the most recent technology to drive future innovation.

30. The sector needs to develop better consultancy and business skills to help customers achieve the business benefits of evolving and new technologies.

31. Businesses in the sector would benefit from embedding change management skills in the workforce to take full competitive advantage of new technological developments.

32. Improved leadership and management skills have also been identified as a need, including project and programme management and management of outsourcing arrangements. Although they have improved over the last decade, employers report that there is still room for improvement.

33. The microelectronics industry requires systems engineers to design and manage complex projects. Systems engineering requires skills in both technical and human-centered disciplines such as control engineering and project management. Increasingly companies have to engage further up the value chain. For example, whereas a decade ago the industry simply supplied microchips, it is now expected to supply the system around the chip and the appropriate software.

Key Challenges

34. The West of England does not appear to have labour supply difficulties, as the sector is an attractive option for young people seeking good career prospects and relatively high wages. However the challenges are in developing the existing workforce and ensuring that training provision keeps pace with the sector's future skills needs.

35. SMEs report finding it harder to attract the interest of training providers as they do not have the critical mass to make course development costs viable.

36. Demand for undergraduate Mathematical and Computing Science courses is declining. There is also a dramatic decline in the numbers of Electronic Engineering graduates in the UK that is threatening the growth of the microelectronics industry. Many graduate entrants to the labour market come from overseas and a serious challenge exists in attracting young people from the UK to higher-level academic programmes.

37. Graduate placements can be seen as an unjustified expense at a time of economic downturn.

38. Those employees who will adapt most successfully to the needs of the developing sector are those with well-honed creative skills. A sector that relies on increasingly sophisticated knowledge and technology requires people with a dynamic attitude to meeting the opportunities and challenges it presents.

39. The microelectronics sector needs young entrants to maintain a high level of innovation. Employers report the need for bright creative graduates with a broad education in electronics engineering who can be trained further 'on-the-job'.

40. Employers are not always aware that the skills of their workforce need updating. There is a challenge in encouraging them to address skills issues with a training needs analysis and an appropriate response.

Priorities for Action

41. Promote the sector as an aspirational career choice for high achievers, and improve the content of Information Advice, and Guidance for young people. In particular, raise awareness amongst young women to address gender imbalances in the sector.

42. Develop new degree options to meet the needs of emerging technologies and hybrid skills requirements.

43. Improve the flexibility and cost-effectiveness of Continuing Professional Development learning routes where they are required.

44. Address the skills needs of business managers across all sectors to realise the benefits of IT for their companies' productivity and competitiveness. Equip the workforce with increasingly sophisticated skills to use IT effectively in their day-to-day work. The priority for investment may be older workers and those at lower skill levels.

45. Promote skills assessments for SMEs to identify skills needs in the workforce and encourage the necessary investment, particularly of time.

46. Support clusters as one of the most important sources of innovation and promote the South West concentration for inward investment. Learn from competitor clusters for example in Reading and Cambridge, home to Microsoft Research.

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