

➤ **United Kingdom**

Northern Ireland

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e-skills UK is the Sector Skills Council for Business and Information Technology; an employer-led organisation rated as 'outstanding' in the re-licensing of the Sector Skills Councils. e-skills UK's mission is to ensure the UK has the technology skills it needs to compete in the global economy, working on behalf of employers to develop the software, internet, computer gaming, IT services and business change expertise necessary to thrive.

Focused on making the biggest contribution to enterprise, jobs and growth across the economy, e-skills UK's three strategic objectives are to:

- inspire future talent,
- support IT professionals,
- increase digital capability.

Delivery on these strategic objectives is underpinned by employer engagement across the sector, authoritative research, a continually developing sector qualifications and learning strategy and effective strategic partnerships.

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# Executive Summary

## 1.0 Introduction (see section 1)

This document summarises the findings of e-skills UK's recent research to provide an in depth understanding of the existing IT & Telecoms landscape and forecasts of the future based on the best available intelligence, with new input from over 4,700 employers across the UK. This research underpins strategy and focuses work with employers and partners across the four nations of the UK. This work will enable the economy to derive maximum benefit from the power of technology, transforming competitiveness and productivity through the creation of appropriate technology related skills.

## 2.0 The importance of IT & Telecoms to the UK economy (see section 2)

### IT & Telecoms and competitiveness

The UK is highly dependent on its IT & Telecoms workforce – it underpins the economy and is integral to information, business and consumer services, health and leisure and modern day social networking. In addition, computing is expected to continue to remain of the 'highest order of economic significance'<sup>1</sup> as across all industries it is the combination of highly skilled IT & Telecoms professionals, technology-savvy business leaders and competent IT users that enable an organisation's effective participation in the UK and global digital economies.

Whilst on a global perspective, compared to many other nations, the UK continues to rate highly with respect to IT investment and utilisation, the UK's global ranking has generally declined in recent years. Moreover it has consistently remained below the level assigned to other leading nations, notably the US and the Nordic states in particular. The real 'game changers' though (those IT firms attracting the largest valuations) all have US roots, which has contributed to the US retaining its place at the top of the IT industry Competitiveness index<sup>2</sup>. However this could be about to change as firms in emerging markets are said to be realising the benefits of ICT<sup>3</sup> investment quicker by learning from the mistakes of their counterparts based within advanced economies and are investing aggressively in ICT. Subsequently, questions have been raised about the potential for the IT industry's centre of gravity to shift from West to East – not least because those firms in emerging markets are said to be twice as likely to those in advanced economies to increase such investments by 20% or more.

Advancement of economies aside, ICT infrastructure remains key to IT competitiveness – seven of the top ten countries according to this measure<sup>4</sup> are also positioned in the top ten of the overall IT competitiveness index. Correspondingly, its absence has been cited for other countries failures to utilise their large pools of skilled IT employees.

### IT & Telecoms productivity

Since the late 18<sup>th</sup> century, Western society has been described as having experienced five distinct eras or revolutions. Although all are said to have led to profound changes in the organisation of the economy, ICT (the fifth

*'While changing the way individuals live, interact, and work, ICT has also proven to be a key precondition for enhanced competitiveness and economic and societal modernisation, as well as an important instrument for bridging economic and social divides and reducing poverty'*

World Economic Forum

<sup>1</sup> UKCES, 'Skills for Jobs: Today and Tomorrow - The National Strategic Skills Audit for England', March 2010

<sup>2</sup> Economist Intelligence Unit 'Investment for the future, Benchmarking IT industry competitiveness 2011', 2011

<sup>3</sup> ICT refers to Information & Communications Technologies and where it is specifically identified as ICT in third party sources this terminology has been kept. The preferred referencing used more generally throughout this report is IT & Telecoms (IT&T)

<sup>4</sup> Economist Intelligence Unit 'Resilience Amongst Turmoil, Benchmarking IT industry competitiveness 2009', 2009

*The IT & Telecoms industry GVA contribution amounts to 8% (£75 billion) of the UK's economy*

and most recent) stands out because of the velocity by which it has changed society.

Today, the IT & Telecoms industry accounts for 8% (£75 billion) of the UK's total Gross Value Added (GVA). In addition, the previously un-assessed economic contribution of the internet is now said to be worth an estimated £100 billion to the UK economy.

Reports investigating the relationship between the effective application of IT and improved productivity found increased investment in ICT capital to have '*played a major role*' in the doubling of US productivity growth rates - commonly referred to as the '*productivity miracle*'.

Studies of the productivity gains in the United States (US) compared to the UK and Europe found that US multinational firms are on average 8.5% more productive than UK domestic owned firms, and that almost all of this difference is due to the higher productivity impact of their use of ICT. Further research has concluded that over 80% of this productivity advantage is explained by better use of ICT and that by 2020, if Europe increased its ICT capital stock to the same level (relative to the size of the economy) to that of the US, GDP would increase by 5% on average - equivalent to €760 billion for Europe as a whole.

Notwithstanding the direct economic contribution of the sector, access to technologies such as the internet also create social benefits including access to employment opportunities for workless adults, improved standards of living for older people, increased democratic engagement and access to information for all.

### The importance of continued business investment in ICT

*Optimisation of ICT by businesses could generate an additional £47 billion GVA in the UK economy which could translate into half a million new jobs, across many occupations and sectors, over the next 5 to 7 years*

The ICT supply chain, as a sector in its own right, clearly offers the UK continued economic opportunities, but perhaps of equal if not greater significance are the potential opportunities across the rest of the economy resulting from businesses in all sectors of the economy maximising their use of ICT, broadband and internet access.

Adroit Economics' 2012 ICT impact model<sup>5</sup> estimates that optimisation of ICT by businesses could generate an additional £47 billion GVA in the UK economy over the next 5 to 7 years. The majority of this 'uplift' (£41.4 billion) will be generated in England, with £3.7 billion in Scotland, £1.5 billion generated in Wales and £0.7 billion in Northern Ireland.

It is further estimated that the ICT driven GVA uplift of £47 billion in the UK economy could translate into half a million new jobs, across many occupations and sectors, over the next 5 to 7 years, the majority of which are forecast to be in England.

It is not only businesses that benefit from use of ICT and access to the internet, citizens and their households also increasingly benefit. The most obvious benefits are entertainment and social benefits (e.g. IP-TV, gaming online, social networking) but there are also economic, educational, health and wider quality of life benefits more generally.

The publication '*The Economic Case for Digital Inclusion: PriceWaterhouseCoopers, 2009*' quantified the potential economic benefits that could result from getting everyone in the UK online as in excess of £22 billion.

Adoption and increased usage of ICT by the public sector has and will continue to generate significant cost savings, improvements in existing services and innovative new services in certain areas e.g.

- One of the most significant cost savings derives from customers (businesses and households) accessing information and public services on line and undertaking an ever increasing range of transactions on line. This reduces transaction costs for the public

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<sup>5</sup> Adroit Economics ICT impact model 2012, using Experian 2012 productivity forecasts

sector and reduces time spent and numbers of physical journeys by customers.

- The health service will also derive savings through reduced GP visits and the improved health enabled by better access to health information and advice online.

Broadband and access to the internet has become an increasingly vital component of modern life. A recent study of 33 OECD countries by *Ericsson, Arthur D. Little and Chalmers University of Technology October 2011* concluded that quadrupling of broadband speeds coupled with a 10% increase in penetration will generate an additional 1.6% GVA over a two year period.

This clearly suggests that faster broadband speeds are integral to the future optimisation and impact of advanced ICT in all countries. It follows that those countries that are able to deploy the best technologies soonest will gain a competitive advantage.

A recent report by The McKinsey Global Institute<sup>6</sup> found the internet is also a catalyst for job creation. Among 4,800 small and medium-size enterprises (SMEs) surveyed, the internet created 2.6 jobs for each lost to technology-related efficiencies.

This report suggests that adoption and use of ICT continues to have a significant range of positive impacts across the economy for businesses, individuals and for the delivery of Government services.

These impacts are substantial and are of particular importance at this point in time, when priorities are to ensure business growth to ensure the recovery does not stall, to reduce the cost of public services and to help the excluded and disadvantaged to improve their health, aspirations, access to qualifications and work.

Research of the obstacles and difficulties that firms and citizens face regarding adopting and optimising modern advanced ICT suggests that future UK ICT policy needs to reflect and address four main issues -

- ICT business support - helping small businesses adopt and exploit more advanced ICT,
- Improved ICT skills – both professional and user skills, within the workforce and within communities,
- Helping the digitally excluded to access the internet,
- Ensuring all of the UK can access a new generation of superfast broadband.

### **3.0 Technology's strategic importance in policy (see section 3)**

Current skills and employment policy is driven by the UK Government's focus on tackling the deficit, reducing public expenditure, rebalancing the economy and creating sustainable, private sector led economic growth.

Skills policy is devolved and as such, is addressed in the four nations' separate skills strategies; each of which sets out the respective ambitions for education and learning driven by the imperative for recovery, growth and economic sustainability.

- In England the direction is set through the 'Plan for Growth' and the 'Skills for Sustainable Growth' skills strategy, committing the government to radical reform of education and skills provision,

*'The total potential economic benefit from getting everyone in the UK online is in excess of £22 billion'*

PriceWaterhouse  
Coopers

*'The Internet is also a catalyst for job creation ....with 2.6 jobs created for each one lost to technology-related efficiencies'*

The McKinsey Global  
Institute (MGI)

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<sup>6</sup> The McKinsey Global Institute (MGI), Internet Matters: The Net's Sweeping Impact on growth, jobs and prosperity, May 2011

increasing apprenticeships and learning participation and removing the barriers to growth.

- In Northern Ireland, through the Economic Strategy and '*Success through Skills: Transforming Futures*' there is emphasis on increasing skills levels and reducing sectoral imbalances through promoting STEM subjects including Computer Science.
- In Scotland through 'The Scottish Economic Recovery Plan' and '*Skills for Scotland: Accelerating the Recovery and Increasing Sustainable Economic Growth*', the skills system is intended to be simplified and FE and HE are subject to wide-ranging reform.
- In Wales through '*Economic Renewal: a new direction*' and '*Skills That Work for Wales*' the aim is to broaden and deepen the skills base in support of economic growth and prosperity.

In addition, the importance of the IT & Telecoms sector and its skills needs is variously recognised across the four nations: as a priority sector (in England, Northern Ireland and Wales); as having economic significance combined with priority skills needs in both England and Wales; and in Scotland, through recognising the need for skills to enable the exploitation of ICT to increase sustainable economic growth.

#### **4.0 IT & Telecoms: underpinning UK employment (see section 4)**

*One in twenty UK workers are employed in IT & Telecoms*

There are over 144,000 workplaces in the UK's IT & Telecoms industry - 87% of which are IT and 13% Telecoms. The vast majority of these (90%) are services orientated, and a significant proportion (45%) are located in London and the South East of England. Though micro firms make up 93% of IT & Telecoms workplaces in Great Britain, they employ just 28% of the sector workforce. By contrast, companies with 200 or more employees make up less than 1% of workplaces but employ the largest proportion (34%) of the workforce.

There are 1.5 million people working in IT & Telecoms in the UK - equivalent to around one in twenty of the working population. Of these individuals, 913,000 (59%) work in the IT & Telecoms industry itself (i.e. IT & Telecoms professionals and those in supporting roles such as HR, admin, finance etc) whilst a further 633,000 (41%) work as IT or Telecoms professionals in other industries (the IT department of a retail chain or bank for example).

*47% of IT & Telecoms professionals are now aged 40+ years old whilst the proportion of 16 - 29 year olds has declined from 32% to 19% between 2001 and 2011*

Of the workforce's 1.1 million IT & Telecoms professionals (working within IT & Telecoms or other businesses), the single largest occupational role is Software Professionals (33%) whilst also nearly 4 in 10 (38%) working in ICT Management or IT Strategy & Planning roles. ICT Managers and Software Professionals have also exhibited the most rapid growth over the last 10 years (28% and 18% respectively) even as there have been substantial decreases in employment amongst Database, Telecoms and Engineering roles.

The average age of an IT & Telecoms professional is currently below that of workers in other occupations (39 versus 41 years respectively); this is following an upward trend as the sector favours experienced workers from other sectors over young recruits from the education system. In recent years the proportion of 16 - 29 year olds has declined from 32% in 2001 to 19% in 2011. Over the same time period, the proportion aged 40+ has increased by fifteen percentage points from 32% to 47%.

Gender also remains a significant and worsening issue for the IT & Telecoms sector and, in 2011, just 18% of IT & Telecoms professionals were female compared with an overall figure of 48% for the UK workforce as a whole.

## 5.0 The changing environment (see section 5)

The main issues of concern for UK businesses are currently the state of the global and national economies. Labour related issues including the availability of IT & Telecoms staff tend not to be of major importance however, largely due to economic related effects (e.g. redundancies and a potential reduction in competition for labour/skills), though within the IT & Telecoms industry at least, concern over IT & Telecoms staffing in particular is notably higher than within other businesses.

Over half of UK firms predict an improvement in company finances, profitability, customer numbers, turnover and sales over the coming year and, on balance, those that are large and/or operating within the IT & Telecoms industry are more likely to anticipate net improvements in these areas than other businesses.

The extent to which resources are focussed on helpdesk/support services will likely diminish over the coming year both with respect to internal and externally delivered services. By contrast, internal/external activity in the areas of integration and databases are both likely to increase.

Amongst businesses already employing these technologies, cloud computing and mobile computing/applications in particular are likely to become more widely used over the coming year whilst the majority of non-users do not predict any change in their current approach to them.

The majority of employers forecast that spending on IT hardware/software, IT staffing, IT services and general IT outsourcing will rise, or at worst remain unchanged over the coming year.

*Despite continued economic uncertainty, over half of UK firms predict an improvement in company finances, profitability, customer numbers, turnover and sales over the coming year*

### Emerging trends and associated skills needs

Research undertaken with employers to identify the degree and timing of the impact of a number of business/IT trends can be summarised as follows:

- **Immediate issues:** those that many employers say will have a major impact on business, and typically in the next 1 to 3 years. The immediate key issues for employers appear to be security and data protection, but innovation is also considered important, followed by cloud computing, convergence of communications & IT and the real world web.
- **Developing issues:** those that will have a major impact on only a selection of businesses, or alternatively may have a widespread impact, but in the medium term. 'Developing' does not necessarily mean new - some of these issues have been around for some time, for example green IT and the transformation of businesses using IT, but it can take time for the impact to be felt. Other issues are new, for example the possibility of reshaping the data centre has emerged in the last 5 years, but only those businesses with intensive computing needs will be directly affected.
- **Horizon issues:** wider, ongoing issues, impacting at different times, on different businesses, but not affecting a majority of businesses all at once. For example, some large businesses are thinking about back-shoring, but it is not regarded as an immediate issue and smaller employers do not appear to be very concerned by it. In contrast, industrialisation of IT delivery will only really impact on small employers in any great number, while the pool of talent and gender balance appears more of an issue for IT & Telecoms businesses than other employers of IT & Telecoms professionals.

Many of the future trends that affect IT & Telecoms utilise similar technologies and/or require similar skills and knowledge from IT & Telecoms professionals. Five skills related cross cutting themes emerge from the above trends.

*Employers frequently associate security related skills issues with many of the key trends facing UK business*

*There were approximately 116,000 vacancies for IT/Telecoms staff during each quarter of 2011*

*In 2011 14% of recruiters of IT & Telecoms staff reported having difficulties filling positions advertised – for the IT & Telecoms industry this figure was much higher at nearly 50%*

### Security skills

Security and data protection will have one of the clearest and most immediate impacts for the skills of IT & Telecoms professionals. But employers frequently associate security related skills issues with many of the key trends and the ability of IT & Telecoms professionals to deal with these security issues will be one of their priority skills areas.

### Business skills

Increasingly IT & Telecoms professionals must have core business skills. Creative, technical and entrepreneurial skills alone are not enough – as professionals need to manage lifecycles of product development, and solve real business issues. Technical skills need to be complemented by a balanced understanding of businesses' broader objectives.

### Technology specific skills

Central to nearly all future trends is specific and high level technical knowledge. For example, within the systems that underpin the convergence of communications & IT, networks and devices that support voice, video and data communications and mobile devices. Other trends have fundamental challenges about architecture and infrastructure, for example IT & Telecoms professionals need a deep understanding of a wide variety of technical issues if cloud computing is to become a reality, and without high level technical expertise and knowledge it is also hard to understand how data security issues can be addressed successfully.

### Interpersonal skills

As information technology and services become more embedded in everyday life, both business and social, IT & Telecoms professionals need to be able to deal with and better understand customer challenges and consumer choices.

### Analytical and research skills

Analytics is a vital component of connecting information and technology to business problems. This will require organisations to have strong data architecture in place and then to develop new analytics skills to bring business meaning to operational data.

## 6.0 Demand and supply of IT & Telecoms labour and skills (see section 6)

Demand for IT & Telecoms staff has recovered substantially since the sharp decline brought on by the recession and, on average, there were approximately 116,000 advertised vacancies for IT & Telecoms staff during each of the four quarters of 2011 compared with just 82,000 during 2009.

The IT Services and Finance sectors have exhibited the largest post-recessionary increases in demand and together these sectors now are thought to account for more than eight in ten (84%) vacancies for IT & Telecoms staff.

The majority of vacancies for IT & Telecoms staff in 2011 were for permanent posts (79%) and in the areas of Development, Design or Support (38%, 23% and 19% respectively) with Systems Developers alone accounting for over one quarter (28%) of all positions advertised during the year.

The technical skills most often called for by employers in 2011 were: SQL, C, C#, .NET and Java and this was true for both permanent and contract positions on offer.

A survey of 4,700 businesses by the National Skills Academy for IT showed just under one in seven (14%) recruiters of IT & Telecoms staff were having difficulties filling positions advertised in 2011, and of these, a similar proportion (15%) stated that they were experiencing IT & Telecoms related

skills shortages. The problem was much more acute however within large firms and those operating within the IT & Telecoms industry.

Skills shortages were most often cited by recruiters seeking to fill positions for Programmers/Software Developers and Web Design/Development professionals. An inadequate supply of candidates with the required Microsoft skills was the most common cause of these shortages (e.g. .NET/ASP.NET, Dynamics, SharePoint, Visual Basic/Visual Studio and C#) though difficulties sourcing applicants with PHP and VMWare were also noted.

Shortages were likely to result in extended lead time for those looking to fill vacancies.

*Skills shortages were most often cited for Programmers/Software Developers and Web Design/Development professionals*

### IT & Telecoms workforce growth dynamics

Work during 2011 with the forecasting experts Experian concluded that the growth of the IT & Telecoms sector is predicted to continue strongly to 2020. While employment in the overall UK workforce is forecast to increase at 0.89% per annum for the coming decade, the IT professional workforce is forecast to grow at 1.62% per annum, nearly twice as fast as the average employment growth of the UK.

Whilst growth within the IT industry has slowed from previous forecasts, brought about predominately by a reduction across IT organisations of non IT staff, (showing an average forecast decline of 2.03% per annum through to 2020), employment growth is predicted to pick up in the Telecoms industry with a forecast growth rate per annum of 0.95% reversing a previous forecast decline of 0.14%.

Growth in the IT professional workforce is expected to manifest itself mainly amongst the more senior level/high value roles i.e. ICT Managers, IT Strategy & Planning and Software Professional roles whilst the number of people employed in lower skilled roles will continue to contract or remain virtually static.

*Employment of IT professionals through to 2020 is forecast to grow at 1.62% per annum – nearly twice as fast as the UK average*

### Recruitment needs

In addition to catering for continued growth, recruitment into IT & Telecoms occupations needs to also address 'replacement demand' – replacing those who leave the sector due to retirement or other reasons. This has been modelled to 2015 with detailed information about predicted replacement rates by occupation. Of the overall recruitment into IT & Telecoms professional jobs (to cover both growth and replacement), 67% is expected to be into managerial and senior professional positions (ICT Managers, IT Strategy & Planning Professionals and Software Professionals); 17% into Associate Professional and Technician level positions (such as IT Operations Technicians and IT User Support); and 16% into skilled trades (Telecoms and Computer Engineers) and administrative roles (Database Assistants & Clerks).

There is a need for an average of 129,000 new entrants a year into IT & Telecoms professional job roles. Based on current data, the makeup of this intake is expected to be as follows:

- 56,000 (43%) people a year coming from occupations other than IT or Telecoms (i.e. experienced workers who can be re-trained as IT & Telecoms professionals),
- 22,600 (18%) people a year coming from education (predominantly graduate level and higher),
- 50,400 (39%) people a year coming from other sources (e.g. re-entering the workforce after a career break, early retirement or unemployment).

*129,000 new entrants a year are required to fill IT & Telecoms job roles in the UK*

Despite the predicted growth in the number of IT & Telecoms workers, employers surveyed in 2011 generally anticipated no change in the degree of difficulty associated with recruiting IT & Telecoms staff over the following

year at least. As such, it would be expected that incidences of shortages will remain at least at current levels and in particular for those seeking to recruit Programmers and Software Development Professionals, Web Designers and Web Development Professionals.

## **7.0 IT & Telecoms skills and development (see section 7)**

*Though highly educated, IT & Telecoms staff are often less likely to hold HE level qualifications than other workers of a similar career 'grade' or 'level'*

As a whole, IT & Telecoms staff are highly educated and around two in three (62%) hold an HE or equivalent level qualification – well above the average for the UK workforce. This said, IT & Telecoms staff are often less likely to hold HE level qualifications than other workers of a similar career 'grade' or 'level' and whilst 70% of Strategy, Planning & Development staff have an HE level qualification this compares with 86% of other 'professionals'.

The 2011 National Skills Academy for IT survey showed around one in ten employers (11%) were aware of gaps in the skills of their employees in 2011 and of these firms, over one third (34%) reported there to have been gaps in the skills of their IT & Telecoms staff. These IT & Telecoms skills gaps are particularly common amongst firms operating in the IT & Telecoms industry.

*Just over one in ten (11%) employers report having skills gaps, and of these over one third (34%) report gaps in the skills of their IT & Telecoms professionals*

IT & Telecoms skills gaps of both a technical and non-technical nature were reported by UK employers - technical skills often being Microsoft /web related and non-technical skills commonly arising in the areas of sales, interpersonal and/or business/related skills.

Around four in ten (42%) employers affected thought that these skills gaps were reducing the level of performance of their IT & Telecoms staff - on average by almost one half.

Around half the reported incidences of IT & Telecoms skills gaps were thought to have been in existence for 6 months or more despite the fact that they were also thought avoidable in a similar number of instances (by better planning, more training or other means).

Only around one third of firms with IT & Telecoms skills gaps (34%) stated that they had a training plan in place setting out the development needs of their IT & Telecoms staff, and only around one in ten (11%) had a dedicated budget to fund their development needs.

*The proportion of IT & Telecoms staff receiving education/training each quarter has been in decline since 2008 and is below the average for UK workers as a whole*

The proportion of IT & Telecoms professionals receiving education/training each quarter is declining and since 2008 has remained below the level recorded for others within the workforce.

This said just under one half (48%) of IT & Telecoms professionals are thought to have received some form of job-related education/training in 2010.

The proportion of IT & Telecoms Strategy, Planning & Development staff receiving education/training each quarter is significantly below that of workers in non-IT & Telecoms roles of an equivalent level or grade (i.e. 23% vs. 41% respectively).

Part-time and self-employed IT & Telecoms professionals are notably less likely to receive education/training than others with only 20% and 13% respectively thought to do so each quarter (compared with an average of 25%).

Each quarter a significant proportion (30%) of IT & Telecoms professionals fail to take up an offer of education/training.

## 8.0 IT related education and qualifications (see section 8)

### Higher Education

In recent years a key issue affecting undergraduate provision has been the large decrease in the number of applicants to single subject IT related courses. Despite a 24% resurgence from 2007 to 2010, the number of applicants to such courses in the UK has declined by 28% since 2002 whilst, by comparison, the total number of applicants to all Higher Education courses in the UK has increased by 51% over the 2002-2010 period. Figures for 2010 also show how 13% of (UK domiciled) applicants to IT related Higher Education courses were female and 87% were male.

UK domicile acceptances for IT courses at Higher Education level declined over the period 2002 to 2007 and, in line with applicant numbers, increased from the low of 14,500 recorded in 2007 to 16,900 in 2009 but decreased slightly to 16,700 in 2010. Across all IT courses in 2010, 85% of UK domiciled acceptances were male and 15% were female.

*Although the number of people applying to IT related courses in Higher Education increased by 10% over the past year, for the period 2001-2010 numbers fell by 28%*

### Further Education

The number of IT & Telecoms related Further Education (FE) apprenticeship starts rose by 43% over the 2008/09 to 2009/10 period, compared with an increase of 17% for all FE apprenticeships. Nearly two thirds (63%) of IT & Telecoms related programme starts in 2009/10 were onto 'IT & Telecoms Professional' apprenticeships (the remaining 34% being onto 'IT User' apprenticeships) – representing an increase of 76% on the previous year. The number of achievements also grew by 36% over the same time period.

IT & Telecoms related NVQ/SVQs awards accounted for 3.5% of all respective qualification awards in the UK whilst IT & Telecoms VRQs accounted for 18% of the total. In both instances, the majority of awards were at level 2.

In 2010/11 there were 176,000 ITQ registrations (58% at Level 2) and 114,000 certifications, an increase of 310% and 302% respectively on the previous year's totals.

*Nearly two thirds (63%) of IT & Telecoms related apprenticeship programme starts were onto the 'IT & Telecoms Professional' apprenticeship, an increase of 76% on the previous year*

### Schools and Colleges

The number of Computing A-Levels taken in England, Northern Ireland and Wales has declined by 61% since 2003 and now constitutes just 0.5% of all A-Levels sat. The number of ICT A-Levels taken in England, Northern Ireland and Wales also declined significantly between 2003 and 2009 (by 34%) but has since stabilised and now constitutes 1.4% of all A-Levels sat.

There are a number of IT related academic courses/awards at GCSE level in England, Northern Ireland and Wales, including a GCSE in ICT, a GCSE Double Award in Applied ICT and a short course GCSE in ICT. As with A-Levels, the number of students studying for these qualifications has also been in decline for a number of years, with the number more than halving (70%) since 2005.

The trend in uptake of IT related qualifications in Scotland is similar to that seen in the rest of the UK. Since 2006, uptake of Computing/Computing Studies courses in Scotland has declined by 17% with Standard Grade Computing Studies declining in the past year by 6%. Computing is the most popular IT related qualification at both Higher and Advanced Higher levels, accounting for 66% of all IT related Higher attainments and 77% of all IT related Advanced Higher attainments in 2010/11.

*The number of students taking Computing A-Levels has fallen by 61% since 2003*

## Gender

As is the case in industry, gender imbalance is generally prevalent across the UK within IT related courses (with the exception of ICT A-Level and GCSEs). This is worsening over time throughout the education system. In 2010 just over one in ten (14%) of applicants to IT related Higher Education courses were female and the proportion of females taking Computing A-Level remained low at 8%.

### 9.0 The wider population's use of IT (see section 9)

*Over 1 in 10 (13%) people aged 16 or over have never used a computer*

Approximately 87% of people aged 16 or over have used a computer at some time and more than one in ten have undertaken some form of computer programming.

When considering two of the most common uses of computers: word-processing and spreadsheets, it is estimated that only one quarter or less of people are skilled to NVQ<sup>7</sup> level 2 or above (in England).

*Firms experiencing IT user skills gaps report a reduction in staff performance of around 22%*

The National Skills Academy for IT employer survey, 2011 showed that, amongst firms reporting the existence of skills gaps within their workforce, approximately two fifths (42%) identified gaps relating to the IT skills held by computer users. These gaps are most likely to exist in the spreadsheet skills held by IT users and virtually all firms with IT user skills gaps identified this as an area in which skills gaps exist.

IT user skills gaps are often thought to result in reduced staff performance – typically a reduction in the order of 22%.

*Only around one quarter (25%) of people using the internet are thought to have taken an IT training course over the past three years*

IT user skills gaps are often a long term phenomena (39% of cases) despite the fact that in the main (73% of cases) they are thought to be avoidable and that many cost effective methods to reduce/eliminate gaps can be readily identified by employers (i.e. better planning, more/better training and better staff management).

Only around one quarter (25%) of people using the internet are thought to have taken an IT training course over the past three years whilst more than two fifths (44%) have never done so. The main reason for this is that individuals consider their IT skills to be sufficient and they are, in any case, likely to self-teach or learn these skills from friends or colleagues.

### 10.0 Variations across the UK (see section 10)

Though highly qualified (most notably in Scotland where IT & Telecoms professionals are 13 percentage points more likely to hold an HE level qualification than counterparts across the UK) since 2003, the likelihood that IT & Telecoms staff will have been trained has declined substantially, particularly in Northern Ireland where IT & Telecoms staff are notably less likely than others as a whole to receive education/training each quarter.

Whilst development activity for IT & Telecoms staff may be falling, growth in demand for IT & Telecoms professionals continues. Over the past year advertised demand has increased for all UK nations, within Scotland in particular, where demand rose by almost a third (31%).

As demand increases, growth in supply will also be needed if related shortages and gaps are to be avoided; but in most instances one of the main sources of new talent – academia – is still exhibiting a long term downward trend. There are exceptions however, and in Northern Ireland there has been a significant increase in the number of GCSE students taking IT & Telecoms related courses over the past five years (increasing by 35% compared to an overall UK decline of 69% over the same time period).

Future growth in the IT & Telecoms workforce, across the UK's nations, is also forecast to continue with rates for IT Professionals in the IT industry ranging from twice, to as much as three times the respective national averages. To enable such growth, 9,600 new entrants to the IT & Telecoms

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<sup>7</sup> National Vocational Qualification

professional workforce in Scotland, 3,100 in Wales and 2,300 in Northern Ireland are needed each year through to 2015.

If the demand/supply balance for IT labour and skills can be realised and maintained, significant rewards could be realised by all UK nations with the optimisation of ICT amongst businesses (particularly by SMEs) having the potential to produce an uplift of £47 billion in national GVA over the next five to seven years across the UK (£3.7 billion in Scotland, £1.5 billion in Wales and £0.7 billion in Northern Ireland).

Driven by new technologies transformational impact on business, firms optimising advanced ICTs will also generate significant additional jobs across many occupations and sectors. If the potential £47 billion ICT driven GVA uplift opportunity is realised, it is estimated this could translate into 39,000 new jobs in Scotland, 18,000 in Wales and 10,000 Northern Ireland respectively – half a million across the UK as a whole.

## 11.0 Current and future skills priorities (see section 11)

### IT & Telecoms professionals

There were, on average, approximately 116,000 advertised vacancies for IT & Telecoms staff in the UK during each of the four quarters of 2011, with Systems Developers in particular found to be the most in demand with well over one quarter (28%) of all positions advertised over the past year for jobs of this nature.

The technical skills of applicants most sought after were SQL, C, C#, .NET, Java, SQL SVR, ASP, JavaScript, Agile and HTML – these being the ten most commonly cited technical skills in adverts for IT & Telecoms professionals during 2011.

Just under one half of firms in the IT & Telecoms industry with IT & Telecoms positions advertised report having difficulty finding applicants to fill them and in particular, skills shortages were cited by recruiters seeking to fill positions for Programmers/Software Developers and Web Design/Development professionals.

The most common job-related skills that employers reported proving hard to find amongst applicants for IT & Telecoms positions were: .NET/ASP.NET, Dynamics, SharePoint, Visual Basic/Visual Studio, C# and PHP.

Although IT & Telecoms staff are generally able to show a high level of educational attainment, it appears that the work related skills they possess do not always align with those required by their employers with around one in ten organisations aware of gaps in the skills of their employees (11%) and of these firms, over one third (34%) reporting gaps in the skills of their IT & Telecoms staff.

The majority of firms with IT & Telecoms skills gaps stated that they were aware of gaps in both the technical and non-technical skills of their IT & Telecoms staff and where technical skills gaps were apparent they were most commonly thought to arise in respect to Microsoft skills – particularly ASP.NET, C and .NET which together with PHP and Linux represent the top 5 technical skills gaps cited by employers.

Over the next twelve months a large proportion of businesses responding to the 2011 National Skills Academy for IT employer survey predict an implementation of business process management, virtualisation, business analytics and mobile computing/applications.

Just over one in ten employers responding to this survey thought it would become more difficult to recruit IT & Telecoms professionals, (SMEs in particular were more likely than others to anticipate increased difficulty) and in particular, employers anticipated difficulty filling positions for Programmers and Software Development Professionals followed by Web Design and Development Professionals.

*Skills that employers reported were proving hard to find amongst job applicants were:  
.NET/ASP.NET,  
Dynamics,  
SharePoint, Visual Basic/Visual Studio,  
C# and PHP*

Employment of IT professionals through to 2020 is forecast to grow at 1.62% per annum – nearly twice as fast as the UK average with Software Professionals in particular, forecast to grow nearly two and a half times faster than the UK average for all other occupations across the UK economy.

Specific emerging technologies with important skills implications are: Cloud Computing; Green IT; Social and Mobile Computing; 'Big Data'/Smart Computing/Analytics and Security and Data Protection.

### The wider population's use of IT

Latest estimates from the Office for National Statistics suggest that approximately 87% of people aged 16 or over have used a computer at some time in their lives.

The 2011 National Skills Academy for IT survey shows that, amongst firms reporting the existence of skills gaps (11%) within their workforce<sup>8</sup>, approximately two fifths (42%) identified gaps relating to the IT skills held by computer users within their company.

Gaps were most often thought to exist in the spreadsheet skills held by computer users and virtually all firms (95%) with IT user skills gaps identified a mismatch in this area.

On average, just under one quarter (24%) of companies reporting gaps in the IT skills of their computer users were of the view that staff were underperforming as a consequence i.e. on average users with gaps in their IT skills were thought to be working at 78% of their full potential.

Making the most of technology is arguably the single most important step that can be taken to improve productivity across the UK economy. To achieve this, not only do all individuals need increasingly sophisticated skills in the use of IT, the UK's 4.5 million managers and leaders across every sector need to grasp the strategic implications of technology and have the skills to realise its potential.

However 8.2 million UK adults still remain off-line in the UK at present and bringing the digitally excluded online is a key priority to avoid this community being left out of the wide and growing range of personal benefits accessing the web brings. The digitally excluded therefore urgently need a sufficient level of IT user skills to use the web to widen their window to the world and to improve their lives.

## 12.0 Global ambition (see section 12)

The UK has one of the most competitive technology industries in the world, a highly respected technology skills pool, and a particular expertise in the application of technology to deliver business benefit. Our vision is that the UK is recognised as a global leader in delivering business value from technology.

Strategic action to accelerate the development of the skills pool in line with this vision is essential for the future. Information Technology and Communications systems are at the heart of every organisation, they underpin the delivery of high quality, cost effective public services, and they are central to the fabric of our daily lives.

IT & Telecoms is at the heart of the modern economy, supporting the value add of practically all organisations in every sector. It is fundamentally affecting companies in all sectors and making the most of technology is arguably the single most important step that can be taken to improve productivity across the UK economy.

A coherent, strategic approach to skills is fundamental to enabling the economy to derive maximum benefit from the power of technology; transforming competitiveness and productivity through the creation of appropriate technology related skills. With this, the UK can be a global

*'To derive maximum benefit from the power of technology a coherent, strategic approach to skills is fundamental. With this the UK can be a global leader in technology, without it the country will become a second rate player in a high technology world'*

e-skills UK 2012

<sup>8</sup> according to results from the National Skills Academy for IT employer survey 2011 - see section 9

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leader in technology. Without it, the country will become a second rate player in a high technology world.

For the UK, the need for broader, deeper and continually changing skills affects not only the 1.5 million people in the IT workforce, but also the 4.5 million business managers and leaders who need to understand how to realise the potential of ICT, together with the 22 million workers requiring skills in the use of IT.

Based on the analysis and skills priorities set out in this document, and taking account of the current environment, e-skills UK will work together with partner organisations to deliver on three key strategic objectives to ensure the UK is truly world class at delivering maximum value from technology both in business and in society more widely:

**Inspire future talent:** motivate talented students to pursue IT-related careers and better prepare all young people for work in a technology-enabled world.

**Support IT professionals:** develop the IT professional skills pool as the best in the world for deriving business benefit from technology.

**Increase digital capability:** trigger increased investment in the IT capability of all individuals and businesses in every sector.



# 1.0 Introduction

The UK Coalition Government's 'Blueprint for Technology'<sup>9</sup> identifies technology enabled innovation as the key to securing private sector led economic growth for the UK. In the context of the current economic climate, focus on deficit reduction and the 'Plan for Growth'<sup>10</sup>, high growth, high tech and innovative businesses are critical – they drive economic growth, productivity, global competitiveness and the creation of new jobs. By getting behind all high growth, innovative and technology companies, the Government believes the UK will be on the path to a new economic dynamism.

The Coalition Government has committed to creating a framework in which high tech and innovative companies can flourish. In doing so, it has emphasised the importance of ensuring that businesses have the right skills they need to grow. The changing shape of the economy means that future growth will depend more and more on the technology sector, and so the technology skills needed for all businesses to innovate will become increasingly important.

e-skills UK is the Sector Skills Council for Business and Information Technology; an employer-led organisation rated as 'outstanding' in the re-licensing of the Sector Skills Councils. e-skills UK's mission is to ensure the UK has the technology skills it needs to compete in the global economy, working on behalf of employers to develop the software, internet, computer gaming, IT services and business change expertise necessary to thrive.

Focused on making the biggest contribution to enterprise, jobs and growth across the economy, e-skills UK's three strategic objectives are to:

- inspire future talent,
- support IT professionals,
- increase digital capability.

Delivery on these strategic objectives is underpinned by employer engagement across the sector, authoritative research, a continually developing sector qualifications and learning strategy, and effective strategic partnerships.

Building on previous research, e-skills UK has analysed the UK's IT & Telecoms workforce, technology trends, opportunities and challenges in order to deliver authoritative labour market intelligence which enables effective influence on policy, strategy and solution development. The resultant suite of publications, 'Technology Insights 2012' sets out the current reality, forecasts the future based on the best available intelligence, and assesses the implications for the IT & Telecoms sector and all other sectors across the UK economy.

This UK report, and the summaries for Scotland, Wales and Northern Ireland use existing knowledge supplemented with new primary research amongst 4,700 employers; a summary of technology-related trends and their implications for the future; new employment forecasts (in partnership with Experian); an impact analysis of ICT optimisation (in partnership with Adroit Economics) and a detailed analysis of the workforce profile and current/future skills provision.

These reports will inform e-skills UK, government, education providers, employers and the IT & Telecoms sector of the implications of emerging trends and the changing environment.

*'There is an urgent need to raise UK skills levels to help drive productivity, growth and job creation'*

Vince Cable,  
Secretary of State for  
Business, Innovation  
and Skills

*'Computing is identified as having the highest relative economic significance while also being constrained by the highest level of skill deficits'*

UKCES, Skills for  
Jobs: Today and  
Tomorrow – The  
National Strategic  
Skills Audit for  
England, 2010

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<sup>9</sup> HM Government, Blueprint for Technology, November 2010

<sup>10</sup> HM Treasury/BIS, The Plan for Growth, March 2011



## 2.0 The importance of IT & Telecoms to the UK economy

This section considers the scope of the IT & Telecoms workforce and its importance to the UK's economy.

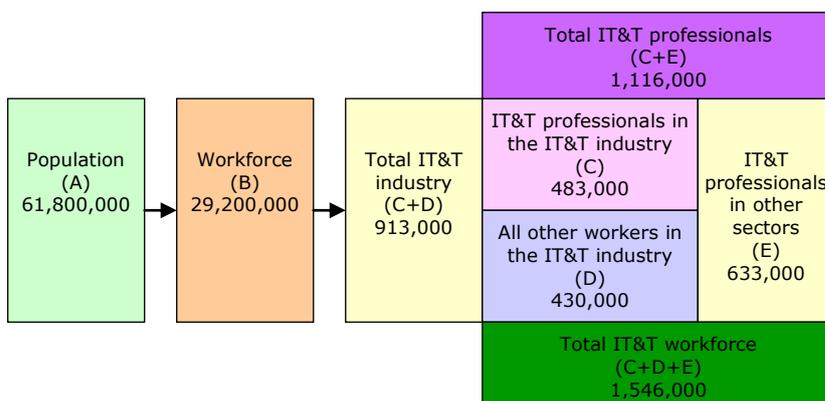
### 2.1 Scope of the workforce

The IT & Telecoms workforce comprises:

- Employees in the **IT & Telecoms industry**<sup>11</sup> (those employed in any role in companies whose primary activity is IT or Telecoms as defined by Standard Industrial Classification (SIC) codes). The IT & Telecoms industry consists of:
  - Business services such as consulting, business process re-engineering and change management,
  - IT services including solution design, systems integration, internet and web,
  - Software development including applications and games,
  - IT operations including information management, security, service delivery and systems maintenance,
  - Networking and communications, including mobile and fixed line telecommunications,
  - IT project and supplier management.
- **IT & Telecoms professionals** in other industries (those whose primary activity is IT or Telecoms as defined by Standard Occupational Classification (SOC) codes<sup>12</sup>, working in companies across any industry).

The following diagram segments IT & Telecoms professionals and the IT & Telecoms industry. In addition it shows which of their respective sub groups combine to form the IT & Telecoms workforce.

Figure 1: The IT & Telecoms workforce – high level segmentation (UK)



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

Note: Figures may not add up due to rounding

e-skills UK has the responsibility for IT-related skills across the whole of the UK workforce which includes the IT related skills needs of the 4.5 million business leaders and managers who need to exploit the potential of IT for their businesses and the IT related skills needs of the 22 million IT users who make use of IT as a tool to support their everyday work life.

<sup>11</sup> A full list of IT & Telecoms related Standard Industrial Classifications (SIC) can be found in Annex B

<sup>12</sup> A full list of IT & Telecoms related Standard Occupational Classifications (SOC) can be found in Annex A

## 2.2 IT & Telecoms and UK competitiveness

*'...technological evolution has accelerated greatly over the last decade with unequivocally positive transformations for societies, companies and individuals'*

World Economic Forum

Whilst compared to many other nations the UK continues to rate highly with respect to IT investment and utilisation (e.g. 10th on the *International Telecommunications Union's (ITU) ICT Development Index*<sup>13</sup>, 14th according to the *Digital Economy*<sup>14</sup> rankings and 15th in the *World Economic Forum's (WEF) Network Readiness Index*<sup>15</sup>), its global ranking has generally declined in recent years and consistently remains below the level assigned to other leading nations - notably the US and the Nordic states in particular (i.e. Sweden, Denmark and Norway).

One means for assessing the UK's IT sector competitiveness is via The Economist Intelligence Unit (EIU) which; whilst also providing analysis for other industries, specifically benchmarks IT sector competitiveness - comparing countries in different regions of the world 'on the extent to which they possess the conditions necessary to support a strong IT industry'.

First highlighted in its 2009 report<sup>16</sup>; IT infrastructure remains a key driver behind highly ranked countries with seven of the top ten countries (including the UK) according to this measure being positioned in the top ten of the overall 2011<sup>17</sup> Index. Similarly, its absence has been cited for emerging markets such as India's (34<sup>th</sup>) and China's (38<sup>th</sup>) failures to utilise their large pools of skilled IT employees.

Though the 2011 report highlights the increasing prominence of such emerging economies and questions whether the IT industry's centre of gravity is 'shifting from West to East'; the US, which has previously been described as 'the world's most conducive environment for the development and growth of IT firms', retains its position at the top of the Index (The UK is ranked in 5<sup>th</sup> place, one place higher than in 2009).

Whilst the real 'game changers' or those attracting the greatest valuations are all said to have US roots e.g. Apple, Google, Facebook etc, IT companies in emerging markets are thought to suffer from not being 'as close to consumers as they are in the West, and so innovations such as social networking - where there is potential to develop a platform and become a global phenomenon - are harder to realise'. However this could all be about to change; a recent report by Oxford Economics<sup>18</sup> finds firms in emerging markets to be 'investing aggressively' in ICT and twice as likely (compared to firms in advanced economies) to be planning to increase their investments in mobile devices, social media, business intelligence, collaborative tools and telepresence systems by more than 20%. Similarly the report describes how such firms in emerging markets are able to realise the benefits of ICT investment quicker through learning from the mistakes of their rivals in more advanced economies.

Another publication, the *WEF Global Competitiveness Index (GCI)*, in which the UK is ranked 10<sup>th</sup> assesses a country's competitiveness; 'the set of institutions, policies and factors that determine the level of productivity of a country', against 12 pillars of economic competitiveness<sup>19</sup>. Productivity is described as being pivotal in setting the level of prosperity that can be earned by an economy and in determining the rate of return obtained by

*'Few today would go back willingly to a world without the Internet and its many associated developments. For many young adults, conceiving of such a world may even be impossible. ICT, and the internet particularly have already changed the world dramatically, and all indications point to an even higher rate of transformation of our lives over the next decade'*

World Economic Forum

<sup>13</sup> ITU, 'Measuring the Information Society', The ICT Development Index, 2011

<sup>14</sup> Economist Intelligence Unit 'Digital Economy Rankings 2010', June 2010

<sup>15</sup> World Economic Forum 'The Global Information Technology Report 2010-2011', 2011

<sup>16</sup> Economist Intelligence Unit 'Resilience Amongst Turmoil, Benchmarking IT industry competitiveness 2009', 2009

<sup>17</sup> Economist Intelligence Unit 'Investment for the future, Benchmarking IT industry competitiveness 2011', 2011

<sup>18</sup> Oxford Economics, 'Capturing the ICT Dividend', October 2011

<sup>19</sup> The twelve pillars are as follows: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation

investments in that economy, which in turn are the fundamental drivers of its growth rates. That is, 'a more competitive economy is one that is likely to grow faster over time'.

Each country is assessed against 12 pillars of economic competitiveness. The ninth pillar – 'Technological readiness' examines 'the agility with which an economy adopts existing technologies to enhance the productivity of its industries, with specific emphasis on its capacity to fully leverage ICT in daily activities and production processes for increased efficiency and competitiveness'.

'Technological readiness' for which the UK is ranked 8th overall is split into two sections; 'Technological adoption' and 'ICT use'. These have three and five subsections respectively. Rankings for each of these sub sections, along with those for the other top ten 'technologically ready' countries are detailed in table 1 below.

*'In today's globalised world, technology is increasingly essential for firms to compete and prosper'*

World Economic Forum

Table 1: Technological readiness international competitiveness rankings

Technological readiness overall ranking	Country	Technological adoption rankings			ICT use rankings				
		Firm-level technology absorption	Foreign direct investment and technology transfer	Availability of latest technologies	Mobile telephone subscription	Broadband internet subscriptions	Fixed telephone lines	Internet users	Internet bandwidth
1st	Switzerland	4 <sup>th</sup>	27 <sup>th</sup>	1 <sup>st</sup>	37 <sup>th</sup>	1 <sup>st</sup>	6 <sup>th</sup>	9 <sup>th</sup>	5 <sup>th</sup>
2nd	Sweden	1 <sup>st</sup>	19 <sup>th</sup>	1 <sup>st</sup>	50 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	5 <sup>th</sup>	3 <sup>rd</sup>
3rd	Iceland	2 <sup>nd</sup>	79 <sup>th</sup>	4 <sup>th</sup>	57 <sup>th</sup>	5 <sup>th</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>
4th	Denmark	9 <sup>th</sup>	29 <sup>th</sup>	9 <sup>th</sup>	34 <sup>th</sup>	3 <sup>rd</sup>	15 <sup>th</sup>	6 <sup>th</sup>	4 <sup>th</sup>
5th	Netherlands	21 <sup>st</sup>	31 <sup>st</sup>	6 <sup>th</sup>	46 <sup>th</sup>	2 <sup>nd</sup>	22 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
6th	Hong Kong SAR	15 <sup>th</sup>	7 <sup>th</sup>	12 <sup>th</sup>	1 <sup>st</sup>	13 <sup>th</sup>	3 <sup>rd</sup>	28 <sup>th</sup>	1 <sup>st</sup>
7th	Norway	5 <sup>th</sup>	57 <sup>th</sup>	3 <sup>rd</sup>	53 <sup>rd</sup>	6 <sup>th</sup>	34 <sup>th</sup>	9 <sup>th</sup>	9 <sup>th</sup>
<b>8th</b>	<b>UK</b>	<b>22<sup>nd</sup></b>	<b>23<sup>rd</sup></b>	<b>7<sup>th</sup></b>	<b>27<sup>th</sup></b>	<b>12<sup>th</sup></b>	<b>9<sup>th</sup></b>	<b>8<sup>th</sup></b>	<b>8<sup>th</sup></b>
9th	Luxembourg	24 <sup>th</sup>	13 <sup>th</sup>	19 <sup>th</sup>	16 <sup>th</sup>	8 <sup>th</sup>	10 <sup>th</sup>	4 <sup>th</sup>	12 <sup>th</sup>
10th	Singapore	10 <sup>th</sup>	3 <sup>rd</sup>	17 <sup>th</sup>	15 <sup>th</sup>	21 <sup>st</sup>	27 <sup>th</sup>	25 <sup>th</sup>	7 <sup>th</sup>

Source: e-skills UK analysis of the World Economic Forum's (WEF) Global Competitiveness report 2011-2012

*The IT & Telecoms industry contributes £75 billion (8%) to the UK's economy*

*'Today we live in a world where more people have access to ICT than to toilets or clean water or the electric grid'*

World Economic Forum

## 2.3 IT & Telecoms and UK productivity

The IT & Telecoms industry directly contributes 8% (£75 billion) towards the UK's total Gross Value Added<sup>20</sup> (GVA) and will continue to have a key role in the UK and global economy, driving competitiveness and productivity amongst all sectors. In addition, the previously unassessed economic contribution of the internet is now said to be worth an estimated £100 billion<sup>21</sup>, or 7.2% of Gross Domestic Product (GDP)<sup>22</sup>, to the UK economy.

### 2.3.1 The effective application and economic impact of ICT

A strong IT & Telecoms sector underpins the economy; contributing to productivity growth by raising the level of capital and technology available to workforces and enabling more profitable business models.

In its *Global Information Technology Report*<sup>23</sup> the WEF provides an analysis on the evolution of ICT over the last decade and recognises its role in not only driving innovation, productivity and efficiency gains across all industries but also in improving people's daily lives.

Since the late 18<sup>th</sup> century it describes Western society as having experienced 'five distinct eras or revolutions: the Industrial Revolution (beginning roughly in 1771), steam power (beginning in 1829), electricity (in 1875), oil (in 1908) and ICT (in progress)'. Though each of these are said to have led to profound changes in the organisation of the economy; ICT stands out because the velocity of change by which it has changed society is 'spectacularly accelerating'. Despite this, most people are still not fully aware how embedded technology is in their everyday lives despite the fact that 'today we live in a world where more people have access to ICT (usually a mobile phone) than to toilet or clean water or the electric grid'.

In addition, there is a wealth of evidence that the effective application of IT delivers identifiable productivity improvements. For example, WEF estimates show that a 10% increase in mobile phone penetration is associated with a 1% growth in GDP<sup>24</sup> whilst the London School of Economics (LSE) concludes 'that half of Europe's productivity gains can be attributed to IT investments'<sup>25</sup>. This impact has, however, emerged unevenly across firms, sectors and countries.

Studies have investigated the causes of these differences, in particular to understand better the productivity gains in the United States (US) compared to the UK and the comparative differences across Europe. One such study undertaken by the LSE found that 'US multinational firms are on average 8.5% more productive than UK domestic owned firms, and that almost all of this difference is due to the higher productivity impact of their use of ICT'. Further research by the Office for National Statistics (ONS) also concluded

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<sup>20</sup> GVA measures the contribution to the economy of each individual producer, industry or sector in the UK. It is the difference between the value of goods and services produced and the cost of the raw materials and other inputs which are used up in production, in any given sector or industry.  $GVA + \text{taxes on products} - \text{subsidies on products} = \text{Gross Domestic Product (GDP)}$

<sup>21</sup> The Boston Consulting Group, 'The Connected Kingdom: How the Internet Is Transforming the UK Economy' October 2010

<sup>22</sup> The total value of all goods and services produced within a country using the expenditure method of calculating GDP

<sup>23</sup> World Economic Forum, 'The Global Information Technology Report 2010-2011', 2011

<sup>24</sup> World Economic Forum, 'The Global Information Technology Report 2010-2011', 2011

<sup>25</sup> London School of Economics, 'It ain't what you do it's the way that you do I.T. Testing explanations of productivity growth using US affiliates.' Nick Bloom, Raffaella Sadun and John Van Reenen, July 2005

that 'over 80% of this productivity advantage is explained by better use of IT'<sup>26</sup>.

More recently, the LSE report '*The economic impact of ICT*<sup>27</sup>', found increased investment in ICT capital to have 'played a major role' in the doubling of US productivity growth rates; commonly referred to as the 'productivity miracle'.

European economies have not experienced the same type of acceleration as the US and as a result differences in the level of output between the US and EU increased from 1.8% in 1995 to 9.7% by 2004. In addition, 'the last two years of global turmoil appearing to coincide with faster productivity gain (in the US)' and this indicates a better use of IT investment and consequently the 'productivity miracle' still benefits the US today. Had Europe matched the US in its productivity growth since the mid-1990's, Oxford Economics believe 'the gap in living standards between the two areas would by today be 25% smaller, equivalent to an improvement in Europe's GDP per head of just under €3,400'.<sup>28</sup> The report, 'Capturing the ICT Dividend' warns that if Europe fails to address and close this productivity gap, it will be in danger of not only failing to catch up with the US but also (for the reasons described in section 2.2) be at risk of losing greater ground to emerging economies.

Within the same report, Oxford Economics quantify the benefits European countries could realise if they were to increase their investment in ICT and implement changes that would improve the use of ICT. They estimate that 'By 2020, if Europe were able to increase its ICT capital stock to the same level (relative to the size of the economy) as that of the US, the result would be impressive: GDP would increase by 5% on average – equivalent to €760 billion for Europe as a whole'.

In addition, as part of their return on investment (ROI) analysis, they measured the extent to which ICT investment raises GDP over and above the value of the capital investment. They found ICT to deliver a greater productivity growth return than most other forms of capital investment. Whilst returns on other forms are about 15%, Oxford Economics estimate ROI on ICT investment to be typically 20-25%. This 'ICT Dividend' is said to contribute one third of the overall returns on ICT investment and as such they estimate 'investing in ICT rather than other capital investments may boost ROI by as much as 50%'.

### 2.3.2 Output and Productivity comparisons (by UK sectors)

The '*Working Futures 2010-2020*<sup>29</sup>' publication provides employment forecasts by occupation and sector for the UK and its constituent geographical areas. As part of the forecasting process the report provides a comprehensive review of the implications of technological change, changes in government policy and legislation, and changes in other economic and social drivers for the UK labour market.

According to their projections; the 'IT sector'<sup>30</sup> will show the highest level of output and productivity in both the short to medium (2010-2015) and longer term (2015-2020) out of all sectors'.

*'In terms of the highest levels of % change, output and productivity the IT sector is forecast to remain the highest of all UK sectors'*

Warwick Institute for Employment Research, '*Working Futures 2010-2020*'

<sup>26</sup> Office for National Statistics, 'IT investment, ICT Use and UK Firm Productivity' Raffaella Sadun, Shikeb Farooki, Giles Gale, Mark Lever, August 2005

<sup>27</sup> London School of Economics, 'The Economic Impact of ICT', January 2010

<sup>28</sup> Oxford Economics, 'Capturing the ICT Dividend', October 2011

<sup>29</sup> Warwick Institute for Employment Research, '*Working Futures 2010-2020*', December 2011

<sup>30</sup> Defined as SIC 61 Telecommunications and SIC 62 Computer programming, consultancy and related activities

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For 2010-15, the IT sector will exhibit output growth of 5.7% per annum, which is replicated in the sector's forecast productivity growth; and in both cases this is around three times the all sector average.

Growth is also projected to continue in the long term (2015-2020) with output at 5.8% per annum and productivity at 5.2% per annum compared to all sector averages of 2.7% in output and 2% respectively.

## **2.4 The importance of continued business investment in ICT**

### **2.4.1 Introduction**

The ICT sector in its own right, clearly offers the UK continued economic opportunities, but perhaps of equal if not greater significance are the opportunities across the rest of the economy arising from businesses in all sectors of the economy maximising their use of ICT, broadband and internet access.

Estimates have been made of the potential GVA and employment impacts likely to result if all businesses, particularly small businesses, fully invest in and optimise advanced ICT. These impacts have been estimated for the UK, constituent nations, for the English regions and UK city regions, in each case using a bespoke ICT-impact model first developed by Adroit Economics Ltd for e-skills UK<sup>31</sup>.

### **2.4.2 There is strong evidence that adoption of advanced ICT will continue to benefit firms and the economy**

The literature suggests that investment in and optimisation of ICT by businesses across the UK economy has, and will continue to result in improvements to productivity and in increased innovation and enterprise, resulting in additional GVA of between 4-8% over a 5 to 7 year period. This will derive not only from continued productivity gains, from increased enterprise and innovation driven and enabled by advanced ICT but also by ever increasing internet access speeds.

### **2.4.3 Evidence from a literature review of the impact of use of ICT on productivity and growth**

There is a growing body of research that assesses the contribution of ICT to productivity and economic growth. Serious studies began to emerge in the early 2000s, for the first time attempting to quantify the economic impact of ICT on the global economy (LSE, N America, OECD). These early studies focussed on productivity gains as a result of use of ICT. The body of evidence in the literature has subsequently increased, with studies examining the impact of ICT on enterprise and innovation and of broadband and access to the internet and in the last 6 months, probably as a result of global economic circumstances, the results of several major studies have been published that examine the more recent impacts of ICT on the global economy, including and particularly that of internet access enabled by ever faster broadband.

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<sup>31</sup> The model was first developed for e-skills UK in 2006/7 and has since been updated in 2010 and now in 2011. The 2011 version of the model estimates potential ICT-driven GVA uplift for each industry sector (using the 2003 Standard Industrial Classification (SIC) system at 2-digit level). The 2011 model calculated potential ICT driven GVA uplift at the level of the UK's nations, the English regions, city regions, and for particular groups of industry sector. ICT GVA uplift is assumed to derive from two factors (i) continued productivity gains and (ii) increased enterprise and innovation. A percentage uplift figure is attributed for each factor and to each industry sector. GVA uplift is calculated by applying the total percentage uplift figure to current GVA for the industry sector (based on Experian's 2012 productivity forecasts).

A recent report by McKinsey and MGI (May 2011)<sup>32</sup> estimates that use of the internet has accounted for 3.4% of GDP growth in 13 study nations and, amongst the mature countries looked at, 21% of GDP growth over the last five years. Much (78%) of the impact of the internet arises within the traditional industries where 2.6 jobs are created for every one that is lost and amongst the SME community productivity growth of 10% has occurred. The internet's impact on global growth is rising rapidly. The internet accounted for 21% of GDP growth over the last five years among the developed countries MGI studied, a sharp acceleration from the 10% contribution over 15 years. Most of the economic value created by the internet falls outside of the technology sector, with 75% of the benefits captured by companies in more traditional industries. The internet is also a catalyst for job creation. Amongst the 4,800 small and medium sized enterprises surveyed, the internet created 2.6 jobs for each one lost to technology-related efficiencies<sup>33</sup>.

*'The Internet is also a catalyst for job creation ....with 2.6 jobs created for each one lost to technology-related efficiencies'*

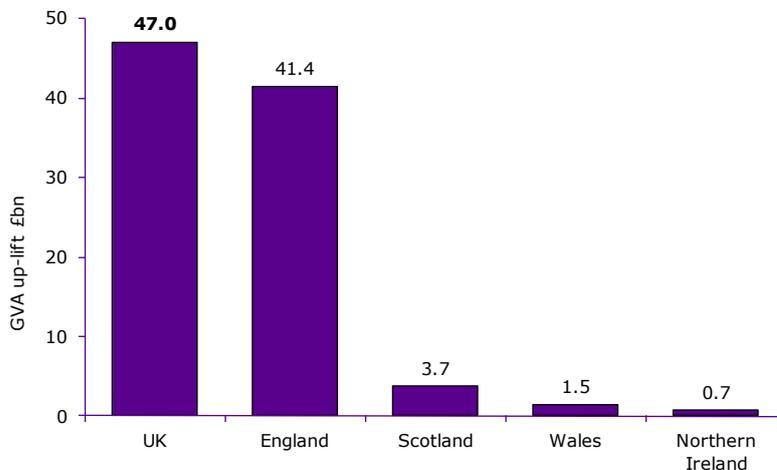
The McKinsey Global Institute (MGI)

#### 2.4.4 ICT driven GVA up-lift at the national level

The 2012 model estimates that optimisation of ICT by UK businesses could generate an additional £47 billion GVA to the UK economy over the next 5 to 7 years. The majority of this 'up-lift' (£41.4 billion) will be generated in England, with £3.7 billion in Scotland, £1.5 billion generated in Wales and £0.7 billion in Northern Ireland.<sup>34</sup>

*Optimisation of ICT by businesses could generate an additional £47 billion GVA to the UK economy over the next 5 to 7 years*

Figure 2: GVA up-lift at the national level over the next 5-7 years



Source: Adroit Economics ICT impact model 2012, using Experian 2012 productivity forecasts

<sup>32</sup> The McKinsey Global Institute (MGI), 'Internet Matters: The Net's Sweeping Impact on growth, jobs and prosperity', May 2011

<sup>33</sup> The McKinsey Global Institute (MGI), 'Internet Matters: The Net's Sweeping Impact on growth, jobs and prosperity', May 2011

<sup>34</sup> These figures reflect the relative sizes and industrial structures of each economy

#### 2.4.5 Translating the ICT driven GVA up-lifts into equivalent jobs

Optimisation of advanced ICT by firms will also generate net additional jobs. There is some discussion however regarding the extent of this.

- Some would argue that increased productivity might result in reduced employment in some firms, static employment in other firms and employment growth in others, such that at the level of the economy, ICT driven productivity gains may not translate 100% into additional jobs.
- Others would argue that whilst in the short term, some firms may simply reduce employment, that in the longer term in a vibrant economy it is reasonable to expect advanced ICT to stimulate considerable new business starts and at the level of the economy for any surplus to be taken up by growth.

Recent evidence however strongly suggests that optimisation of ICT will generate significant additional jobs, driven in particular by the emergence of new ICT applications and services that will, in many respects, have a transformational impact on many businesses. In fact, recent studies report that optimisation of cloud computing and of 'big data'<sup>35</sup> alone will create over a quarter of a million jobs by 2015/17, namely:

- Spend on public and private cloud computing services will create 226,000 jobs in the UK by 2015, according to a study from analyst firm IDC<sup>36</sup> with SMEs adopting cloud computing faster than larger companies straddled with legacy systems.
- Harnessing 'big data' could contribute £216 billion to the UK economy and stimulate 58,000 new jobs between 2012 and 2017 according to a new study by The Centre for Economics and Business Research (Cebr) and SAS<sup>37</sup>, a leader in business analytics software and services.

These and other fast emerging new IT applications and services are likely to generate significant additional jobs in the UK.

#### 2.4.6 Equivalent jobs at the level of the nations

Calculating the exact number of additional jobs is difficult because many factors are at play. To reflect this, the Adroit Economics model developed for e-skills UK uses several contrasting methods to provide a range of possible job outcomes. The range provides a useful cross-check.

Taking the mid-range as the best guide of the likely number of additional jobs, it is estimated that the ICT driven GVA uplift of £47 billion in the UK economy could translate into half a million new jobs, across many occupations and sectors, over the next 5 to 7 years, the majority of which are forecast to be in England.

*The ICT driven GVA uplift of £47 billion in the UK economy could translate into half a million new jobs, across many occupations and sectors, over the next 5 to 7 years*

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<sup>35</sup> As the amount of data continues to grow, compounded by the internet, social media, cloud computing and mobile devices, it poses both a challenge and an opportunity for businesses i.e. how to manage, analyse and make use of the ever-increasing amount of data being generated. As a result, organisations are turning to big data analytics solutions such as high-performance analytics to unlock the value of data and reveal previously unseen patterns, sentiments and customer related intelligence

<sup>36</sup> IDC, 'Cloud Computing's Role in Job Creation', 2012

<sup>37</sup> The Centre for Economics and Business Research (Cebr) and SAS, 'Data Equity: Unlocking the value of big data', April 2012

Table 2: GVA up-lift and estimate of equivalent jobs at the national level over the next 5-7 years

	GVA uplift £ billion	Estimate of equivalent jobs
England	41.4	427,000
Scotland	3.7	39,000
Wales	1.5	18,000
Northern Ireland	0.7	10,000
<b>UK</b>	<b>47</b>	<b>494,000</b>

Source: Adroit Economics ICT impact model 2012, using Experian 2012 productivity forecasts

#### 2.4.7 Social and economic benefits of household use of ICT and of tackling digital exclusion

It is not only businesses that benefit from use of ICT and access to the internet, citizens and their households also increasingly benefit. The most obvious benefits are entertainment and social benefits (e.g. IP-TV, gaming online, social networking) but there are also economic, educational health and wider quality of life benefits more generally.

An estimated 8.2 million UK adults remain off-line in the UK at present and are missing out on these benefits. The groups subject to the highest digital exclusion are the families with single parents, those aged 65 or over and the unemployed.

Those suffering 'Digital exclusion' will be unable to benefit from the wide and growing range of personal benefits accessing the web brings e.g. improved educational attainment, improved skill levels, improved job level and income, savings from online shopping and better access to public services including health services. Digital exclusion goes hand in hand with social exclusion - the former serves to exacerbate the latter.

A report by PriceWaterhouseCoopers<sup>38</sup> quantified the potential economic benefits that could result from getting everyone in the UK online as in excess of £22 billion.

#### 2.4.8 ICT and significant public service cost savings

Adoption and increased usage of ICT by the public sector has and will continue to generate significant cost savings, improvements in existing services and innovative new services in certain areas e.g.

- One of the most significant cost savings derives from customers (businesses and households) accessing information and public services on line and undertaking an ever increasing range of transactions on line. This reduces transaction costs for the public sector whilst reducing time spent and numbers of physical journeys required by customers.
- The health service will also derive savings through reduced GP visits and the improved health enabled by better access to health information and advice online.

*An estimated 8.2 million UK adults remain off-line in the UK*

*'The total potential economic benefit from getting everyone in the UK online is in excess of £22 billion'*

PriceWaterhouse  
Coopers

<sup>38</sup> PriceWaterhouseCoopers 'The Economic Case for Digital Inclusion', 2009

*Those countries that are able to deploy the best technologies soonest, will gain a competitive advantage*

#### 2.4.9 The economic importance of super fast broadband

Broadband and access to the internet has become an increasingly vital component of modern life. A recent study of 33 OECD countries by *Ericsson, Arthur D. Little and Chalmers University of Technology, October 2011*, concluded that 'quadrupling of broadband speeds coupled with a 10% increase in penetration would generate an additional 1.6% GVA over a two year period'.

This clearly suggests that faster broadband speeds are integral to the future optimisation and impact of advanced ICT in all countries. It follows that those countries that are able to deploy the best technologies soonest, will gain a competitive advantage.

#### 2.4.10 Ensuring the benefits of ICT are realised?

This report strongly suggests that adoption and use of ICT continues to have a significant range of positive impacts across the economy for businesses, individuals and for the delivery of Government services.

These impacts are substantial and are of particular importance at this point in time, when priorities are to ensure business growth avoiding a stall in economic recovery, reducing the cost of public services and helping the excluded and disadvantaged to improve their health, aspirations, access to qualifications and work.

What then are the implications of this analysis for future UK policy? Is there a need for future ICT policy at the national and/or local levels, or will things take care of themselves?

The evidence suggests that there is a clear and present need for policy intervention identified by:

- Businesses, particularly small firms, finding it hard to adopt and exploit advanced ICT. Appropriate support will ensure that a higher proportion do - and do so more quickly.
- UK citizens face digital exclusion which is resulting in rapidly increasing disadvantage to them, in turn resulting in lost economic opportunity and increased costs to public services. Moreover there is an accelerating spiral of deprivation for the individuals concerned.

Research of the obstacles and difficulties that firms and citizens face regarding adopting and optimising modern advanced ICT strongly suggests that future UK ICT policy needs to reflect and address four main issues -

- i. ICT business support - helping small businesses adopt and exploit more advanced ICT,
- ii. Improved ICT skills - both professional and user skills, within the workforce and within communities,
- iii. Helping the digitally excluded to access the internet,
- iv. Ensuring all of the UK can access a new generation of superfast broadband.

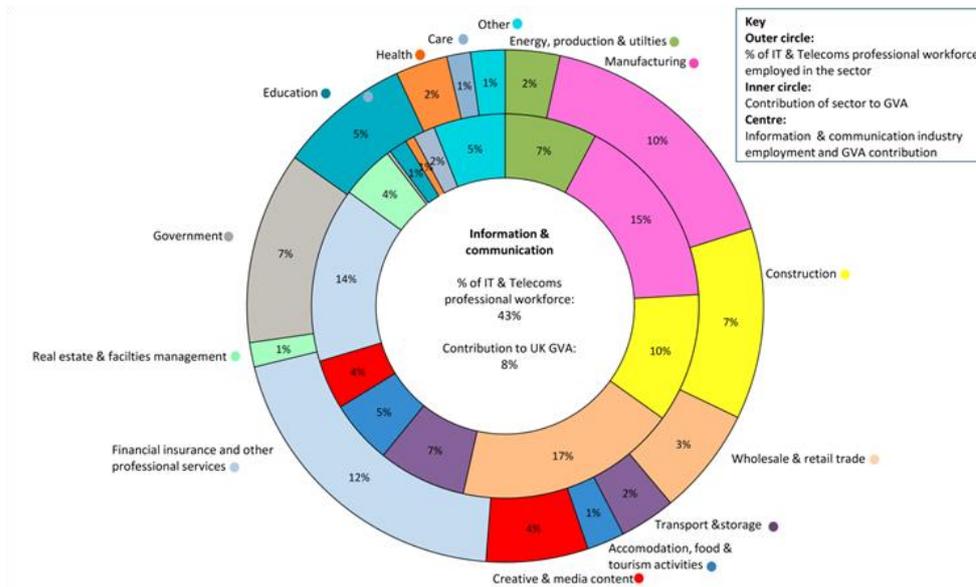
## 2.5 The underpinning nature of IT & Telecoms

### 2.5.1 IT & Telecoms at the heart of many sectors of the economy

Across all industries, it is the combination of highly skilled IT & Telecoms professionals, technology-savvy business leaders and competent IT users that enable an organisation's effective participation in the digital economy.

The following diagram shows the relationship between the proportions of the UK's IT & Telecoms professionals employed across various UK sectors, along with their respective GVA contributions, highlighting the role of IT & Telecoms at the heart of the UK economy.

Figure 3: The importance of IT & Telecoms to every sector



Source: e-skills UK analysis of data from the Office for National Statistics (ONS)<sup>39</sup>

It is clear that technology related skills are a major factor for economic and social success across many UK sectors, in particular, financial services, manufacturing, construction and within government.

In the UK IT is critical not only to the 1.5million people in the IT & Telecoms workforce, i.e. the experts who create, implement and operate the systems, services and communications backbone on which everyone relies; but also the 4.5 million business managers and leaders who need to have a solid grasp of the strategic implications of technology and the skills to realise its potential together with those in the 22 million jobs which require skills in the use of IT.

*'ICT has evolved into the general purpose technology of our time, given the critical spill overs to the other economic sectors and their role as industry wide enabling infrastructure'*

World Economic Forum

<sup>39</sup> Information and communication figures based on 4 digits SIC codes



## 3.0 Technology's strategic importance in policy

This section summarises the skills and employment related policy environment in the UK with reference to national skills strategies and other policy developments and activities that impact the IT & Telecoms sector.

### 3.1 Skills and employment policy context - UK

Current skills and employment policy is driven by the UK Government's focus on tackling the deficit, reducing public expenditure, rebalancing the economy, and creating sustainable, private sector led economic growth.

Skills policy is devolved from UK government to administrations in Scotland, Wales and Northern Ireland. Many challenges are common across the four nations of the UK but there are differences in policy direction and approach embodied in each national skills strategy; particularly in response to local economic conditions and labour market structure.

#### 3.1.1 Economic strategies

The *Plan for Growth*<sup>40</sup> is the UK wide plan for sustainable, long term economic growth. The policy aims to achieve strong, sustainable and balanced growth, more evenly shared spatially and sectorally. The ambitions of the plan are: to create the most competitive tax system in the G20; to make the UK one of the best places in Europe to start, finance and grow a business; to encourage investment and exports as a route to a more balanced economy; and to create a more educated workforce that is the most flexible in Europe.

The government has already supported radical reform of education and skills provision in England and, in creating a more educated workforce, the government is now committed to: supporting more Apprenticeships, increasing participation of 16-24 year olds in employment or learning, narrowing the education attainment gap and lowering burdens from employment regulation. There is also a focus on the need for government to remove the barriers to growth (including by addressing skills issues) in particular sectors of the economy including the Digital & Creative industries and Business and Professional Services (including Computer Services).

The economy is the top priority in the Northern Ireland '*Programme for Government*' which is driving for sustainable growth and prosperity, through a dynamic and innovative economy. The aim in Northern Ireland<sup>41</sup> is to rebuild the local economy, increase employment levels and employability and to focus on export-led economic growth to maximise the opportunities for economic recovery whilst at the same time reducing the historic reliance on the public sector.

Growing the Scottish economy is addressed through the '*Government Economic Strategy*<sup>42</sup> which focuses on improving employment opportunities and making Scotland the most attractive place for doing business in Europe. The revised '*Economic Recovery Plan*<sup>43</sup> takes into account changes in the economic environment since 2007. It focuses on: establishing an environment that is attractive to growth companies that will create and support jobs in Scotland; building up sectors that drive future growth (including in the creative industries, digital content and technologies); and aligning growth towards international growth markets.

Jobs and the economy are the overriding priorities for the Welsh Government and are outlined in '*Economic Renewal: a new direction*<sup>44</sup>. Five

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<sup>40</sup> HM Treasury, 'The Plan for Growth', March 2011

<sup>41</sup> DETI, 'Northern Ireland Executive Economic Strategy: Consultation on priorities for Sustainable growth and prosperity', January 2011

<sup>42</sup> Scottish Government, 'The Government Economic Strategy', November 2007

<sup>43</sup> Scottish Government, 'The Scottish Economic Recovery Plan: Update February 2011', February 2011

<sup>44</sup> Welsh Assembly Government, 'Economic Renewal: a new direction', July 2010

priorities will help provide the best conditions for growth in the private sector: investing in high-quality and sustainable infrastructure; making Wales a more attractive place to do business; broadening and deepening the skills base; encouraging innovation; and targeting business support. The Information and Communication Technologies sector is highlighted as an Economic Renewal Priority Sector where targeted intervention could help improve the global competitiveness of the Welsh economy.

### 3.1.2 Skills and education policy

Each national skills strategy sets out the ambitions for education and learning for the respective nation.

In England the government is reforming the FE and skills system to improve the skills of the workforce, stimulate economic growth and increase engagement in learning through *'Skills for sustainable growth'*. It is building on the Post 16 FE plans set out in *"New Challenges, New Chances"* which concerns funding Adult and Community Learning. In Higher education, *'Students at the Heart of the System'* plans for reform of higher education and student finance are presented to maintain England's world class universities, whilst promoting social mobility as well as economic growth. Other skills and education policy developments of relevance to the sector include the National Curriculum review by the Department for Education; the focus on Apprenticeships including additional places and Higher level Apprenticeships; and, as a result of the *'Plan for Growth'*, the commitment to improving the stock of skills in the "digital and creative industries".

The recently published Northern Ireland Skills Strategy, *'Success through Skills: Transforming Futures'*<sup>45</sup>, reiterates that investment in skills is a critical driver for the local economy and for future growth. The skills strategy aims to raise levels of productivity and social inclusion in Northern Ireland. There are four strategic goals which aim to increase skills at each level and, importantly for the IT & Telecoms sector, aim to address subject imbalance through increasing the proportion of graduate leavers from STEM subjects including Computer Science. The strategy identifies the need to: increase higher level skills; up-skill the existing workforce; reduce sectoral imbalances; increase management and leadership skills; and attract skilled labour.

In Scotland through *'Skills for Scotland: Accelerating the Recovery and Increasing Sustainable Economic Growth'*<sup>46</sup> the focus is on skills to accelerate economic recovery & sustain a growing, successful country. The four priority themes are: empowering people; supporting employers – including supporting ICT skills enabling the exploitation of ICT to increase sustainable economic growth; simplifying the skills system; and strengthening partnerships. Additionally, Scottish government has also set out its proposals on post-16 education in *'Putting Learners at the Centre'*<sup>47</sup> building on the recent reviews of Post-16 education and Higher education and the refreshed Skills Strategy. This proposes wide ranging reform for higher education, further education, skills provision and community learning and development.

In Wales, the government has set out the importance of education and skills for economic growth and prosperity building on *'Skills that Work for Wales'*<sup>48</sup> and the HE strategy *'For our Future'*<sup>49</sup>. In terms of broadening and

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<sup>45</sup> Department for Employment and Learning, *'Success through Skills: Transforming Futures'*, May 2011

<sup>46</sup> Scottish Government, *'Skills for Scotland: Accelerating the Recovery and Increasing Sustainable Economic Growth'*, October 2010

<sup>47</sup> Scottish Government, *'Putting Learners at the Centre – Delivering our Ambitions for Post-16 Education'*, September 2011

<sup>48</sup> Welsh Assembly Government, *'Skills that Work for Wales: A Skills and Employment Strategy and Action Plan'*, July 2008 (currently under review)

<sup>49</sup> Welsh Assembly Government, *'For Our Future - The 21st Century Higher Education Strategy and Plan for Wales'*, November 2009

deepening the skills base the strategy is based around: partnership with employers on workforce skills at all levels; motivating young people, ready for employment; funding for priorities and policy commitments; high quality Apprenticeships offered by more employers; skills that open up rewarding routes; a provider network that delivers choice, innovation and excellence; and Higher education and higher level skills.

### 3.1.3 Other policy developments across the nations

Other recent policy activities of relevance to the sector include:

- Strategies to promote digital inclusion and the exploitation of broadband including:
  - 'Race Online 2012', and recently, 'Go ON UK'<sup>50</sup> a radical new cross sector partnership to bring the benefits of the internet to every individual, organisation and community across the UK,
  - 'Digital Northern Ireland 2020' (DNI2020)<sup>51</sup> which exists to promote and exploit the benefits of a digital platform for the Northern Ireland economy, maximising economic growth, improved quality of life and social uplift life for all citizens,
  - 'Scotland's Digital Future'<sup>52</sup> outlines how Scotland will achieve its digital ambition through public service delivery, the digital economy, digital participation and broadband connectivity,
  - 'Delivering a Digital Wales'<sup>53</sup> contains recommendations on inclusivity, skills (from basic digital literacy to specialist skills for all ages and levels), economy, public services and infrastructure.
- The focus on STEM including technology skills in 'Success through STEM' in Northern Ireland<sup>54</sup> and the 'National Strategic Skills Audit' reports for England and Wales,
- The increased importance of cyber security. Cyber security is recognised as an important enabler for economic growth and government has set out a role for the UK to have the cross-cutting knowledge, skills and capability it needs to underpin the cyber security objectives<sup>55</sup>,
- 'Skills for Jobs: Today and Tomorrow: The National Skills Audit for England 2010'<sup>56</sup> and the corresponding document for Wales<sup>57</sup>,
- The report for England:
  - identifies technology as one of seven key drivers of change that will affect the demand for skills in the future across all sectors,
  - highlights the Computing industry as currently having the combination of the greatest economic significance and greatest skill deficiency,
  - reports that the Computing and Post & Telecoms industries will continue to remain of the highest order of economic significance in the future,

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<sup>50</sup> [www.go-on-uk.org](http://www.go-on-uk.org) (accessed 10.05.12)

<sup>51</sup> <http://www.dni2020.com/about-dni2010> (accessed 31.10.11)

<sup>52</sup> Scottish Government, 'Scotland's Digital Future: A Strategy for Scotland', March 2011

<sup>53</sup> Welsh Assembly Government, 'Delivering a Digital Wales: The Welsh Assembly Government's Outline Framework for Action', December 2010

<sup>54</sup> Department for Employment and Learning, 'Success through STEM', August 2010

<sup>55</sup> <http://www.bis.gov.uk/policies/business-sectors/cyber-security> (accessed 1.11.11)

<sup>56</sup> UKCES, 'Skills for Jobs: Today and Tomorrow – The National Strategic Skills Audit for England 2010', March 2010

<sup>57</sup> UKCES, 'Skills for Jobs: The National Strategic Skills Audit for Wales 2011', June 2011

- shows specific and significant management and professional skills shortages in the computing and software sectors as high priority skills needs for immediate action.
- The report for Wales:
  - provides evidence that IT professionals, particularly in the IT industry itself, are one of the occupational areas with the greatest evidence of demand,
  - shows that high projected rates of productivity and employment growth means the Computing sector will be of the highest economic significance until 2017,
  - indicates priority action is needed to improve management capability in exploitation of technology in order to optimise business benefits. Also highlighted as an area of immediate priority need for IT professionals are higher level security and data protection skills and an increasing need for customer and business-oriented skills and associated technical competencies.

### 3.1.2 e-skills UK strategic response

e-skills UK has developed Strategic Plans for England, Scotland, Wales (2009-2014) and Northern Ireland (2010-2014).

Based on research input from over 4,000 employers, their purpose is to set out a coherent suite of skills strategies that enable the digital economy to derive maximum benefit from the power of technology; transforming competitiveness and productivity through the creation of appropriate technology related skills.

e-skills UK is undertaking work to support three strategic objectives:

- **Inspire future talent** by motivating students to pursue IT-related careers and better prepare all young people for work in a technology-enabled world,
- **Support IT professionals** by developing the IT professional skills pool as the best in the world for deriving business benefit from technology,
- **Increase digital capability** by triggering increased investment in the IT capability of all individuals and businesses in every sector.

Actions detailing how e-skills UK will deliver these objectives are set out in the plans with specific activities tailored to the context and needs of each nation. The strategic plans for each nation and the associated actions will be further informed by the research presented in this suite of '*Technology Insights 2012*' publications.

## 4.0 IT & Telecoms: underpinning UK employment

This section provides a detailed analysis of industry and employment in the UK, focussing in particular on IT & Telecoms. It begins by presenting an overview of general economic statistics for the UK and its constituent nations/regions.

### 4.1 Key economic data

#### 4.1.1 Key workforce and workplace statistics

There are 62 million people living in the UK of which 84% live and/or work in England. The two largest areas of the UK with respect to population and employment are London and the South East of England and these two regions alone account for just over one quarter (27%) of all UK residents and a similar, though slightly higher proportion of UK workers (29%) and workplaces (30%).

Table 3: Workforce and workplace statistics, by nation/region

	Population		Workplaces		Workforce	
	n	%	n	%	n	%
England	51.8m	84%	2,161,000	85%	24,387,000	84%
North East	2.6m	4%	74,000	3%	1,096,000	4%
North West	6.8m	11%	251,000	10%	3,136,000	11%
Yorkshire & Humber	5.2m	8%	184,000	7%	2,394,000	8%
East Midlands	4.4m	7%	172,000	7%	2,013,000	7%
West Midlands	5.4m	9%	207,000	8%	2,394,000	8%
East of England	5.8m	9%	250,000	10%	2,622,000	9%
London	8.0m	13%	394,000	15%	4,269,000	15%
South East	8.4m	14%	390,000	15%	3,956,000	14%
South West	5.2m	8%	238,000	9%	2,508,000	9%
Wales	3.0m	5%	111,000	4%	1,302,000	4%
Scotland	5.2m	8%	192,000	8%	2,478,000	8%
Northern Ireland	1.8m	3%	84,000	3%	779,000	3%
<b>UK</b>	<b>62.0m</b>		<b>2,548,000</b>		<b>29,169,000</b>	

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average) and the ONS Inter Departmental Business Register, 2011

Notes: Figures may not add up due to rounding  
Percentage figures show the proportion of the UK figure

By contrast Wales, Scotland and Northern Ireland combined account for around one seventh of the UK population, workforce and workplaces. The North East of England, Wales and Northern Ireland are seen to be the smallest nations/regions when considered in these terms.

*London and the South East of England are the largest contributors to national GVA, accounting for some 35% of the UK total*

#### 4.1.2 Key economic statistics

Given the relative size of London and the South East of England (in population/employment terms), it is perhaps unsurprising that these regions are also the largest contributors to national GVA, accounting for some 35% of the UK total. In addition, these are the only regions with GVA per head figures that are above the UK average of £20,500 with London in particular, associated with a level that is 70% above this value.

Table 4: GVA and weekly earnings, by nation/region

	Total GVA		GVA per head		Weekly earnings	
	n	%	n	%	n	%
England	£1,081bn	86%	£21,000	85%	£500	100%
North East	£41bn	3%	£15,900	3%	£440	88%
North West	£121bn	10%	£17,600	10%	£470	94%
Yorkshire & Humber	£89bn	7%	£17,100	7%	£460	92%
East Midlands	£80bn	6%	£18,000	7%	£470	94%
West Midlands	£95bn	8%	£17,500	8%	£470	94%
East of England	£112bn	9%	£19,500	10%	£490	98%
London	£265bn	21%	£34,800	15%	£640	128%
South East	£182bn	14%	£21,700	15%	£520	104%
South West	£98bn	8%	£18,800	9%	£460	92%
Wales	£104bn	8%	£20,100	4%	£490	98%
Scotland	£46bn	4%	£15,200	8%	£450	90%
Northern Ireland	£29bn	2%	£16,200	3%	£440	88%
<b>UK</b>	<b>£1,260bn</b>		<b>£20,500</b>		<b>£500</b>	

Source: ONS statistical Bulletin, Regional, sub regional and local GVA 2010

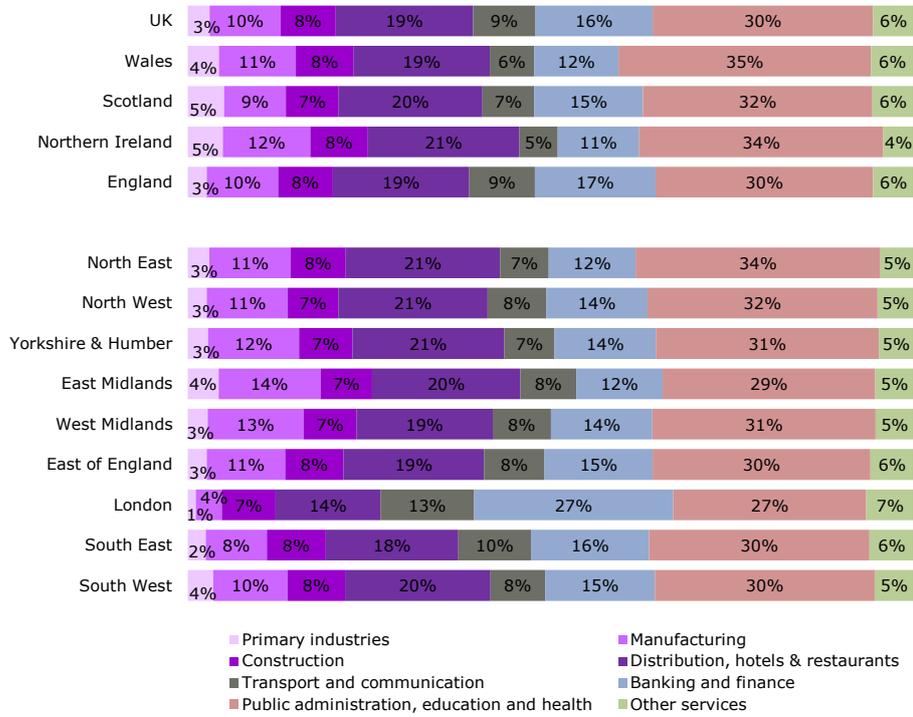
Note: Percentage figures show the proportion of the UK figure

## 4.2 Industries and employment in the UK

Four out of five people working in the UK (80%) are employed within the service sector and just under one third (30%) work in Public Administration, Education & Health. The nations/regions with workforces most reliant upon Public Administration, Education & Health for employment are the North East of England, Northern Ireland and Wales, with more than a third of their respective workforces employed in these sectors.

Comparing sector proportions amongst the UK nations/regions reveals that whilst London has a noticeably lower than average proportion of its workforce employed in the Manufacturing (4%) and Public Administration, Education & Health sectors (27%), it has a higher than average proportion of its workforce employed in the Banking & Finance (27% versus a 16% UK average) and Transport & Communication (13% versus a 9% UK average) sectors. The opposite is true of the North East, Northern Ireland and Wales.

Figure 4: Workforce distribution by industry and nation/region



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

## 4.3 The IT & Telecoms Industry

### 4.3.1 Number of Workplaces

There are nearly 144,000 IT & Telecoms workplaces in the UK representing 6% of the UK total. Of these IT & Telecoms workplaces, the vast majority (87%) are IT focussed and services orientated (90%).

*There are more than 144,000 workplaces in the UK's IT & Telecoms industry*

Table 5: Number of IT & Telecoms workplaces in the UK

<b>IT Services</b>		
Software Publishing	Publishing of computer games	100
	Other software publishing	1,800
Computer Programming		18,900
Computer Consultancy		67,400
Other IT Services	Computer facilities management activities	200
	Other IT & computer service activities	22,600
	Data processing, hosting & related activities	3,200
	Web portals	1,100
	Repair of computer & peripheral equipment	3,700
<b>IT Manufacturing</b>		
Reproduction of recorded media		*
Manufacture of computer & peripheral equipment		800
<b>IT Wholesale/Retail</b>		
Wholesale of computers, computer peripheral equipment & software		2,700
Retail sale of computers, peripheral units & software in specialised stores		2,800
<b>IT Sector Total</b>		<b>125,300</b>
<b>Telecoms Services</b>		
Wired telecommunications activities		900
Wireless telecommunications activities		700
Satellite telecommunication activities		100
Other telecommunication activities		8,500
Repair of communication equipment		200
<b>Telecoms Manufacturing</b>		
Manufacture of communication equipment		1,500
Manufacture of fibre optic cables		100
<b>Telecoms Wholesale/Retail</b>		
Wholesale electronic & telecommunications equipment & parts		3,300
Retail sale of telecommunications equipment in specialised stores		3,600
<b>Telecoms Sector Total</b>		<b>18,900</b>

Source: e-skills UK analysis of data from the ONS Inter Departmental Business Register, 2011

Notes: Figures may not add up due to rounding

\* Data not available at 4 digit level

### 4.3.2 Geographical distribution of IT & Telecoms workplaces

Though approximately 1 in every 17 workplaces (6% of the total) in the UK are IT & Telecoms related, the proportion varies from 1 in every 13 workplaces in London and the South East (8%); to 1 in 33 workplaces in Wales and the North East of England (3%), and 1 in every 50 for Northern Ireland (2%).

Table 6: Geographical distribution of workplaces

	IT & Telecoms			All sectors
	Number of workplaces	Share (of area total)	Share (of UK total)	Share (of UK total)
England	131,600	6%	91%	84%
North East	2,600	3%	2%	3%
North West	11,900	5%	8%	10%
Yorkshire & Humber	7,400	4%	5%	7%
East Midlands	7,600	4%	5%	7%
West Midlands	10,100	5%	7%	8%
East of England	16,000	6%	11%	10%
London	32,900	8%	23%	15%
South East	31,500	8%	22%	15%
South West	11,800	5%	8%	9%
Wales	3,500	3%	2%	4%
Scotland	7,500	4%	5%	8%
Northern Ireland	1,500	2%	1%	3%
<b>UK</b>	<b>144,200</b>	<b>6%</b>	<b>100%</b>	<b>100%</b>

Source: Source: e-skills UK analysis of data from the ONS Inter Departmental Business Register, 2011

Note: Figures may not add up due to rounding

The proportion of IT & Telecoms workplaces sited in London/the South East is notably higher than for workplaces as a whole (i.e. 45% compared with 30%) and in total by region, 8% of all workplaces in each of these two regions are IT & Telecoms focussed, compared with a figure of 6% for the UK as a whole.

By contrast, IT & Telecoms workplaces are least concentrated in Northern Ireland (just 2% of workplaces or businesses), Wales (3%) and the North east of England (also 3%).

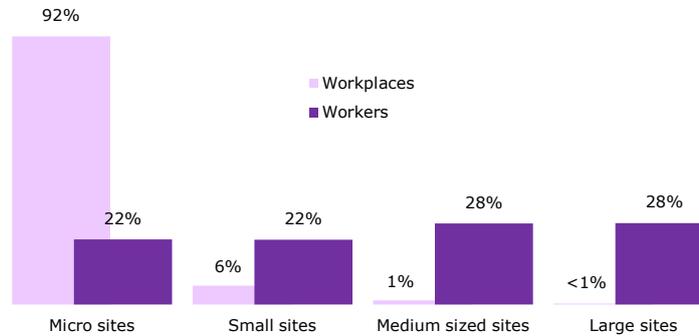
### 4.3.3 Size of workplace

More than nine out of every ten (92%) IT & Telecoms workplaces are micro sites (i.e. employing less than 10 people) – a notably higher proportion than that for the economy as a whole (where 83% of workplaces are this size). Although, large in number however, workplaces of this size account for just 22% of all IT & Telecoms industry workers compared with 28% for large employers (i.e. those with 250 or more employees which account for less than 1% of all IT & Telecoms workplaces).

*45% of IT & Telecoms workplaces are in London and the South East*

*Workplaces with 200 or more employees make up less than 1% of IT & Telecoms workplaces but account for over a third of industry workers*

Figure 5: Share of workplaces/workforce, by size of workplace



Source: e-skills UK analysis of data from the ONS Inter Departmental Business Register, 2011 and ONS Labour Force Survey, 2011, (four quarter average)

Note: Firm sizes: micro = under 10 employees, small = 11-49 employees, medium = 50-249 employees, large = 250+ employees

#### 4.4 The IT & Telecoms workforce

*One in twenty (1.5million) people work in the UK IT & Telecoms workforce*

One in twenty people (1.5 million) working in the UK are employed in either the IT & Telecoms industry sector itself (913,000) or as an IT & Telecoms professional<sup>58</sup> within other industry sectors (633,000). More specifically:

- There are 913,000 people working in the IT & Telecoms industry, of which just over one half (53%) are employed as IT & Telecoms professionals (483,000) and the remainder other roles (management, legal, HR etc),
- There are 1,116,000 IT & Telecoms professionals, of which 43% (483,000) are in the IT & Telecoms industry and 57% other industries (663,000).

Table 7: Size of workforce

		IT & Telecoms professionals	Other occupations	All occupations
<b>IT industry</b>	n	401,000	240,000	641,000
	%	63%	37%	100%
<b>Telecoms industry</b>	n	82,000	190,000	272,000
	%	30%	70%	100%
<b>IT &amp; Telecoms industry</b>	n	483,000	430,000	913,000
	%	53%	47%	100%
<b>Other industries</b>	n	633,000		
<b>Total</b>		<b>1,116,000</b>		

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

<sup>58</sup> See Annex A for the classification of IT & Telecoms professions/occupations

#### 4.4.1 IT & Telecoms workforce - distribution by geography

Geographic variation exists in the distribution of the UK's IT & Telecoms workplaces when compared to workplaces across all sectors. Data for the IT & Telecoms industry and IT & Telecoms professionals show a similar variation, as shown in the table below.

*A high proportion of IT & Telecoms professionals (41%) work in London or the South East of England*

Table 8: Geographical distribution of the IT & Telecoms workforce

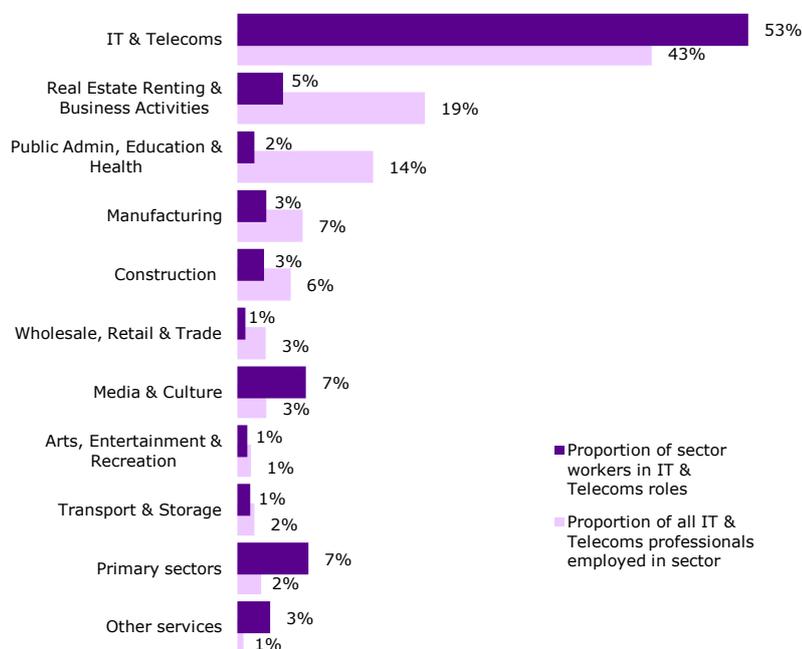
	Proportion (%) of UK total					
	IT & Telecoms industry workers	Workers in other industries	Delta	IT & Telecoms professionals	All other workers	Delta
England	90%	85%	5%	88%	85%	3%
North East	3%	3%	0%	3%	3%	0%
North West	9%	10%	-1%	8%	10%	-1%
Yorkshire & Humber	5%	7%	-2%	6%	7%	-1%
East Midlands	5%	7%	-2%	4%	7%	-2%
West Midlands	7%	8%	-1%	8%	8%	0%
East of England	9%	10%	-1%	9%	10%	-1%
London	19%	15%	4%	22%	15%	7%
South East	23%	15%	8%	19%	15%	3%
South West	8%	9%	-1%	8%	9%	-1%
Wales	2%	4%	-2%	3%	4%	-1%
Scotland	6%	8%	-1%	6%	8%	-1%
Northern Ireland	2%	3%	-2%	2%	3%	-1%
<b>UK</b>	<b>100%</b>	<b>100%</b>		<b>100%</b>	<b>100%</b>	

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

#### 4.4.2 IT & Telecoms occupations – distribution by industry

Aside from the IT & Telecoms industry itself, the next largest employer of IT & Telecoms professionals is the Real Estate Renting & Business Activities sector where one fifth of IT & Telecoms professionals are employed. A large proportion can also be found working in the public sector (i.e. 14% are employed in Public Administration, Education & Health) – around the same proportion that are employed within the primary/manufacturing sectors as a whole.

Figure 6: Percentage of IT & Telecoms professionals employed by broad industrial group



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

#### 4.4.3 IT & Telecoms occupations – segmentation and growth dynamics

*Software Professionals account for the largest proportion (33%) of the IT & Telecoms professional workforce*

Considering in more detail the nature of occupation in which IT & Telecoms professionals are employed, it can be seen that around four out of ten (38%) will typically hold a Managerial/Strategic role in the organisation, one in three (33%) are employed as Software Professionals and a similar proportion (31%) work as IT Technicians, Assistants or Engineers.

Table 9: Number of IT & Telecoms professionals, by occupation

SOC Code	Description	Number working in role	Proportion of total
1136	ICT Managers	285,000	26%
2131	IT Strategy & Planning Professionals	137,000	12%
2132	Software Professionals	370,000	33%
3131	IT Operations Technicians	121,000	11%
3132	IT User Support Technicians	65,000	6%
4136	Database Assistants & Clerks	36,000	3%
5242	Telecoms Engineers	55,000	5%
5243	Line Repairers & Cable Jointers	*	*
5245	Computer Engineers	41,000	4%
<b>Total</b>		<b>1,116,000</b>	<b>100%</b>

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

Note: \* = figures suppressed in accordance with ONS guidelines

Analysis of trends in IT & Telecoms professional employment over the last ten years shows how a shift to higher level employment has taken place i.e. the largest rate of growth over this period has been in ICT Managers which

has grown by 28%. By comparison, there have been substantial decreases in employment in Database, Telecoms and Engineering roles.

Table 10: Change in IT & Telecoms professional numbers, 2001-2011

SOC code	Description	2001	2011	Change (%)
1136	ICT Managers	223,000	285,000	28%
2131	IT Strategy & Planning Professionals	128,000	137,000	7%
2132	Software Professionals	314,000	370,000	18%
3131	IT Operations Technicians	128,000	121,000	-6%
3132	IT User Support Technicians	73,000	65,000	-11%
4136	Database Assistants & Clerks	102,000	36,000	-65%
5242	Telecoms Engineers	65,000	55,000	-16%
5243	Line Repairers & Cable Jointers	15,000	5,000	-64%
5245	Computer Engineers	47,000	41,000	-12%
<b>Total</b>		<b>1,096,000</b>	<b>1,116,000</b>	<b>2%</b>

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2001 & 2011 (four quarter averages)

## 4.5 IT & Telecoms occupations – demographics

### 4.5.1 Gender

Gender imbalance remains a significant and worsening issue for the IT & Telecoms workforce and the percentage of women employed as IT & Telecoms professionals has declined from 22% in 2001 to just 18% in 2011. By comparison just under half (48%) of people working in the UK across all other occupations are female.

As female representation within the IT & Telecoms professions has declined, so too has their presence within the IT & Telecoms industry and whilst 27% of those working within IT & Telecoms firms in 2001 were female, this figure had fallen to 22% by 2011.

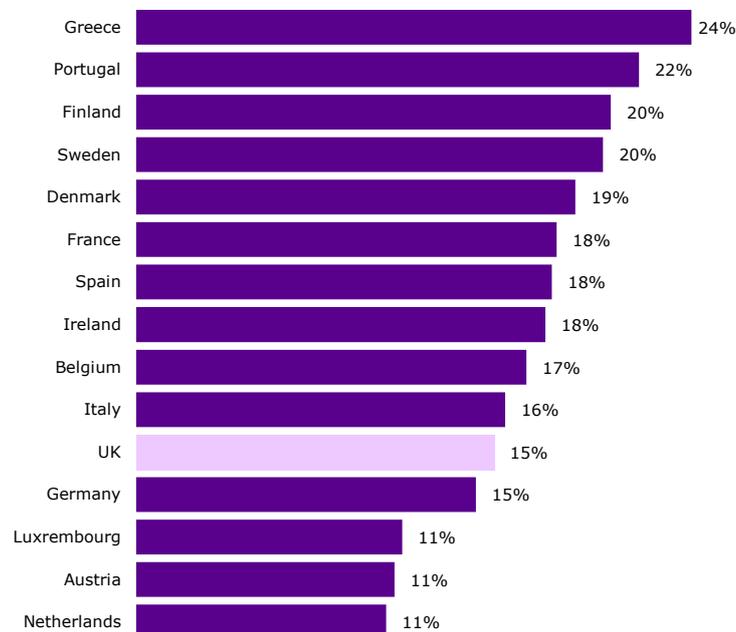
A low level of female representation within IT & Telecoms is not an issue that is unique to the UK, and amongst the Euro 15<sup>59</sup> for example, just 17% of people working in IT & Telecoms roles during 2011 were found to be female. This is still a full two percentage points higher than the comparative figure for the UK<sup>60</sup> however, and as shown in the chart overleaf, representation within the UK is actually worse than all other EU 15 nations bar: Germany, Luxembourg, Austria and the Netherlands.

*Just 18% of IT & Telecoms professionals are female*

<sup>59</sup> The first 15 members of the EU

<sup>60</sup> Definition of IT & Telecoms roles used for EU comparisons varies slightly from that employed for the UK specific analysis presented elsewhere in this report

Figure 7: Representation of women in IT occupations amongst selected EU nations



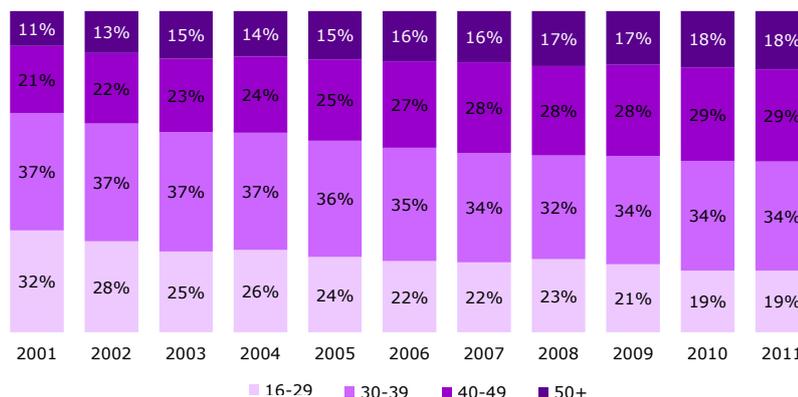
Source: e-skills UK analysis of data from Eurostat/the ONS Labour Force Survey, 2011 (four quarter average)

#### 4.5.2 Age

The average age of IT & Telecoms professionals working in the UK is estimated to be 39 years old, compared with 41 years old for workers more generally. Just under one half (47%) of IT & Telecoms professionals are aged 40 or above and less than one in five (19%) are in the 16-29 age bracket.

Figure 8: Age profile of IT & Telecoms professionals 2001-2011

*The proportion of IT & Telecoms staff aged 16-29 years old has fallen by 13 percentage points over the past eleven years*



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

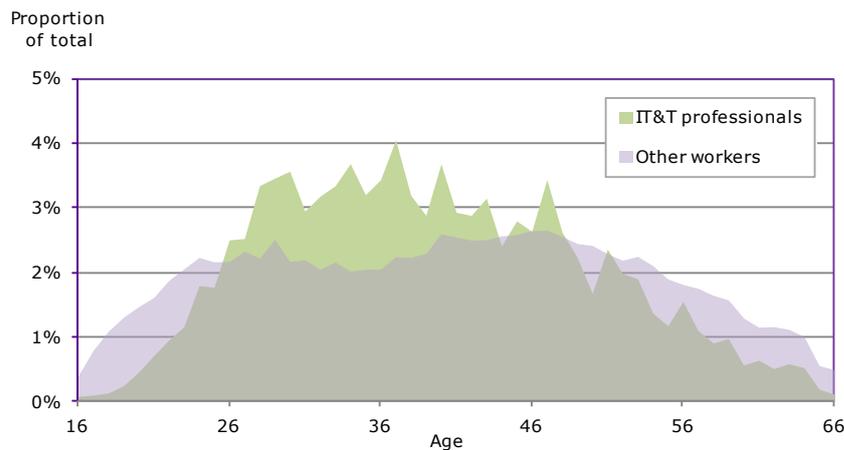
Though on average, there is little difference between the age of IT & Telecoms professionals working in the UK and that of other workers, as illustrated within the chart above, the average age of IT & Telecoms professionals has increased over the past ten years. Whilst the proportion aged 16-29 has dropped from 32% in 2001 to 19% in 2011, the proportion aged 40+ has increased by fifteen percentage points (from 32% in 2001 to 47% in 2011) over the same period.

### 4.5.3 'Young people'<sup>61</sup> in IT & Telecoms occupations

Looking at the age composition of the IT & Telecoms professional workforce in more detail reveals further evidence that its proportion of 'young people' is low and declining. More specifically, as illustrated within the chart below, the proportion of 'young people' working as IT & Telecoms professionals is estimated to be less than half of that for workers in other occupations (i.e. 6% and 13% respectively).

*Proportionately, the number of IT & Telecoms professionals aged 24 or under is less than half that for other occupations*

Figure 9: Age distribution of IT & T professionals versus other UK workers



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

The relative absence of individuals in IT & Telecoms roles aged 24 and below hasn't always been such an issue however, and in 2001 'young people' accounted for just over one in ten of those working in IT & Telecoms positions (12%) – a similar proportion to that for other workers (15%). Since that time however there has been a steady decline in the number of young IT & Telecoms professionals, even as the overall number of people working in IT & Telecoms roles has continued to rise, and during 2011 in total there were just 62,000 people of this age employed in IT & Telecoms roles across the UK.

One reason often put forward for the low proportion of 'young people' in IT & Telecoms roles is the gradual decline in associated entry level positions, often thought to be a consequence of organisations off-shoring IT & Telecoms activities to other, low cost nations (e.g. the BRIC nations of Brazil, Russia, India and China). In particular companies have (historically at least) concentrated on off-shoring support, database and other low value added IT activities – typically the areas in which new entrants have started their IT & Telecoms careers.

This hypothesis is supported to some degree by an analysis of employment trends over the past decade which shows how growth in more senior IT & Telecoms positions (i.e. Managerial/Professional) has coincided with a decline in lower level posts (i.e. Technicians/Engineers) – these being the most likely points of entry for young people seeking to commence a career in IT & Telecoms.

<sup>61</sup> In this case used to describe those aged 24 or less and based on SOC 2010

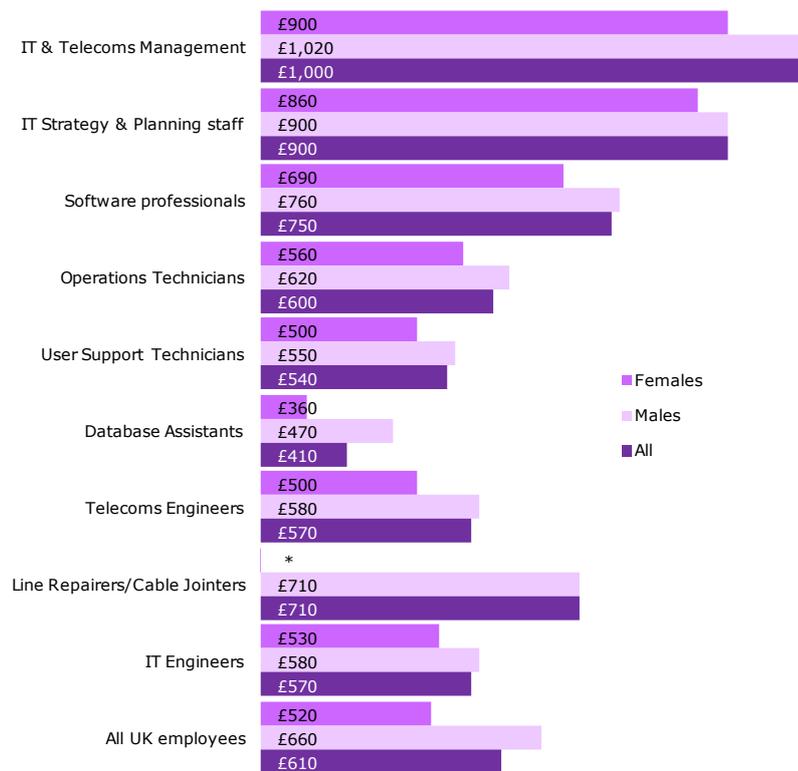
*IT & Telecoms professionals earn more than a quarter (27%) more than the UK average*

#### 4.5.4 Earnings

At £790 per week, the average gross weekly earnings of IT & Telecoms professionals (in full time employment) during 2011 was 27% higher than the figure for (full-time) UK workers as a whole.

Those working in IT & Telecoms management were the highest paid IT & Telecoms staff, with gross weekly earnings more than double the amount received by the lowest earners i.e. Database Assistants (with comparison figures of £1,000 and £410 per week respectively for full-time employees) .

Figure 10: Average weekly earnings of full time employees, by gender and occupation



Source: e-skills UK analysis of data from the ONS Annual Survey of Hours and Earnings, 2010

Note: \*Figures suppressed

As illustrated in the chart above, there is a significant disparity between the earnings of male and female IT staff with males receiving on average around 13% more than their female equivalents in any specific IT or Telecoms role.

## 5.0 The changing environment

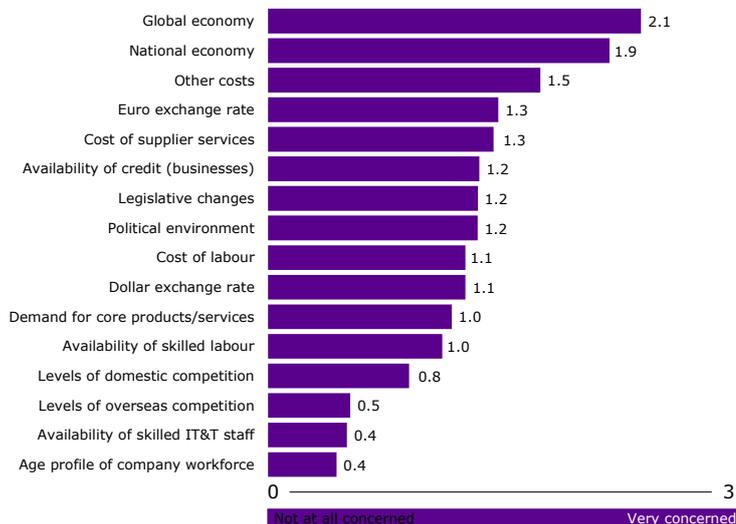
This section combines findings from the 'National Skills Academy for IT - Employer survey, 2011' together with a summary of key trends and skills implications from 'Technology Insights 2011: Trends and UK Skills Implications, e-skills UK/Experian'.

### 5.1 Understanding the concerns for UK businesses

When asked about their level of concern over various business influencers, employers surveyed in 2011 by the National Skills Academy for IT clearly highlighted the state of the global and national economies as being the most pressing issue for them. At the same time, labour related issues tended to be of comparatively little concern, primarily due to employers anticipating large numbers of redundancies and a general decline in demand for labour giving rise to an abundance of potential candidates and reduced competition in the marketplace.

*The main areas of concern for UK businesses are the state of the global and national economies*

Figure 11: Employer rating of current concerns facing UK firms<sup>62</sup>



Source: National Skills Academy for IT - Employer survey, 2011

The availability of skilled IT & Telecoms staff did however appear to be more of a concern to firms within the IT & Telecoms sector - double the figure for UK businesses as a whole (i.e. with 'concern ratings' of 0.8 and 0.4 respectively).

Further analysis of responses from the IT & Telecoms sector also reveal a much higher degree of concern over the level of overseas competition and demand for core products/services which attracted associated ratings of 0.9 and 1.6 respectively (compared with 0.5 and 1.0 for all businesses). Demand for core products/services was also much more of a concern for large firms (i.e. as opposed to SMEs) from which an associated rating of 1.5 was obtained.

Overall, it should be noted though that in many cases the associated level of concern held by employers has diminished somewhat over the past year, with just the state of the global economy seeming to be more of a concern to employers in 2011 than it was during 2010 (the reverse being true for: availability of credit (business), legislative changes, political environment,

*IT & Telecoms firms are twice as concerned about the availability of skilled IT & Telecom staff as other businesses*

<sup>62</sup> The rating presented is derived from the responses of just under 600 employers each of which was asked if they were Very concerned, Fairly concerned, Not very concerned or Not at all concerned about each of the issues shown. For presentation purposes an average rating was then produced by allocating the following point values to the responses collected: Very concerned = 3, Fairly concerned = 2, Not very concerned = 1 and Not at all concerned = 0

cost of labour, levels of demand and the availability of skilled labour/IT & Telecoms staff).

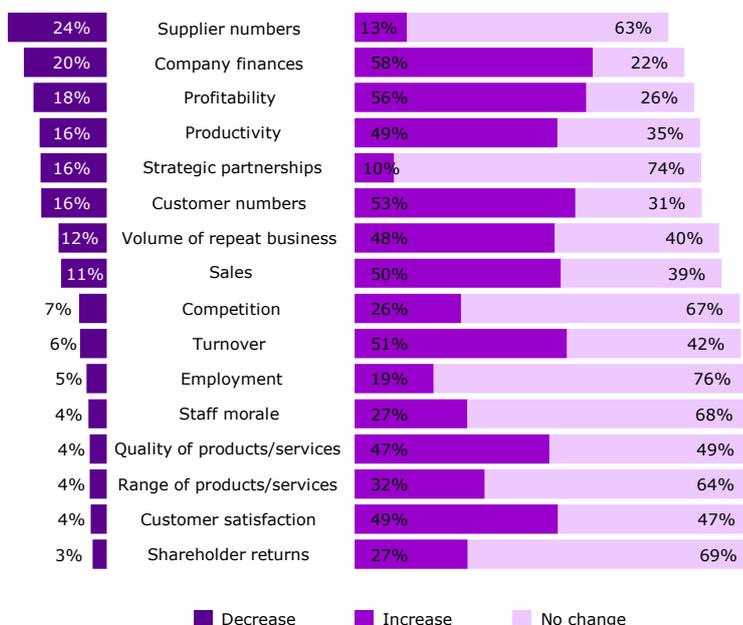
## 5.2 Likely changes for UK firms over the coming 12 months

### 5.2.1 Business outlook

*Employers generally upbeat about future prospects*

Despite continuing concerns over the state of the global/national economies, when asked to predict likely changes occurring for a range of business metrics over the coming year, companies appear, in general, to be fairly upbeat with the majority predicting either an improvement or no change for a variety of indicators. In fact the *net* percentage of firms anticipating an improvement in the measures discussed (i.e. subtracting the percentage of employers anticipating a decrease in a particular measure from that anticipating an increase) was positive in all instances bar supplier numbers and strategic partnerships (and here it is arguable whether a negative result would actually be detrimental to business operations).

Figure 12: Business outlook for the next 12 months



Source: National Skills Academy for IT - Employer survey, 2011

Over half of all companies surveyed were predicting an improvement in company finances, profitability, customer numbers, turnover and sales though the largest net improvements in business outlook related to customer satisfaction and turnover where, on balance, 45% more businesses anticipated an increase/improvement over the coming year than expected a decrease/deterioration (i.e. excluding no change assessments).

When asked about employment levels, though positive on balance, the net percentage of firms anticipating an increase in employment levels was comparatively small at just 14% (an increase predicted by 19% of businesses and a decrease predicted by 4%) though as with other indicators the vast majority of firms did at least anticipate no change to occur.

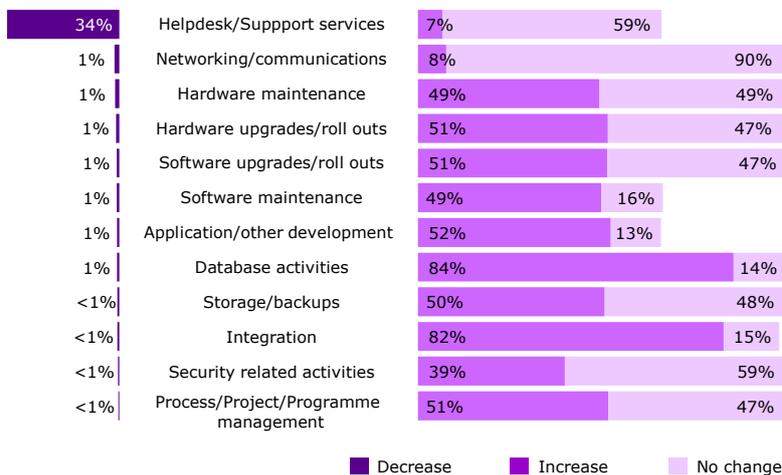
The net figures varied substantially according to firm size and sector with large firms and those operating within the IT & Telecoms sector generally most likely to anticipate a net improvement in business outlook over the coming year.

### 5.3 IT & Telecoms activity

It appears that the focus of IT & Telecoms activities carried out internally by UK firms is likely to change significantly for many businesses over the coming year with one of the most noticeable trends being a likely reduction in the amount of internal resources dedicated towards Helpdesk/Support Services. Data from the National Skills Academy for IT shows that whilst only 7% of firms thought activity in this area would increase between 2011 and 2012, just over a third (34%) stated that they expected a reduction in the amount of internal activity of this nature giving a net decrease/balance of -27%.

By contrast database activities and integration in particular were highlighted by the vast majority of businesses as areas in which more work will be undertaken by their own staff (i.e. with a net balance of over 80% considering this to be the case in each instance).

Figure 13: Business view on the focus of internal IT & Telecoms activity over the next 12 months



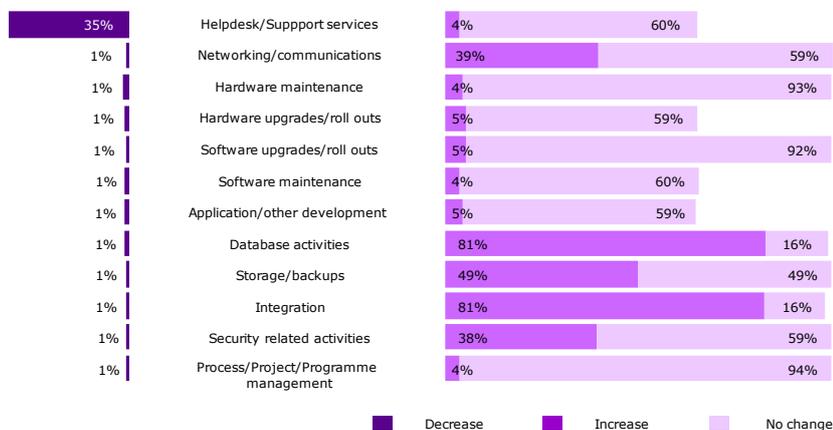
*Internal resources dedicated to Helpdesk/Support Services are likely to diminish over the coming year whilst Integration and Database activities in particular is likely to increase as many firms increase IT & Telecoms activities in these areas*

Source: National Skills Academy for IT - Employer survey, 2011

Interestingly, the reduction in Helpdesk/Support activities delivered internally is anticipated to coincide with a similar reduction in externally provided services of this nature (i.e. with only 4% of firms anticipating an increase in externally delivered Helpdesk/Support activities and 35% anticipating a decrease, on balance a net decline is forecast by 31% of businesses). As such it truly would appear that this is an aspect of IT that is likely to diminish over the coming year.

Conversely, large net increases were recorded with respect to the proportions of firms anticipating change in the amount of external work in the areas of Security related activity, Storage/backups, integration and databases suggest these to be generally growing business areas within the IT & Telecoms sector.

Figure 14: Business view on the focus of external IT & Telecoms activity over the next 12 months



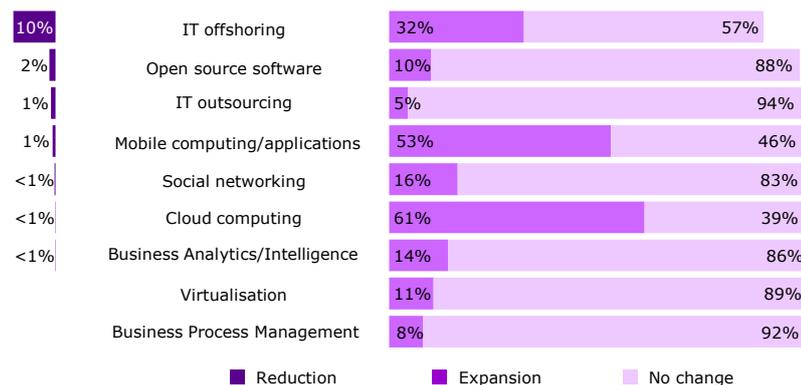
Source: National Skills Academy for IT - Employer survey, 2011

### 5.3.1 Changes in the use of technologies

*A large proportion of firms anticipate an increase in their use of cloud computing and mobile computing/applications*

Looking at the future use of more specific technologies/IT related business processes, it can be seen once again (for existing users at least) that UK businesses are primarily anticipating either an increase or at least no change in their utilisation over the coming year. In particular, whilst cloud computing and mobile computing/applications are still used by a relatively small proportion of businesses as a whole (10% and 16% respectively) more than half of users in both cases anticipate an increase in their utilisation over the coming year (with associated net increases of 61% and 52% respectively).

Figure 15: Approach to specific technologies/processes over the coming year (existing users)

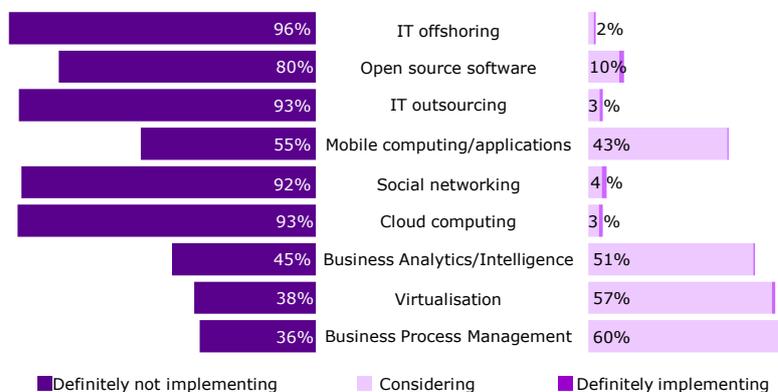


Source: National Skills Academy for IT - Employer survey, 2011

By contrast, only a relatively small percentage of firms anticipate growth in their usage of many of the more commonly used technologies/IT related business processes such as social networking, outsourcing and open source software.

Amongst those businesses not currently using these technologies/processes, the predictions for future implementation varied considerably and whilst a large proportion predict an implementation of business process management, virtualisation, business analytics and mobile computing/applications, the reverse was noted for IT offshoring, IT outsourcing, social networking and cloud computing in particular.

Figure 16: Approach to specific technologies/processes over the coming year (non-users)



Many firms not already utilising mobile computing/applications are likely to do so over the coming year

Source: National Skills Academy for IT - Employer survey, 2011

### 5.3.2 Changes to spending patterns

Translating these forecasts into likely spending activity for the coming year, it would seem that again, whilst the majority of firms are often anticipating a 'no change scenario', it is likely that notable increases will still occur in many areas, notably IT & Telecoms staffing, hardware/software spending and general outsourcing activities where on balance the number of firms anticipating an increase in spending outweighs those forecasting a decrease by over 10%.

Table 11: Anticipated changes in IT & Telecoms spending over the coming year

	Up	Down	Same	Balance
IT & Telecoms staffing	13%	0%	87%	13%
IT & Telecoms staff training	6%	1%	93%	5%
IT User skills training	4%	3%	94%	1%
IT & Telecoms hardware spend	28%	15%	56%	13%
IT & Telecoms software spend	29%	12%	59%	17%
IT & Telecoms services spend	12%	3%	85%	9%
Spend on outsourcing:				
General IT & Telecoms activities	15%	3%	82%	12%
Applications/development	3%	10%	87%	-7%
Help desk/support services	8%	7%	85%	1%
Database management/maintenance	6%	1%	93%	4%
Storage	5%	2%	94%	3%
Security	2%	0%	98%	2%
Process, project or programme management	5%	7%	88%	-2%

Just under one third of firms anticipate increasing spend on IT & Telecoms hardware/software over the coming year

Source: National Skills Academy for IT - Employer survey, 2011

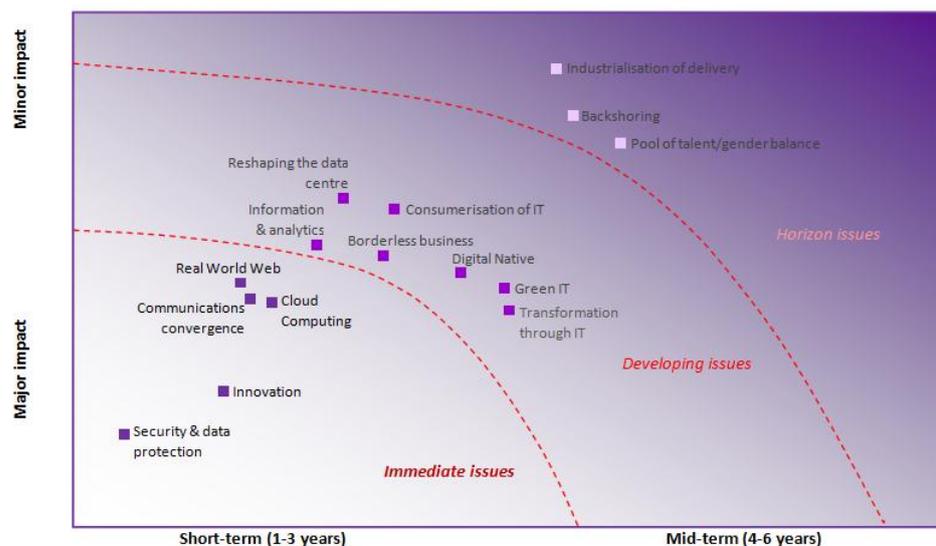
*The most immediate key issue for employers is security and data protection*

## 5.4 Emerging trends and associated skills needs

Figure 17 illustrates the relative impact of each key trend on business according to employers who were asked how significant the impact of each trend would be on their business, and if there was an impact, what the broad timescale would be. Based on these results the trends are categorised into one of three groups:

- **Immediate issues:** Those that many (typically more than half) employers say will have a major impact on business, and typically in the next one to three years. The immediate key issues for employers appear to be security and data protection, but innovation is also considered important, followed by cloud computing, convergence of communications & IT and the real world web,
- **Developing issues:** Those that will have a major impact on only a selection of businesses, or alternatively may have a more widespread impact, but in the medium term. 'Developing' does not necessarily mean new – some of these issues have been around for some time, for example green IT and the transformation of businesses using IT, but it can take time for the impact to be felt. Other issues are new, for example the possibility of reshaping the data centre has emerged in the last five years, but only those businesses with intensive computing needs will be directly affected,
- **Horizon issues:** Wider, ongoing issues, impacting at different times, on different businesses, but not affecting a majority of businesses all at once. For example, quite a few large businesses are thinking about back-shoring, but it is not regarded as an immediate issue and smaller employers do not appear to be very concerned by it. In contrast, industrialisation of IT delivery will only really impact on small employers in any great number, while the pool of talent and gender balance appears more of an issue for IT & Telecoms businesses than other employers of IT & Telecoms professionals.

Figure 17: Trends shaping IT & Telecoms skills changes



Source: Technology Insights 2011: Trends and UK Skills Implications, e-skills UK/Experian

## 5.5 Immediate issues

### 5.5.1 Security and Data Protection

Increasing use of electronic channels and information-intensive products creates greater convenience and more efficient channels, but also a new market for theft and illegal activities. The increasing use of personal devices in IT opens up new channels into networks and repositories of data. IT & Telecoms professionals will need skills to *develop integrated security solutions*, and to *manage risk*. IT & Telecoms professionals need to keep up to date through research into new security schemes and policies, and understand the vulnerabilities of the underlying architecture and infrastructure.

### 5.5.2 Innovation

Innovation is the process that renews or makes an improvement on something that already exists. With technologies, products and services, for the renewal to take place it is necessary for people to change the way they make decisions - they must choose to do things differently, make choices outside of their norm. Innovation is also about how the design process is managed, about changing cultural attitudes that enables further innovations. Alongside *creativity skills*, innovation needs to be driven through using *re-appraisal*, *project management* and *testing skills* to ensure ideas become reality.

### 5.5.3 Cloud Computing

Cloud computing is a model for delivering internet-based information and technology services in real time. It frequently takes the form of web-based tools or applications that users can access and use through a web browser as if it was a programme installed locally on their own computer. Users no longer have need for expertise in, or control over, the technology infrastructure that supports them. Cloud computing promises to speed application deployment, increase innovation and lower costs - all while increasing business agility. *Project and integrated solutions management skills* are required to realise these potential advantages, as are further *architecture and infrastructure, networking and quality assurance testing skills*.

*Cloud computing promises to speed application deployment, increase innovation, lower costs, all while increasing business agility*

### 5.5.4 Communication & IT Convergence and Integration

The course of telecommunications, computing and networking is converging and moving from hardware intensive to software intensive platforms. Patterns of work and collaboration are changing as communications, devices and applications are integrating more into day to day work, for example mobile devices that integrate phones with internal systems. Security maintenance skills will be the main priority for employers, following by technical expertise in the new technologies.

### 5.5.5 Real World Web

Real World Web borrows many elements of Web 2.0, but it is focused more on generating real time content and reacting to the surrounding world, for example tracking real world traffic/experiences of users. Mobile devices are beginning to augment interactions with real world items. *Technological communications infrastructure skills* will be particularly necessary, and so too will *collaborative commerce skills* to develop and market applications in line with 'real world' developments.

## 5.6 Developing issues

### 5.6.1 Green IT: Environmental Computing

Green IT refers to sustainable IT: the invention, analysis, design, implementation, use and disposal of services, systems and infrastructure while minimising their environmental impact. The IT & Telecoms industry has the potential to enhance its own environmental performance as well as that of clients/users. An increase in global awareness of the environmental challenge means that businesses need to remain competitive in their offer by ensuring that employees have the relevant skills. IT & Telecoms professionals will need to *fully understand user consumption, environmental impact assessment and management, technology utilisation and re-cycling and technical design skills related to power management.*

### 5.6.2 Transformation through IT

The transformational power of IT comes from bringing together business people and technologists to address business issues. The role of technology is expanding all the time, moving from a model of technology deployment to technology enablement. Increasingly in an e-commerce environment the centrality of IT & Telecoms professionals in achieving business objectives will only grow, enabling transformation of key functions such as customer relationships, sales and procurement through the exploitation of new technologies. IT & Telecoms professionals now need to be not only 'versatilists' with depth abilities to identify *business issues* and *strategic challenges*, but also mediators with the *interpersonal skills* to deal with people across business to enable change.

### 5.6.3 Information and Analytics

Analytics is the use of business intelligence to gain insight and enable the planning and implementation of appropriate responses. For businesses to benefit from the competitive advantage their intelligence holds, they clearly need the basic ability to generate, gather and analyse data, and hence staff will need advanced skills in *modelling, simulation and analytics*. But this is only one stage – businesses also need the maturity to integrate their various analytical operations and draw out lessons that can shape overall business strategy.

### 5.6.4 Reshaping the Data Centre

Traditional approaches focussed upon new-build data centres with a large footprint, full power back up and latent overcapacity are being challenged by modular/mobile data centres and cloud based solutions. This offers businesses benefits of scalability, rapid response, lower fixed costs and a smaller carbon footprint. To realise these benefits, IT & Telecoms professionals will need enhanced *hardware utilisation, security maintenance and power and thermal management skills. Project management skills* will also be required to facilitate rapid and effective response to client needs, as will greater understanding of *technical and network architectures*.

### 5.6.5 Borderless Business

The borders of business networks are expanding over geographical divides, across devices and across an increasing range of applications. Borderless services and applications should deliver to anyone, anywhere, on any device and at any time. *Cyber security skills* are clearly paramount. But there are also specialised technical skills needs in the areas of *voice, data, and video technologies* together with a higher understanding of the *architectures and infrastructures* that underpin these systems.

*Organisations need advanced skills in analytics to benefit from the competitive advantage their intelligence holds*

### 5.6.6 Digital Natives

'Digital natives' - those born after 1985 and who have grown up in an IT-intensive environment - are not only IT & Telecoms customers, but also the source of tomorrow's workers. To cope with this influx of new generation workers, senior and managerial staff (i.e. 'digital immigrants' who have come across computing later in life) will need to *manage diverse workforces* with different capabilities as well as handle greater scales of *technological complexity* and *process design*.

### 5.6.7 Consumerisation of IT

Many employees now personally consume more advanced technology than they use at work, and they now expect to use the same technologies in a work environment. An obvious cost-saving solution is to integrate personal devices into business, which will create a requirement for *integration and customisation skills* to do this and the *architecture and infrastructure skills* to understand interoperability. More generally greater expectations also require better *commercial design* and *product development skills*.

## 5.7 Horizon issues

### 5.7.1 The Pool of Talent and Gender Balance

Enrolments in technology-intensive courses continue to decline and women, in particular, remain unconvinced about a career in IT. However, employment in IT and Telecoms is forecast to grow rapidly over the next decade and the ability to attract high quality recruits will be a key issue for employers. The sector needs not only a vibrant, well-skilled recruitment pool but also more innovative and skilful approaches to *recruitment, workforce development* and *HR management* in order to secure the *technical, business, design* and *innovation* skills needed for the future.

### 5.7.2 Back-shoring

When offshoring fails some companies choose to bring services back onshore. This is not new technology, and nor is it the norm, but where it does happen employers need to recruit the right people to facilitate such change. In a back shoring situation, IT & Telecoms professionals will need to be able to handle the disruption caused, to deal with internal/external clients, manage teams and ensure that the company's security is protected at all times.

### 5.7.3 Industrialisation of technology delivery

Increasingly the IT industry is driven by automation, process and service standardisation. With products sourced from multiple suppliers, there needs to be common standards and frameworks that are adhered to as delivery of technology operates on a larger and larger scale. This requires specific skills in *solution design* and the ability to *design and re-engineer business processes*. However, it is also about these experts having the skills to *manage customer accounts and relationships*.

## 5.8 Future skills issues

Many of the future trends that affect IT & Telecoms utilise similar technologies and or require similar skills and knowledge. There are five cross cutting themes in the demand for skills that emerge across the future trends survey and the relationship between skills and trends is shown in figure 18 below.

Figure 18: Future IT trends and the cross cutting skills issues

	Security skills	Business skills	Technology specific skills	Interpersonal skills	Analytical/research skills
Security and data protection	●		●		●
Innovation		●		●	●
Cloud computing	●	●	●	●	
Transformation through IT		●	●	●	
Real world web		●	●	●	
Convergence of IT & communications	●	●	●		
Borderless Business	●		●		
Digital Native		●	●	●	●
Reshaping the Data Centre	●	●	●	●	
Green IT			●		●
Information and analytics			●		●
Consumerisation of IT		●	●	●	
Back-shoring	●	●		●	
Pool of talent/gender balance		●	●	●	
Industrialisation of IT delivery		●	●	●	

● Priority skills requirement (>67% of respondents say will be required)

● General skills requirement (<67% of respondents say will be required)

Source: IT & Telecoms Insights 2011: Trends and UK Skills Implications

### 5.8.1 Security skills

As a future trend, security and data protection will have one of the clearest and most immediate impacts for the skills of IT & Telecoms professionals. But security is also a cross cutting skills theme as figure 18 shows: employers frequently associate security related skills issues with a number of the key trends analysed and the ability of IT & Telecoms professionals to deal with these security issues, some of which are described below, will be one of their key priority skills areas.

*Employers frequently associate security related skills issues with many current and future trends*

Data protection is an important consideration for many IT & Telecoms professionals. Businesses looking to utilise cloud computing services need to think about the ramifications of storing data off-site, particularly in terms of legal issues and the potential damage incurred by temporary outages. The consumerisation of IT runs the risk of insecure personal devices and data leaks via usage of social networks. Furthermore as IT and communications devices converge, and businesses become increasingly borderless there are questions emerging about data transfer and accessibility. The number of access points into and within networks is increasing in scale and diversity, and the scale of personal data held growing exponentially.

Security also incorporates broader issues, such as business continuity. In reshaping the data centre businesses need to plan for the future, but modular and mobile data centres affect the way IT & Telecoms professionals weigh up cost pressures against certainty of future capacity. Similarly, cloud computing offers scalable flexibility and reduced cost, but not without security challenges. Security may also be a factor in assessing the success or failure of outsourcing and back-shoring.

### 5.8.2 Business skills

As IT & Telecoms professionals need to manage lifecycles of product development, and solve real business issues such as the link between mobile technologies and workforce planning, or social media and marketing they will need to draw increasingly on a set of core business skills. Creative, technical and entrepreneurial skills alone will not be enough as IT & Telecoms professionals will need to be able to manage projects and change, as new products are designed and deployed.

Technical skills need to be complemented by a balanced understanding of the broader objectives of businesses. For example, where cost cutting is a major goal, energy efficiency, modular data centres or cloud computing offer potential business savings, but they may also lead to outsourcing of the knowledge and capabilities that are needed internally for product development. Resourcing issues might require businesses to re-think their approach to workforce development whilst intelligence analysis can potentially shape the entire businesses strategy.

### 5.8.3 Technology specific skills

Central to nearly all future trends is specific and high level technical knowledge. For example, within systems that underpin the convergence of communications & IT and borderless businesses, networks and devices that support voice, video and data communications and mobile devices. Expertise in these devices also underpins real world web development, and the possibilities and challenges of the use of personal devices.

A number of future IT trends address other fundamental challenges about architecture and infrastructure. Demand for skills in power management, thermal solutions and utilisation are common issues in reshaping data centres, and in making IT greener. IT & Telecoms professionals need a deep understanding of a wide variety of technical issues if cloud computing is to become a reality, and without this knowledge it is also hard to understand how data security issues can be addressed successfully.

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#### 5.8.4 Interpersonal skills

As information technology and services become more embedded in everyday business and social life, IT & Telecoms professionals need to be able to deal with and better understand customer challenges and consumer choices. Within business there are examples of CIOs having responsibility for supply chains, customer relationships, sales and procurement. Increasingly IT & Telecoms professionals not only solve problems for these business functions, but they are closely integrated with the people working within them, and as such are working closely to innovate and explore the ramifications and benefits of exploiting new technologies to existing business processes.

With the rise of social computing, powered by a set of internet-based technologies, IT & Telecoms professionals need to apply social networking, interactive design and social/technical skills to these internet based channels.

#### 5.8.5 Analytical and research skills

In some senses analytics is a sub-set of generic business skills and technology, but it is a vital component of connecting information and technology to business problems. This will require organisations to have strong data architecture in place and then to develop new analytics skills to bring business meaning to operational data. While analytics are deeply embedded in business performance and strategy, analytics also underpin a businesses' ability to innovate with skills in business simulation, performance modelling and information analytics key to future success.

## 6.0 Demand and supply of IT & Telecoms labour and skills

This section explores IT & Telecoms workforce growth and replacement dynamics, recruitment needs by occupation, and recruitment sources. The general demand figures contained within this section are drawn from a bespoke analysis of data from Salary Services Ltd whilst observations regarding recruitment difficulties and skills shortages have been obtained from the National Academy for IT<sup>63</sup>.

### 6.1 Demand for IT & Telecoms professionals

#### 6.1.1 Demand trends past and present

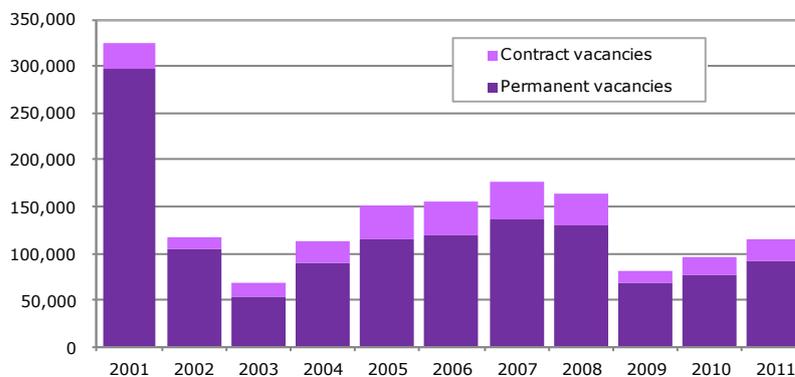
There were, on average, approximately 116,000 advertised vacancies for IT & Telecoms staff in the UK during each of the four quarters of 2011 – 79% of which (i.e. 92,000) were for permanent posts.

Though still at a relatively low level compared with recent years, demand for IT & Telecoms staff (i.e. vacancy numbers) does appear to have recovered substantially over the past two years following the decline induced by the UK recession between 2008 and 2009 (i.e. a fall of 50% to just 82,000 vacancies).

This 'partial recovery' in demand has been particularly pronounced within the contract market where growth of 64% was recorded over the 2009-2011 period. This said, the decline in demand for contract staff during the recession was also more pronounced, with contract vacancies falling in number by 55% between 2008 and 2009 compared with a fall of 48% for permanent positions.

*There were 116,000 IT & Telecoms vacancies per quarter on average during 2011*

Figure 19: Change in demand for IT & Telecoms professionals, 2001-2011<sup>64</sup>



Source: e-skills UK analysis of data from Salary Services Ltd

'Post recessionary' demand increases of over 50% were seen amongst businesses within the IT Services<sup>65</sup> and Finance sectors and together these two sectors now account for some 84% of all demand for IT & Telecoms professionals in the UK (compared with just under 80% in 2008/9).

By comparison, demand from Public sector organisations (the other main source of vacancies for IT & Telecoms staff) was seen to fall by 58% between 2009 and 2011 and that arising from other organisations was seen to increase by just 2% over the period.

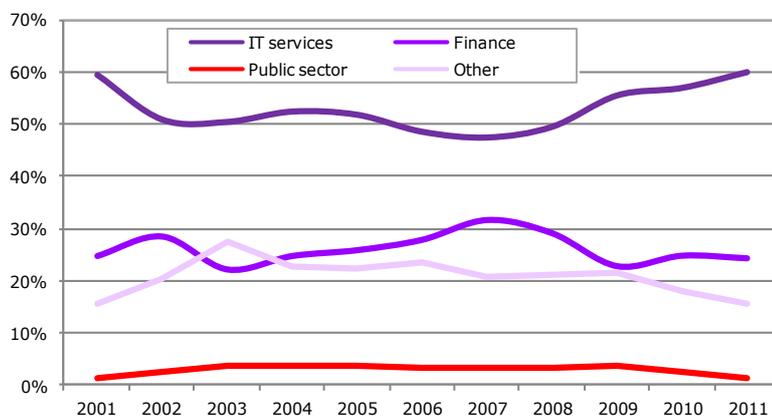
*More than eight out of ten vacancies for IT & Telecoms professionals arise from the IT Services and Finance sectors*

<sup>63</sup> Over the Summer/Autumn 2011 a survey of 4,700 businesses was undertaken on behalf of the National Academy for IT looking at IT & Telecoms skills development and recruitment

<sup>64</sup> Four quarter average

<sup>65</sup> Defined as 'Software houses' by SSL Ltd

Figure 20: Proportion of IT & Telecoms vacancies arising from key business sectors, 2001-2011<sup>66</sup>



Source: e-skills UK analysis of data from Salary Services Ltd

*Six out of ten vacancies for IT & Telecoms professionals in the UK originate in London/the South East of England*

Geographically, demand for IT & Telecoms professionals is heavily concentrated around London and the South East of England, which together accounted for six in ten (61%) UK based IT & Telecoms vacancies during 2011. This is a slightly higher proportion than that recorded pre-recession (59% in 2008) owing to a more pronounced 'recovery' in demand amongst firms based in London in particular. As a consequence, the share of IT & Telecoms vacancies generated within the capital has increased from 39% to 44% over the 2008 to 2011 period, whilst in all other nations/regions a decline/no change was recorded.

Table 12: Origin of IT & Telecoms vacancies in the UK, 2008-2011

	2008	2009	2010	2011
England	95%	96%	96%	95%
North East	1%	1%	1%	1%
North West	6%	7%	7%	6%
Yorkshire & Humber	5%	5%	5%	4%
East Midlands	6%	7%	6%	6%
West Midlands	6%	6%	5%	4%
East of England	5%	6%	5%	5%
London	39%	36%	45%	44%
South East	19%	19%	17%	18%
South West	7%	8%	6%	6%
Wales	1%	1%	1%	1%
Scotland	3%	3%	3%	3%
Northern Ireland	<1%	<1%	<1%	<1%
<b>UK</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: e-skills UK analysis of data provided by Salary Services Ltd

<sup>66</sup> Four quarter average

### 6.1.2 Nature of demand for IT & Telecoms professionals

Analysis of demand for IT & Telecoms staff by role focus shows the majority of adverts for IT & Telecoms positions placed during 2011 were in the areas of Development, Design or Support (38%, 23% and 19% respectively) with a further, relatively small proportion of vacancies occurring in the fields of Operations (7%)<sup>67</sup>, Management (4%) and the Internet (2%).

By occupation Systems Developers in particular were found to be the IT & Telecoms professionals most sought after by recruiters in 2011, and well over one quarter (28%) of all positions advertised over the past year were for jobs of this nature.

*Over one quarter of IT & Telecoms vacancies in 2011 were for Systems Developers*

Table 13: IT & Telecoms staff most demanded by recruiters during 2011

	Vacancies per quarter (average)	Percentage of all vacancies
Systems Developers	32,700	28%
Senior Systems Developers	8,300	7%
Projects Managers	6,900	6%
Systems Administrators	6,300	5%
Business Analysts	5,200	4%
Systems Architects/Planners	4,400	4%
Technical Pre/post Sales-Support staff	4,100	4%
Software Engineers	3,900	3%
Database Administrators/Analysts	3,000	3%
Test Analysts	3,000	3%

Source: e-skills UK analysis of data provided by Salary Services Ltd

Further analysis of the permanent and contract markets reveals a similar picture, with Systems Developers standing out as the most 'in demand' group of IT & Telecoms professionals during the past year irrespective of contractual status (i.e. this group accounted for 28% of permanent adverts and 29% of those for contractors during 2011). In fact four of the top five occupations in demand during 2011 were common to recruiters of both permanent and contract IT & Telecoms staff (i.e. Systems Developers, Senior Systems Developers, Systems Administrators and Projects Managers).

For each of the vacancies advertised, a range of generic skills and competences are typically required from applicants, together with a variety of job specific, technical skills - the most commonly required being: SQL, C, C#, .NET, Java, SQL SVR, ASP, JavaScript, Agile and HTML (which were the ten most commonly cited technical skills in adverts for IT & Telecoms professionals during 2011).

<sup>67</sup> Including Networking and Database positions

The skills needed from applicants will vary according to the nature of IT & Telecoms position however and for the most in demand occupational groups the associated 'core' skills required were as follows:

Table 14: Top five job specific skills cited within adverts for IT & Telecoms staff (top ten occupational groups), 2011

<b>Systems Developers</b>	<b>Senior Systems Developers</b>	<b>Projects Managers</b>
SQL C C# .NET Java	C C# SQL Java .NET	PRINCE Agile SAP Scrum C
<b>Systems Administrators</b>	<b>Business Analysts</b>	<b>Systems Architects/Planners</b>
Linux SQL Unix MS Exchange VMWare	Agile SQL UML SAP SQL Server	Java .NET SQL Oracle C
<b>Technical Pre/post sales Support staff</b>	<b>Software Engineers</b>	<b>Database Administrators/Analysts</b>
Oracle SQL SAP SQL Server C	C C++ Java C# Linux	SQL SQL Server Oracle Access SAS
<b>Test Analysts</b>	<b>All permanent positions</b>	<b>All contract positions</b>
SQL Agile MS Office Java SQL Server	SQL C C# .NET Java	SQL C C# Java .NET

Source: e-skills UK analysis of data provided by Salary Services Ltd

### 6.1.4 Matching employer demand with labour supply

Amongst employers seeking to recruit IT & Telecoms staff during 2011, just under one in seven (14%) reported having difficulties filling the positions advertised, and of these, a similar proportion (15%) stated that they were experiencing IT & Telecoms related skills shortages (i.e. a lack of applicants with the required skills, qualifications or experience required). In all, this would equate to around 5,700 IT & Telecoms vacancies that were hard-to-fill and 3,100 that were difficult to fill due to skill shortages in the UK labour pool<sup>68</sup>.

Table 15: Incidence of recruitment and skills shortages

	IT & Telecoms firms	Other firms	All firms
Business sites with vacancies	15%	9%	9%
of which have IT/Telecoms vacancies	59%	11%	14%
of which have some that are hard-to-fill (HTF)	48%	2%	14%
of which, some are due to skills shortages	61%	30%	15%

Source: National Skills Academy for IT - Employer survey, 2011

Problems relating to the recruitment of IT & Telecoms professionals were particularly apparent amongst larger businesses as opposed to SMEs and whilst one third (33%) of large sites with IT & Telecoms vacancies reported difficulties filling these positions, less than one in eight (13%) SMEs stated this to be the case. The proportion of firms attributing these difficulties to skills shortages was however, almost twice as high amongst the SME community (61%) compared with large establishments (34%).

The prevalence of hard-to-fill IT & Telecoms vacancies was however, even higher within the IT & Telecoms industry, where just under one half of IT & Telecoms recruiters (48%) reported having difficulty filling IT & Telecoms positions and 61% were of the view that this was due to the existence of IT & Telecoms skills shortages.

Aside from skills shortages, the next most common reason for IT & Telecoms positions being hard-to-fill was thought to be location, and 22% of firms with hard-to-fill IT & Telecoms vacancies stated that this was due to their being an insufficient number of potential applicants in their region or the site being geographically remote.

Other less common reasons (i.e. cited by less than 5% of those with hard-to-fill IT & Telecoms vacancies) included other firms in sector paying better, too much competition from other UK employers, applicants' reluctance to work in a company of a specified size and insufficient applicants arising as a result of company recruitment practices.

### 6.1.5 Nature of IT & Telecoms skills shortages

IT & Telecoms related skills shortages were most frequently associated with 'professional' level openings (i.e. as opposed to managerial, technician or engineer grade posts) and around four in five (79%) businesses experiencing IT & Telecoms related skills shortages stated that they were arising in this area.

In particular, skills shortages were cited by recruiters seeking to fill positions for Programmers/Software Developers and Web Design/Development professionals – with the problem of skills shortages reported by 38% and 23% of recruiters respectively (unweighted data).

*Just under one half of firms in the IT & Telecoms industry with IT & Telecoms vacancies report having difficulty finding applicants to fill them*

*IT & Telecoms skills shortages most often reported for professionals working as Programmers/ Software Development professionals or Web Design/Development*

<sup>68</sup> Note that these figures show a 'snapshot' of IT & Telecoms demand as opposed to a quarterly total and as such are not directly comparable with the figures shown earlier

Table 16: Incidence of IT & Telecoms skills shortages<sup>69</sup>, 2011

	Number of firms	Per cent
Programmers/Software development professionals	45	38%
Web design/development professionals	27	23%
IT User Support Technicians	13	11%
Business Analysts/Architects & Systems Designers	8	7%
Other IT & Telecoms professionals	7	6%
IT Sales	6	5%
IT Managers	4	3%
IT Operations Technicians	4	3%
IT Project/Programme Managers	2	2%
Telecoms Engineers	1	1%

Source: National Skills Academy for IT - Employer survey, 2011

Notes: Figures are unweighted and should be treated with caution due to the small number of responses  
Data provided by firms experiencing related shortages and able/willing to provide additional details as to their nature

When asked about the specific job-related skills that were proving hard to find amongst applicants for IT & Telecoms positions, a wide range of responses were obtained from recruiters, the most common being Microsoft related: .NET/ASP.NET, Dynamics, SharePoint, Visual Basic/Visual Studio and C# together with PHP and VMWare<sup>70</sup>.

*The technical skills that were proving hardest to fill were - .NET/ASP.NET, Dynamics, SharePoint, Visual Basic/Visual Studio, C#, PHP and VMWare*

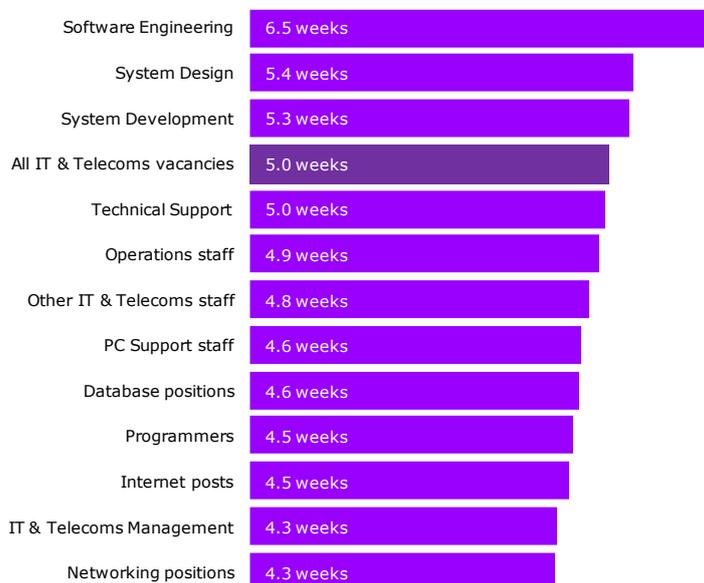
### 6.1.6 Effects of IT & Telecoms skills shortages

Where IT & Telecoms related skills shortages are apparent, an immediate and obvious effect on the firm will be a delay in recruitment and hence an increase in advertising and recruitment spend. Although it is not always possible to obtain directly comparable figures, bespoke data provided by Salary Services Ltd appears to support this observation and during 2011, *Software Engineering* and *Programming* positions in particular were noted for advertising periods well above the average for IT & Telecoms positions as a whole (i.e. 6.3 weeks compared with 5.0 weeks overall).

<sup>69</sup> Unweighted

<sup>70</sup> Treat with caution very small number of responses

Figure 21: Average advertising duration for IT & Telecoms positions, by major occupational group, 2011



Source: e-skills UK analysis of data provided by Salary Services Ltd

Advertising duration was also found to be above average in the case of *Business Analysts* (5.7 weeks), *Systems Designers* (5.4 weeks) and *IT Projects Managers* (5.4 weeks), though positions for *IT management* and *Web Designers* tended to remain open for a slightly shorter length of time (4.3 and 4.6 weeks respectively).

## 6.2 IT & Telecoms workforce growth dynamics 2011 – 2020

A series of employment forecasts for the IT & Telecoms workforce were developed by Experian on behalf of e-skills UK during the second half of 2011. The timing and currency of these forecasts was particularly important given the continued economic uncertainty within the UK and abroad and, more specifically, the necessity to allow for the scale and extent of changes brought about by the Government's comprehensive spending review.

Predicted growth rates forecast for IT & Telecoms employment over the period 2011 – 2020 have been assessed in line with Experian's overall forecasting methodology. This involves a top-down approach beginning with the UK economy as a whole, and with key macroeconomic variables. Estimates of regional employment by industry are determined, and these then inform the forecasts for IT & Telecoms activity.

*Employment of IT professionals through to 2020 is forecast to grow at 1.62% per annum – nearly twice as fast as the UK average*

Table 17: Forecast annual average employment growth rates per annum, 2011-2020

	Growth per annum (%)
IT professionals	1.62%
IT professionals within the IT industry	1.78%
IT professionals in all other sectors	1.52%
The IT industry	0.54%
All other occupations within the IT industry	-2.03%
Telecoms professionals	0.57%
The Telecoms industry	0.95%
All workers in all sectors	0.89%

Source: e-skills UK analysis of Experian employment forecasts 2011

The table above shows that employment in the IT professional workforce is expected to grow at 1.62% per annum, over the 2011-2020 period - nearly twice as fast as the predicted growth rate for UK workers as a whole. Whilst the growth forecast for the IT industry has been revised down from previous forecasts, brought about predominately by a reduction across IT organisations of non IT staff, (showing a forecast decline of 2.03% per annum through to 2020), employment growth is predicted to pick up in the Telecoms industry with a predicted growth rate per annum of 0.95% reversing a previous forecast decline of 0.14%.

*UK growth will continue to be primarily in high value roles with Software Professionals forecast to grow nearly three times faster than the UK average*

Underneath the forecast growth across the IT & Telecoms professional workforce lies a much more complex picture of restructuring and skills shift. The move of certain IT activities to lower cost countries over recent years is creating challenges in terms of career paths and skills development. However, the forecast trends identified in section 5 are also creating opportunity by enabling significant sector growth and growing skills needs, in particular there are immediate requirements focussing around areas such as cloud computing and security and data protection. The impact of these types of changes plays through into the following forecasts for the various occupational segments within the IT & Telecoms professional workforce.

Table 18: Number of IT & Telecoms professionals by occupation, 2011-2020

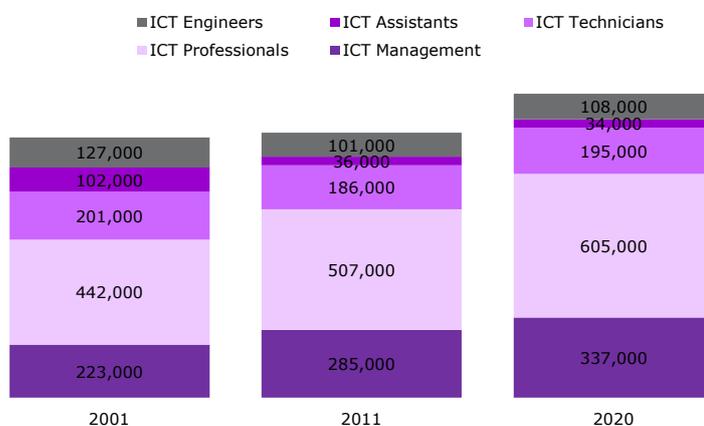
	Employment				Average annual growth	Growth 2011-2020
	2011		2020			
	n	%	n	%	%	n
ICT Managers	285,000	26%	337,000	26%	2.0%	52,000
IT Strategy & Planning professionals	137,000	12%	163,000	13%	2.1%	26,000
Software professionals	370,000	33%	442,000	35%	2.1%	72,000
IT Operations Technicians	121,000	11%	127,000	10%	0.5%	6,000
IT User Support Technicians	65,000	6%	68,000	5%	0.5%	3,000
Database assistants	36,000	3%	34,000	3%	-0.6%	-2,000
Telecoms Engineers	55,000	5%	58,000	5%	0.5%	3,000
Line Repairers and Cable Jointers	5,000	<1%	6,000	<1%	0.7%	1,000
Computer Engineers	41,000	4%	44,000	3%	0.7%	3,000
<b>Total</b>	<b>1,116,000</b>		<b>1,278,000</b>			<b>162,000</b>

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average) together with 2011 forecasts from Experian

Comparing this occupational breakdown with table 10 (at section 4.4.3) which shows the historical growth by segment from 2001 to 2011, it can be seen that the general historic trends previously observed are set to continue, with the highest levels of employment growth arising in high skill areas, i.e. Software Professionals, ICT Managers and IT Strategy & Planning Professionals. In fact, Software professionals are projected to represent over a third of the IT & Telecoms professional workforce by 2020 and are forecast to grow in number by a rate nearly two and a half times that for UK workers as a whole.

Conversely, employment in comparatively low skilled occupations such as Database Assistants, Telecoms Engineers and Computer Engineers will continue to decline or remain virtually static.

Figure 22: Summary of actual/forecast changes in IT & Telecoms professional employment, 2001 to 2020



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average) together with 2011 forecasts from Experian

By linking these occupational projections with the employer views of future skills needs taken from section 5 it becomes clear that future requirements for IT & Telecoms labour and skills will continue to arise primarily amongst the higher value areas such as: project management, systems architecture, business process, change management, security, risk management, together with analytics and web/internet development. In addition however, there will be a continuing/growing need for all IT & Telecoms recruits and existing staff to have a more rounded and highly developed skillset incorporating interpersonal and business-oriented skills together with core technical competencies.

*Future requirements for IT & Telecoms skills will continue to arise primarily in the higher value roles*

### 6.2.1 Employment of IT & Telecoms professionals by sector

Table 7 of section 4.4 shows how just over one half (57%) of IT & Telecoms professionals are currently working outside of the IT & Telecoms sector. This section looks at how the numbers of IT & Telecoms professionals working in non IT & Telecoms industries is expected to change in the future.

Experian have provided forecasts of employment of IT & Telecoms professionals for different sectors of the economy by 2 digit SIC (2003) from 2011 through to 2020. The following table shows the top twenty sectors with the fastest growth rates for IT & Telecoms professionals together with the relative proportion of IT & Telecoms professional within each sector as at 2011.

Table 19: Sector employment (as proportion of the total) of IT & Telecoms professionals and forecast annual growth from 2011 to 2020

	IT & Telecoms professionals in 2011 (% of total)	Growth per annum 2011 to 2020
Recycling	<0.1%	9.5%
Financial Intermediation (auxiliary activities)	2.4%	4.8%
Transport activities of Travel Agents (supporting & auxiliary)	1.0%	4.5%
Research & Development	1.2%	3.8%
Financial Intermediation (excluding insurance & pension funding)	5.7%	3.2%
Retail Trade (excluding motor vehicles/cycles & repair of personal/household goods)	2.3%	2.6%
Water Transport	<0.1%	2.3%
Manufacture of motor vehicles, trailers & semi-trailers	0.3%	2.3%
Manufacture of machinery & equipment not elsewhere specified	0.6%	2.2%
Other business activities	12.5%	2.1%
Other service activities	0.1%	2.1%
Manufacture of electrical machinery & apparatus not elsewhere specified	0.3%	2.1%
Hotels & Restaurants	0.4%	2.0%
Other Mining & Quarrying	<0.1%	1.9%
Wholesale/Commission Trade (except motor vehicles/cycles)	2.0%	1.9%
Manufacture of medical, precision & optical instruments, watches & clocks	0.6%	1.9%
Real Estate activities	0.7%	1.8%
Post & Telecommunications	6.3%	1.8%
Computer/related activities	37.6%	1.7%
Health & Social Work	2.7%	1.5%

Source: e-skills UK analysis of Experian employment forecasts, 2011

Whilst the predicted growth rate for IT & Telecoms employment is highest for the recycling sector, the number of IT & Telecoms professionals working in this sector is relatively small. By contrast, Financial Intermediation (and auxiliary activities) is associated with high growth forecasts and an already significant proportion (over 8%) of IT & Telecoms professionals. Computer and Related Activities (which substantially defines the IT industry sector) shows an anticipated growth rate of 1.69% per annum from 2011 through to 2020.

In addition to looking at the forecast growth rates it is useful to see which sectors of the economy are forecast to employ the largest proportion of IT & Telecoms professionals by 2020. Table 20 below shows the top twenty sectors employing the highest numbers of IT & Telecoms staff.

*Through to 2020 IT & Telecoms professionals working in financial mediation are forecast to grow significantly faster than those working in other sectors*

Table 20: Forecast employment of IT & Telecoms professionals by sector (as a proportion of the total) in 2020

Sector	IT & Telecoms professionals in 2020 (% of total)
Computer/related	38.0
Other business activities	13.0%
Financial Intermediation (excluding insurance & pension funding)	6.5%
Post & Telecommunications	6.4%
Construction	4.2%
Education	3.8%
Public Administration & Defence; Compulsory Social Security	3.6%
Financial Intermediation (auxiliary activities)	3.0%
Health & Social Work	2.7%
Retail Trade (excluding motor vehicles/cycles & repair of personal/household goods)	2.5%
Wholesale/Commission Trade (except motor vehicles/cycles)	2.1%
Recreational, Cultural & Sporting activities	1.7%
Research & Development	1.4%
Transport activities of Travel Agents (supporting & auxiliary)	1.2%
Publishing, printing & reproduction of recorded media	1.1%
Real Estate activities	0.7%
Manufacture of medical, precision & optical instruments, watches & clocks	0.6%
Manufacture of Machinery & Equipment not elsewhere specified	0.6%
Insurance & Pension funding (excluding Compulsory Social Security)	0.6%
Manufacture of Radio, Television & Communications equipment & apparatus	0.5%

Source: e-skills UK analysis of Experian employment forecasts, 2011

Computer/related activities (the majority of the IT industry) will continue to account for the largest proportion of IT & Telecoms professionals working in 2020 whilst 'Other business activities' (which includes the likes of legal, accounting and business and management consultancy) has a significantly higher proportion of IT & Telecoms staff than most other sectors. Financial Intermediation again is of note as the sector forecast to have the third highest proportion of the IT & Telecoms professional workforce in 2020.

*Financial Intermediation is the sector forecast to have the third highest proportion of the IT & Telecoms professional workforce in 2020*

### 6.3 Recruitment needs by occupation, growth and replacement demand

#### 6.3.1 Background

The employment change estimates and forecasts presented in the previous section are net changes in employment, i.e. the stock of jobs forecast in a particular occupation in 2020 compared with 2011. This can be termed the change due to expansion (growth) or contraction. This section looks at the relationship between net and gross employment changes in the demand for labour by occupation, which is particularly useful in terms of projecting job-specific qualifications, skills requirements and potential training issues.

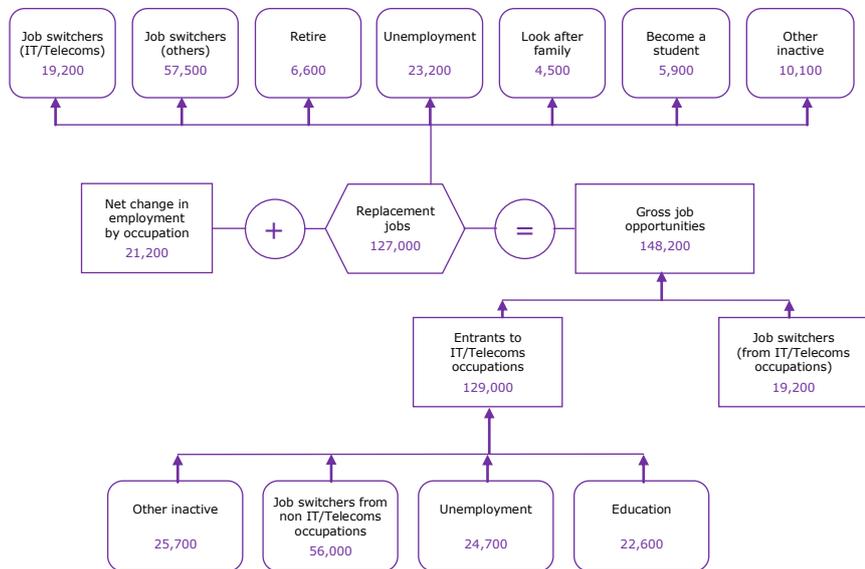
Gross employment changes also take into account job opportunities created by replacement demand. Additional information on replacement rates have been used to adjust the forecasts to take replacement demand into account. A job opportunity is generated whenever a net new job is created (growth)

or whenever someone leaves an occupation (replacement) – either for another job or to leave employment altogether. These two effects together (i.e. growth + replacement) have been termed 'gross job opportunities'. Gross job opportunities created by replacement tend to be much larger than those created by expansion (growth).

### 6.3.2 IT & Telecoms Professionals - Gross job opportunities per annum to 2015

The figure below shows there are 148,200 gross job opportunities expected each year up to 2015 across all IT & Telecoms occupations. Replacement accounts for the vast majority of these opportunities with 127,000 jobs (or 86%) expected to become available due to one of the replacement factors<sup>71</sup>.

Figure 23: Anticipated annual gross job opportunities for IT & Telecoms professionals to 2015



Source: Experian/e-skills UK analysis of gross job opportunities, 2011

<sup>71</sup> Job switcher numbers only reflect the position at the end of a year compared with that at the start and do not take account of job movements within the IT & Telecoms professional workforce taking place throughout the year

### 6.3.3 Recruitment needs by occupation

Table 20 shows the breakdown of the total gross job opportunities by occupation. Of this intake:

- Two thirds (67%) will be for managerial and senior professional positions (ICT Managers, IT Strategy & Planning, Software Professionals),
- Approximately one fifth (17%) will be for associate professional and technician level positions (IT Operations Technicians, IT User Support Technicians),
- One tenth (8%) will be for skilled trade positions (Telecoms Engineers, Line Repairers, Computer Engineers),
- Just under one tenth (8%) will be for administrative positions (Database Assistants & Clerks).

*129,000 new entrants a year are required to fill IT & Telecoms professional job roles in the UK*

Table 21: IT & Telecoms occupations - gross job opportunities, per annum to 2015

Occupation	Due to growth/expansion	Due to replacement	Gross job opportunities	Jobs filled by:	
				Movement within IT & Telecoms professional workforce	New entrants to the IT & Telecoms professional workforce
ICT Managers	8,000	32,100	40,100	3,600	35,400
IT Strategy & Planning	4,100	13,900	18,000	3,300	14,000
IT Software professionals	8,900	32,200	41,100	6,400	35,600
IT Operations Technicians	700	15,100	15,800	2,800	12,700
IT User Support Technicians	300	9,200	9,500	1,600	7,900
Database Assistants	-300	12,700	12,400	300	12,600
Telecoms Engineers	-300	4,800	4,600	200	4,400
Line Repairers and Cable Jointers	-	1,000	1,000	-	1,000
Computer Engineers	-100	6,000	5,900	1,000	4,800
<b>Total</b>	<b>21,200</b>	<b>127,000</b>	<b>148,200</b>	<b>19,200</b>	<b>129,000</b>

Source: Experian/e-skills UK employment forecasts 2011

Of the 148,200 additional appointments a year arising from individuals leaving IT/Telecoms careers and employers increasing demand for staff, only 19,200 will be filled by IT & Telecoms job switchers (i.e. those moving from one IT & Telecoms position to another). Instead, the vast majority i.e. 129,000 jobs will need to be filled by people moving into an IT & Telecoms professional job from elsewhere – for example from a different occupation, from education, from unemployment or from some other type of 'inactive' status (e.g. students or family carers).

*The largest recruitment source (43%) is 'employed individuals in occupations other than IT or Telecoms' with new entrants from education contributing 18% and 39% from other sources*

### 6.3.4 Recruitment sources

Table 21 shows there is a need for 129,000 new entrants a year into IT & Telecoms professional occupations. Based on current data, the makeup of this intake is expected to be as follows:

**Table 22: IT & Telecoms professionals – recruitment sources for new entrants**

Recruitment source	Number (average pa to 2015)	Share
Those already in work (in occupations other than IT or Telecoms)	56,000	43%
Individuals joining from education	22,600	18%
Other sources	50,400	39%
<b>Total</b>	<b>129,000</b>	<b>100%</b>

Source: Experian/e-skills UK employment forecasts, 2011

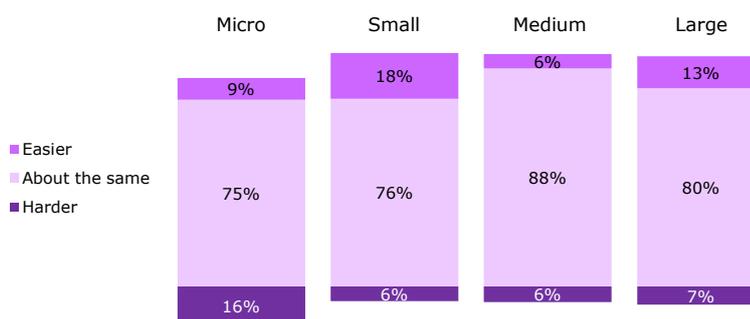
*Most IT & Telecoms employers anticipate no change in the degree of ease/difficulty associated with recruiting IT & Telecoms staff over the next 12 months*

### 6.4 Future recruitment of IT & telecoms professionals

When speculating about the recruitment of IT & Telecoms professionals in the future, the vast majority (76%) of employers<sup>72</sup> responding to the National Skills Academy Employer Survey during 2011 thought there would be no change in the degree of ease/difficulty associated with filling IT & Telecoms vacancies over the coming 12 months. Moreover, whilst just over one in ten (13%) did think it would become more difficult, a similar proportion (11%) thought it would be easier to recruit.

SMEs<sup>73</sup> were more likely than others to anticipate increased difficulty when recruiting IT & Telecoms staff over the following 12 months (i.e. 13% compared with 7% for large firms) as were firms operating outside of the IT & Telecoms sector (13% versus 9% of IT & Telecoms businesses). In fact, IT & Telecoms firms appeared quite 'positive' about future recruitment of IT & Telecoms staff compared with other businesses with 22% anticipating that it would be easier to recruit this kind of staff in the coming year.

**Figure 24: Employer views on the ease/difficulty associated with recruiting IT & Telecoms staff over the next 12 months, by firm size**



Source: National Skills Academy for IT - Employer survey, 2011

An analysis of employer views by nation/region shows that firms based in Wales were more likely than others to anticipate no change in the level of difficulty associated with IT & Telecoms recruitment (94% stating this to be their view).

<sup>72</sup> Employers already employing IT & Telecoms staff

<sup>73</sup> Micro, small and medium establishments

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This said, irrespective of nation/region, industry/size etc it would appear that the most common reason for firms holding the view that recruitment will become easier over the coming year is the prevailing economic climate i.e. more people will likely be looking for work as a result of company closures/redundancies even as competition for staff declines as recruitment activity remains static/drops off from current levels.

By contrast, those anticipating increased difficulties are likely to be of the view that an abundance of potential applicants does not necessarily equate to an abundance of applicants with the required skills, qualifications/experience i.e. competition for the best candidates will still increase. Aside from this, many recruiters were also of the opinion that the increase in potential applicants may not be as pronounced as expected owing to the reduction in the number of people moving from one job to another – perhaps caused by individuals concern over job security in new positions or merely a wish to ‘ride out’ the recessionary period.

#### 6.4.1 Future skills shortages

When asked to speculate on the likely nature of future IT & Telecoms related recruitment difficulties, employers responding to the National Academy survey most often thought that problems would be most apparent when seeking to fill positions for: Programmers and Software Development professionals followed by Web design and development professionals and, to a lesser extent, IT User Support Technicians.

*‘Employers’ views of likely future recruitment difficulties focussed around positions for Programmers, Software Developers, and Web Design and Development professionals’*

National Skills Academy for IT Employer Survey, 2011



## 7.0 IT & Telecoms skills and development

This section looks at the level of skills held by IT & Telecoms professionals working in the UK, the degree to which they match with those needed by UK employers and the steps taken by individuals/employers to address mismatches and ensure future balance between the skills held by/needed of IT & Telecoms professionals. The analysis is based primarily upon the findings of a recent survey of employers carried out on behalf of the National Skills Academy for IT (2011) alongside a bespoke analysis of data provided by the Office for National Statistics via their quarterly Labour Force Survey.

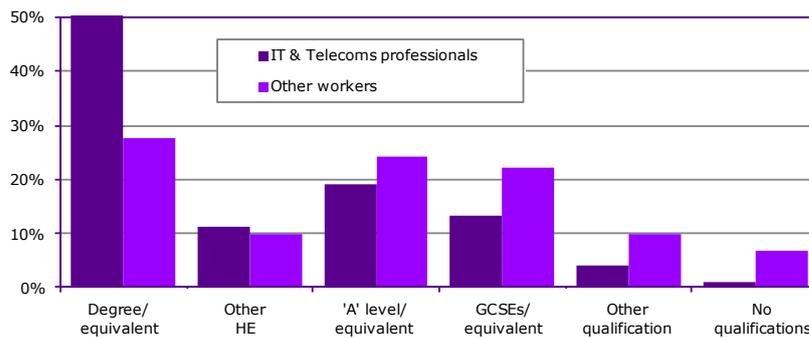
### 7.1 IT & Telecoms professional skills

#### 7.1.1 Level of educational attainment

On average, IT & Telecoms professionals tend to be educated to a higher level than other UK workers, with 62% holding a Higher Education (HE) level qualification compared with just 37% of those working in other occupations. Moreover, whilst 7% of other workers have no qualifications, the figure for IT & Telecoms staff is much lower at just 1%.

*Six out of ten IT & Telecoms staff hold a HE level qualification*

Figure 25: Highest qualification held, by IT & Telecoms occupations



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

IT & Telecoms staff working in Northern Ireland, Scotland and London are more likely than others to be educated to HE level, as is the case for those working in full-time positions, those aged between 25 and 44 and those working in the IT & Telecoms industry sector (i.e. more than 60% in each instance).

The level of educational attainment varies significantly according to the nature/level of IT & Telecoms occupation held and whilst 72% of those working in IT Strategy, Planning & Development positions are thought to hold an HE level qualification, this compares with just 34% of IT & Telecoms Engineers and 24% of IT & Telecoms Assistants.

Despite being the most 'highly educated' IT & Telecoms staff however, those working in IT Strategy, Planning & Development roles are still less likely than their peers<sup>74</sup> to hold an HE level qualification (i.e. comparison figures of 72% and 86% respectively). Moreover, this finding also appears to be true in the case of IT & Telecoms Technicians (52% and 61%) and Assistants (24% versus 28%).

<sup>74</sup> Other workers in 'professional level' occupations such as teachers, doctors or accountants for example

Table 23: Percentage of workers holding an HE level qualification, by type of IT & Telecoms role, SOC level and occupational equivalent

IT & Telecoms occupations (grouped)	SOC level <sup>75</sup>	IT & Telecoms staff	Equivalent roles
IT & Telecoms Management	1	67%	49%
IT & Telecoms Strategy, Planning & Development	2	72%	86%
IT & Telecoms Technicians	3	52%	61%
IT & Telecoms Assistants	4	24%	28%
IT & Telecoms Engineers	5	34%	13%
<b>Total</b>		62%	49%

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

Table 24 below shows despite the fact that IT & Telecoms *industry workers* are also collectively educated to a higher level than the UK workforce as a whole (i.e. 59% hold an HE level qualification), the 'educational shortfall' observed amongst IT & Telecoms professionals at SOC levels 2/3 in table 23 above is also apparent within the IT & Telecoms industry workforce and whilst for example 74% of Professionals (SOC level 2) working in IT & Telecoms firms are thought to hold an HE level qualification, the figure for workers within other industry sectors is thought to be much higher at approximately 85%.

Table 24: Proportion of workers holding HE level qualifications within/outside the IT & Telecoms sector

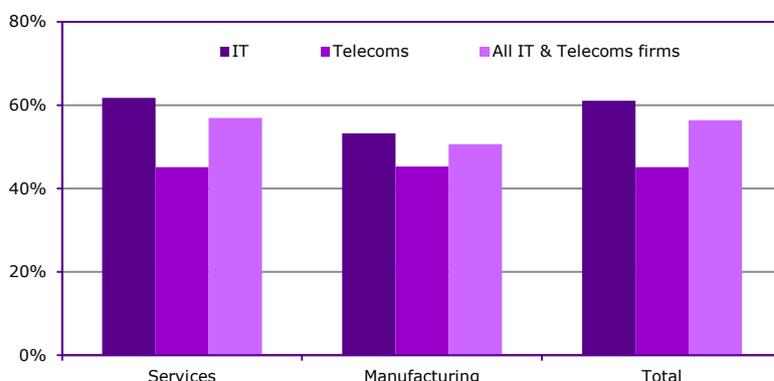
SOC level	SOC Major Group	IT & Telecoms sector	Other sectors
1	Managers and Senior Officials	65%	49%
2	Professional occupations	74%	85%
3	Associate Professional and Technical	56%	60%
4	Administrative and Secretarial	36%	28%
5	Skilled Trades Occupations	38%	13%
6	Personal Service Occupations	-	23%
7	Sales/Customer Service Occupations	25%	18%
8	Process, Plant and Machine Operatives	11%	10%
9	Elementary Occupations	20%	11%
	All workers	59%	38%
	those in IT & Telecoms roles	67%	59%
	those in other roles	50%	37%

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

Aside from variation by occupation, the level of educational attainment for IT & Telecoms industry workers is again seen to vary according to a number of other factors, for example, age, region and industry subsector and in this case it would appear that the most highly skilled IT & Telecoms sector workers were: employed in Northern Ireland, Scotland or London, aged 35-39 or 45-49, in full-time employment and working in the IT sub sector – most likely IT Services.

<sup>75</sup> The Standard Occupational Classification (SOC 2000) consists of major groups at SOC levels 1 to 9 as shown/defined in Annex A

Figure 26: Proportion of staff holding an HE level qualification, by IT & Telecoms industry sub-sector



Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

### 7.1.2 Skills matching in the workplace

Although IT & Telecoms professionals are generally able to show a high level of educational attainment, it appears that the work related skills they possess do not always align with those required by their employers. Results from the 2011 employer survey carried out by the National Academy for IT for example, show around one in ten employers are aware of gaps in the skills of their employees (11%) and of these firms, over one third (34%) report there being gaps in the skills of their IT & Telecoms staff.

In general, skills gaps appear to be more prevalent within large firms (25%), those operating within the IT & Telecoms industry (17%) and those based within the devolved nations (29%) compared to the average of 11%. However, the issue of IT skills gaps (i.e. gaps in the skills of IT staff) is particularly acute within the IT industry, where amongst the 17% of firms with skills gaps, 70% report gaps in the skills of their IT & Telecoms staff.

When asked about the nature of these IT skills gaps, the majority of firms stated that they were aware of gaps in both the technical and non-technical skills of their IT staff (71% and 67% of businesses respectively) and that, on average, skill gaps were identifiable amongst approximately 71% of those holding IT & Telecoms positions within the firm.

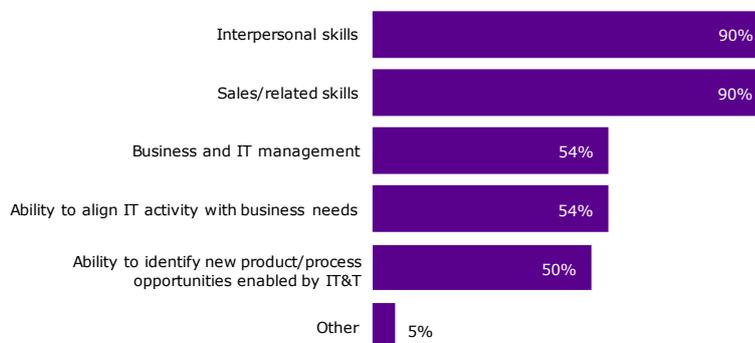
When technical skills gaps were apparent (i.e. within 71% of employers with gaps and amongst 71% of IT & Telecoms staff with gaps working in these firms), they were most commonly thought to arise in respect to Microsoft skills – particularly ASP.NET, C and .NET which together with PHP and Linux represented the top 5 technical skills gaps cited by employers.

In cases where non-technical skills gaps were observed (i.e. within 67% of employers with gaps and amongst 58% of IT & Telecoms staff with gaps working in these firms) it appeared that the most common areas for gaps were: sales related and interpersonal skills though gaps in business/related skills were also common as illustrated within the following figure:

*Over one in ten employers reported skills gaps in their workforce, and of these, over one third (34%) reported gaps in the skills of their IT & Telecoms professionals*

*Gaps in technical skills most often relate to Microsoft products, particularly ASP.NET, C and .NET*

Figure 27: Incidence of different non-technical skills gaps amongst UK firms<sup>76</sup>



Source: National Skills Academy for IT - Employer survey, 2011

### 7.1.3 Effects of skills mismatches

*Performance of IT & Telecoms staff with skills gaps is only around one half what it should be*

Two in five employers of IT & Telecoms staff with skills gaps (42%) considered these gaps to be having a detrimental effect upon the performance of these staff and the likely reduction in performance is often thought to be substantial i.e. when asked to rate the performance of IT & Telecoms staff with skills gaps, employers on average, stated that they were only working at around half (53%) of their maximum potential.

The likelihood of skills gaps affecting performance appears to be much greater within micro firms where around six out of ten (61%) firms with IT skills gaps associated this with a reduction in the performance of their IT & Telecoms staff. In this case however, the estimated shortfall in performance was less, with IT & Telecoms staff estimated to be working at around 68% of their full capability.

The effects of reduced performance are likely to be wide ranging and far reaching and though data for 2011 are not available, results from a survey carried out in 2010 by e-skills UK showed how skills gaps often result in delays developing new products or services, difficulties introducing technological change, increased operating costs, and difficulties introducing new working practices for example.

### 7.1.4 Managing skills in the workplace

*In around half of the cases reported, IT & Telecoms skills gaps were thought to have lasted for 6 months or more*

As companies take on new staff, implement new products and/or processes, undergo other internal/external changes, it would, be reasonable to assume that skills gaps – in the short term at least - would not be that uncommon and would also be unavoidable in certain cases. However results from the 2011 Academy Employer survey show that IT & Telecoms skills gaps often run over a relatively long period of time with almost one half (47%) of the reported cases of IT skills gaps lasting for 6 months or longer. In addition, it was found that the gaps were actually viewed as being unavoidable in over one half of cases even when in existence for this length of time.

<sup>76</sup> Those that have IT skills gaps

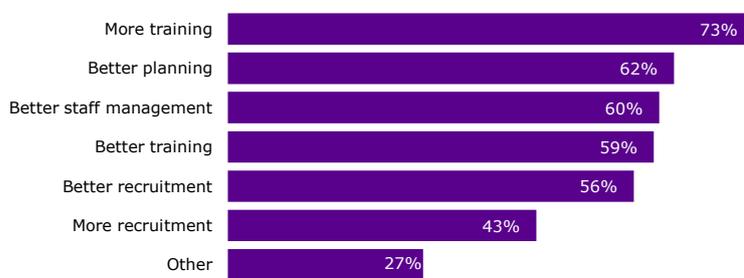
Table 25: Incidence of IT & Telecoms skills gaps by duration and evitability

	Short term	Long term	Total
All cases	53%	47%	100%
Unavoidable	58%	52%	55%
Avoidable (by better planning, more training or other means)	42%	48%	45%

Source: National Skills Academy for IT - Employer survey, 2011

Amongst employers that identified at least some of their IT & Telecoms skills gaps as being fully or partially avoidable, additional training was most often cited as the means by which this could have been accomplished in a cost effective manner (73% of firms with avoidable gaps) as illustrated below.

Figure 28: Percentage of employers identifying selected methods as a cost effective means of avoiding/reducing the incidence of IT & Telecoms skills gaps



Source: National Skills Academy for IT - Employer survey, 2011

Whether businesses will actually be able to undertake any of these actions is questionable however as only around one third of firms with IT & Telecoms skills gaps (34%) state that they have a training plan in place setting out the development needs of their IT & Telecoms staff and just around one in ten (11%) have a dedicated budget to fund their development needs.

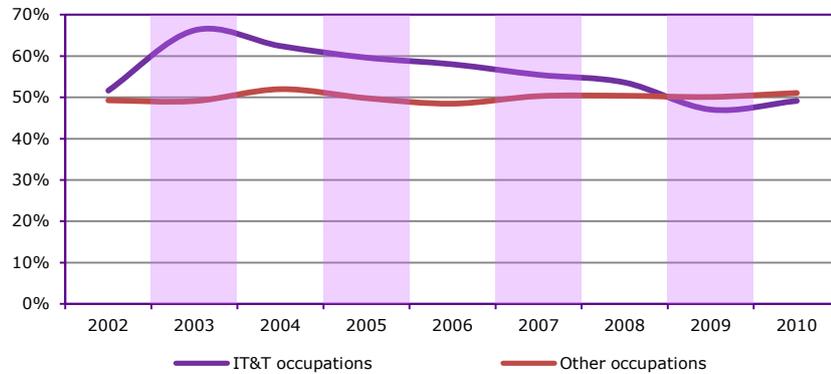
### 7.1.5 Incidence of IT & Telecoms staff development

Historically, IT & Telecoms staff have been more likely than others to have received job related education/training and in 2003 for example, whilst 66% of IT & Telecoms professionals were thought to have received education/training during the year, the figure for those in other occupations was significantly lower at just 49%. Since 2003 however, whilst the incidence of education/training amongst other workers has remained largely unchanged, the likelihood that IT & Telecoms staff will have been trained has declined substantially and since 2008 has remained below the level of others within the workforce.

*IT & Telecoms skills gaps thought avoidable in half of cases and more training was the most readily identified way of avoiding/reducing their occurrence*

*Though historically IT & Telecoms professionals were more likely to have received education/training than others, since 2008 the reverse has been true*

Figure 29: Percentage of workers receiving education/training during the previous year



Source: e-skills UK analysis data from the ONS Labour Force Survey, 2002-2010

During 2010 it is estimated that 48% of IT & Telecoms professionals received some form of job-related education/training compared with 51% of workers in other occupations. In both cases, education/training was most likely have been received during one quarter of the year only, though those working outside of the IT & Telecoms professions were more likely to have received education/training during two or more quarters as illustrated within table 26:

Table 26: Number of quarters in which education/training was received during 2010

	IT & Telecoms staff	Equivalent roles
1 quarter	49%	39%
2 quarters	26%	27%
3 quarters	15%	21%
4 quarters	10%	13%

Source: e-skills UK analysis data from the ONS Labour Force Survey, 2010

*IT & Telecoms staff more likely to have received education/training during one quarter of the year only*

### 7.1.6 Incidence of staff development by occupation

An analysis of development activity by occupation shows IT and Telecoms engineers the most likely to receive job-related education/training with around 31% having done so during each quarter of 2011. Comparing the incidence of education/training with other workers in equivalent occupations also highlights IT & Telecoms engineers together with IT & Telecoms Managers as being the only groups of IT & Telecoms staff that were more likely than their peers to have received education.

Table 27: Incidence of job-related education/training in the past 13 weeks, by IT & Telecoms occupation/equivalent

IT & Telecoms occupational group	SOC level	IT & Telecoms staff receiving training	Equivalent roles receiving training
IT & Telecoms Management	1	25%	23%
IT & Telecoms Strategy, Planning & Development	2	23%	41%
IT & Telecoms Technicians	3	28%	37%
IT & Telecoms Assistants	4	14%	22%
IT & Telecoms Engineers	5	31%	16%
Total		25%	28%

Source: e-skills UK analysis of data from the ONS Labour Force Survey, 2011 (four quarter average)

This comparison also shows a stark difference in the incidence of education/training amongst 'professional' level workers (SOC level 2) with those in non-IT & Telecoms roles almost twice as likely to receive education/training as IT & Telecoms staff in equivalent level positions (i.e. IT & Telecoms Strategy, Planning & Development).

#### 7.1.7 Other factors affecting likelihood of staff development

Further analysis of ONS Labour Force Survey data for 2011 reveals a number of additional factors affecting the likelihood of education/training being received by IT & Telecoms staff/other workers:

##### Nature of employment contract

Self-employed IT & Telecoms workers are much less likely to receive education/training than those working as employees with comparative figures of 13% and 26% respectively.

- The likelihood of part-time IT & Telecoms staff receiving education/training is also notably lower than that of their full-time equivalents (i.e. 20% and 25%).

##### Nature of employer

IT & Telecoms staff employed in SMEs are much less likely, on average, to receive education/training than those working in large firms (i.e. with 250 or more staff) with comparative figures of 23% and 33% in this case.

The incidence of education/training is lower within the IT & Telecoms sector where, on average, 23% of IT & Telecoms staff receive education/training each quarter compared with 26% in other sectors.

Almost one third (31%) of IT & Telecoms staff working in the public sector received education/training each quarter compared with 24% of those working in private organisations.

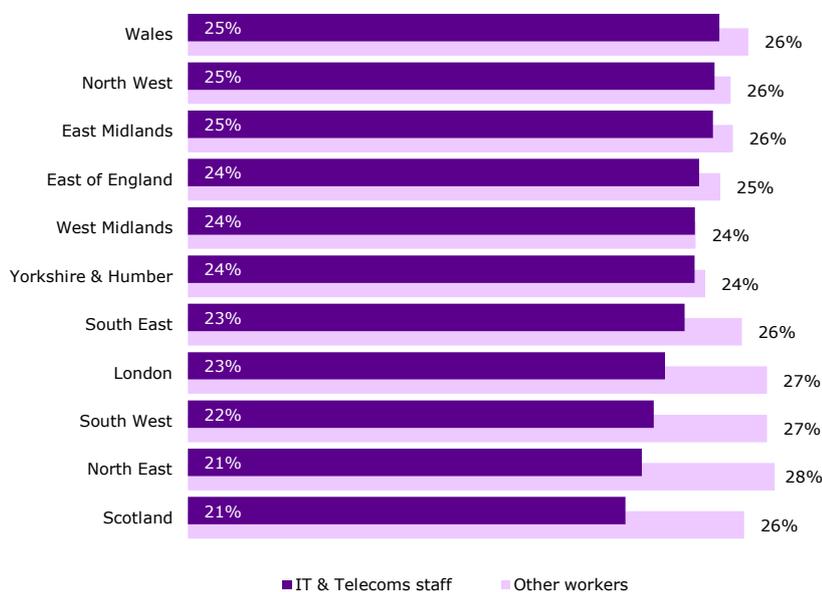
IT & Telecoms staff working for employers in the North East and the South West of England are, on average the most likely to receive education/training in any particular quarter.

*Only a little over one in ten IT & Telecoms contractors receive education/training each quarter*

*IT & Telecoms staff in SMEs less likely to receive education/training than others*

*Almost one third (31%) of IT & Telecoms staff working in the public sector received education/training each quarter compared with 24% of those working in private organisations*

Figure 30: Percentage of workers receiving education/training during the previous quarter by nation/region and job type<sup>77</sup>



Source: e-skills UK analysis data from the ONS Labour Force Survey, 2011 (four quarter average)

### 7.1.8 Nature of development activity

The education/training received by IT & Telecoms staff will most often have been technically focussed (57% of those receiving education/training stating this to be the case) and will often include IT user skills training as well as 'professional' development. The most common type of non-technical training is likely to be of a generic nature i.e. personal development, though management training (IT and/or generic) is also common<sup>78</sup>.

As is the case for other workers, the likelihood that education/training is obtained on- or off-the-job is more or less identical for IT & Telecoms staff (i.e. 57% and 56% respectively of those receiving education/training reported having received it in this manner)<sup>79</sup>. This said, overall, those receiving education/training are still most likely to have done so at their employers premises with around one third (33%) stating this to be the case.

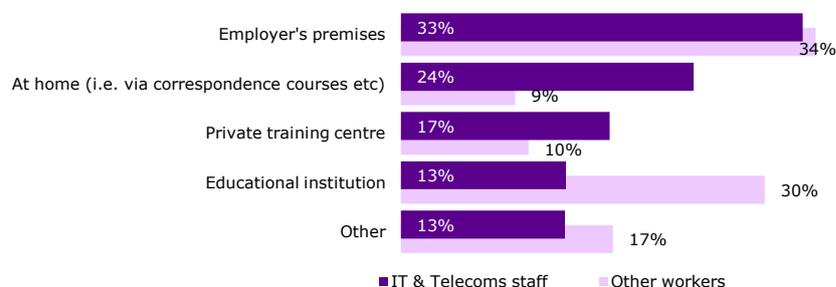
*Almost six out of ten IT & Telecoms staff receiving training will have undertaken technical training*

<sup>77</sup> Figures for Northern Ireland have been suppressed in accordance with ONS guidance relating to estimates based on a small number of survey respondents

<sup>78</sup> e-skills UK Technology Insights, 2011

<sup>79</sup> Average based on the nature of delivery amongst those receiving education/training in the 4 weeks prior to survey (ONS Labour Force Survey data) for each of the four quarters of 2011

Figure 31: Site of delivery for receiving education/training during the previous year, by region and job type



Source: e-skills UK analysis data from the ONS Labour Force Survey, 2011 (four quarter average)

### 7.1.9 Other development opportunities

Though around one quarter of IT & Telecoms staff will typically receive some form of education/training each quarter it is worth noting that amongst those not receiving education/training, almost one third (30%) will have been offered the opportunity to do so by their employer – the proportion ranging from around one in five (20%) of those employed as IT & Telecoms assistants to almost two in five (36%) IT & Telecoms Engineers. What is not known, however, is the reason why such a large proportion of IT & Telecoms/other workers are not taking up these development opportunities.

*Approximately one third of IT & Telecoms staff without education/training each quarter will at least have received an offer to undertake such development activity*

Table 28: Incidence of a training offer amongst staff that had not received education/training in the past 13 weeks, by IT & Telecoms occupation/equivalent

IT & Telecoms occupations (grouped)	SOC level	IT & Telecoms staff offered training	Equivalent roles offered training
IT & Telecoms Management	1	31%	29%
IT & Telecoms Strategy, Planning & Development	2	29%	37%
IT & Telecoms Technicians	3	30%	35%
IT & Telecoms Assistants	4	20%	26%
IT & Telecoms Engineers	5	36%	24%
Total		30%	30%

Source: e-skills UK analysis data from the ONS Labour Force Survey, 2011 (four quarter average)



## 8.0 IT related education and qualifications

This section considers the talent pipeline into the IT & Telecoms workforce highlighting key developments and implications for employers and the wider economy. It focuses in particular on students in the education system undertaking technology related courses and the extent to which they are able to develop competencies relevant to future employment in IT & Telecoms roles/organisations.

### 8.1 Higher Education

#### 8.1.1 Context

Higher Education statistics presented in this section originate from various sources including the Higher Education Statistics Agency (HESA)<sup>80</sup> and the Universities and Colleges Admissions Service (UCAS). The term 'IT related degrees' is used generically to refer to disciplines identified by the Joint Academic Coding System (JACS) codes of: G4 (Computing), G5 (Information systems), G6 (Software Engineering), G7 (Artificial Intelligence, and, in some cases, G92 (Others in Computing Science). The term 'Telecoms related degrees' refers to Telecoms disciplines coded as: H640 (Communications Engineering), H641 (Telecommunications Engineering) and H643 (Satellite Engineering).

Though the focus of this section is on IT & Telecoms related degrees, it should be noted that employers of IT & Telecoms staff also look to graduates from other disciplines when seeking to fill IT & Telecoms positions at entry level as this is seen to provide a healthy mix in the workforce. Additionally, there is no assumption that all students on IT & Telecoms related degrees should necessarily wish to enter the sector; as with other degrees, many students may choose these disciplines because of their interest in the subject area, not necessarily that they have decided on a career in this discipline.

#### 8.1.2 Applicants to IT related HE courses

In recent years a key issue affecting undergraduate provision has been the large decrease in the number of applicants to single subject IT related courses. Despite a 24% resurgence from 2007 to 2010, the number of all applicants to such courses in the UK has declined by 28% since 2002 whilst, by comparison, the total number of applicants to all HE courses in the UK has increased by 51% over the 2002-2010 period. In 2010 13% of UK domiciled applicants to IT related HE courses were female and 87% were male.

*Although the number of people applying to IT related courses in Higher Education increased by 10% over the past year, for the period 2002-2010 numbers fell by 28%*

Table 29: Applicants to IT related HE courses, by domicile, 2002-2010

	2002	2007	2010	% change 2002-2010	% change 2007-2010
UK domicile applicants to IT courses	22,700	13,000	16,400	-28%	26%
All domicile applicants to IT courses	26,100	15,300	19,000	-28%	24%
All domicile applicants to all courses	461,400	534,500	697,500	51%	30%

Source: e-skills UK analysis of data from UCAS

Note: Figures may not add up due to rounding

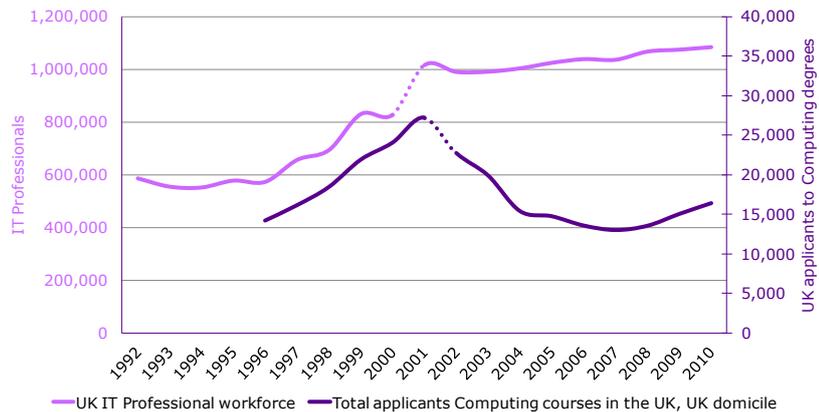
As the table 29 shows, the degree choices of young people do not appear to be supporting the growth of the IT & Telecoms workforce. This is still more apparent when comparing trends in workforce growth with those relating to

<sup>80</sup> Figures presented relate to UK domiciled students unless otherwise stated

applicant numbers. Whilst the IT professional workforce has grown by 10% over the period 2002 to 2010 the number of applicants to IT related HE courses has declined by 28% as illustrated in the chart below:

Figure 32: Comparison between the number of IT professionals and applicants to IT related HE courses, 1992-2010 (UK domicile)

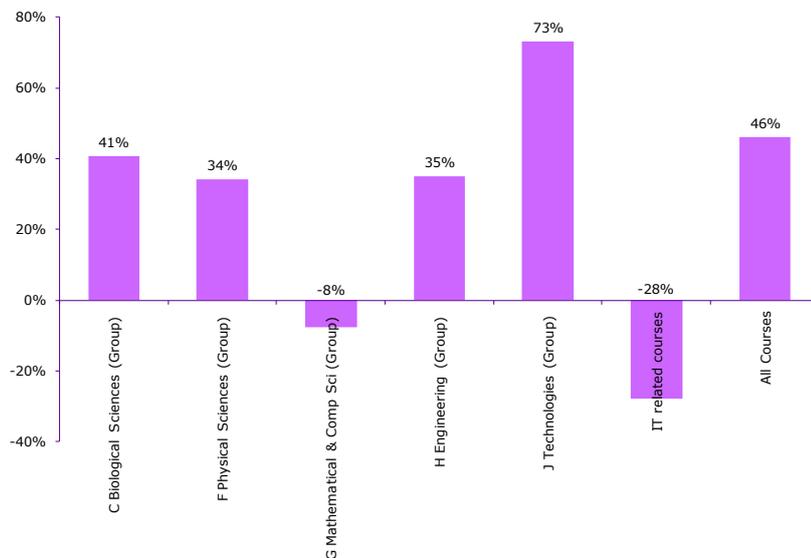
*Whilst growth in IT professional employment has been 10% over the period 2002 to 2010 the number of UK domiciled applicants to IT related HE courses has declined by 28%*



Source: e-skills UK analysis of data from the ONS Labour Force Survey (four quarter averages) and UCAS

Comparing applicant numbers (UK domicile) for IT related degrees in Higher Education with those to other Science, Technology, Engineering and Maths (STEM) subjects shows that, whilst the number of applicants to Engineering, Biological Sciences and Physical Sciences grew by 35%, 41% and 34% respectively between 2002 and 2010, the number of applicants to IT related courses fell by 28% over the same period.

Figure 33: Percentage change in number of applicants to STEM and IT related HE courses, 2002-2010 (UK domicile)



Source: Source: e-skills UK analysis of data from UCAS

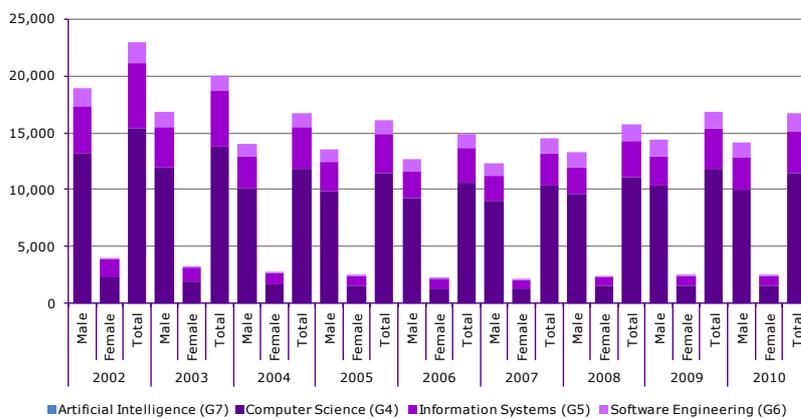
### 8.1.3 Acceptances onto IT related HE courses

Acceptances onto IT related courses include a high proportion from clearing which now accounts for 21% of total acceptances (UK domicile) into IT related degrees and HNDs (compared to 14% for all subjects).

UK domicile acceptances for IT courses at HE level declined over the period 2002 to 2007 and, in line with applicant numbers, increased from the low of 14,500 recorded in 2007 to 16,900 in 2009 but decreased slightly to 16,700 in 2010. Across all IT related courses in 2010, 85% of UK domiciled acceptances were male and 15% were female.

*21% of total acceptances into IT related degrees are via clearing – compared to 14% for all subjects*

Figure 34: Acceptances onto IT related HE courses, by gender (UK domicile)



Source: e-skills UK analysis of data from UCAS

### 8.1.4 Qualifiers from IT & Telecoms related HE courses<sup>81</sup>

Qualifications data covers both undergraduate and post-graduate degrees. The decline/increase in the number of qualifiers lags behind the decline/increase in the number of acceptances by the length of degree courses.

In 2010, of the total UK domiciled qualifiers from UK HEIs in IT & Telecoms related courses (19,450), 98% (18,980) were from IT related courses and 2% (470) from Telecoms. The number of qualifiers from both IT & Telecoms related courses fell by 2% over the past year. In 2010 females accounted for just 18% of qualifiers from IT & Telecoms related HE courses.

The following table shows that, in 2010, a quarter of Telecoms qualifiers were at post-graduate level compared to 16% of the Computing qualifiers.

*Only 18% of qualifiers from IT related HE courses are female*

<sup>81</sup> Applicant data currently available only for IT related courses whilst qualifiers data covers both undergraduate and post-graduate degrees and is readily available for both IT and Telecoms related subjects

Table 30: Level of degree qualification for IT & Telecoms related HE courses (UK domicile)

	IT related courses	Telecoms related courses	Total IT & Telecoms related courses
Postgraduate	16%	25%	16%
First degree	60%	58%	60%
Other (e.g. Foundation Degree)	24%	17%	24%

Source: e-skills UK analysis of data from HESA, 2009/10

### 8.1.5 Graduate destinations by industry segment and occupation

Each year HESA undertakes a survey of HE leavers six months after their departure from higher education. Participation with the 'Destinations of Leavers from Higher Education' (DLHE) survey is not compulsory and not all leavers are involved. As such, the information collected is primarily used to provide an indicator of the relative proportion of leavers undertaking specific activities (entering employment of a specific nature/in a specific industry etc) as opposed to a measure of the absolute numbers doing so.

Amongst leavers from UK HEIs taking up IT & Telecoms roles within six months of leaving, 50% were from IT or Telecoms related courses and 50% from other disciplines. The following chart shows this in more detail.

*Of leavers from UK HEIs taking up IT & Telecoms roles - 50% were from IT or Telecoms related courses and 50% from other disciplines*

Table 31: HEI leavers entering an IT & Telecoms role, 2010

	Proportion (%)
IT&T leavers taking up IT&T positions in the IT&T industry	25%
Other leavers taking up IT&T positions within the IT&T industry	17%
IT&T leavers taking up IT&T positions in other sectors	24%
Other leavers taking up IT&T positions in other sectors	33%
<b>Total</b>	<b>100%</b>

Source: e-skills UK analysis of data from HESA, 2009/10

Note: Figures may not add up due to rounding

The proportion of IT & Telecoms leavers that were 'assumed to be unemployed' six months after leaving their HEI decreased from 14% in 2009 to 13% in 2010. This was still a higher percentage than that for leavers as a whole however, less than one in ten of which (7%) were thought to be unemployed at this point after completing their studies/leaving.

Amongst IT & Telecoms graduates that did secure employment six months after leaving HE, the majority will typically obtain employment within the region of their institution. The region that retained the largest proportion of graduates in 2010 was Northern Ireland (85%) whilst the region that retained the lowest was the East Midlands (39%).

Table 32: Destination of respondents entering IT & Telecoms occupations by region of employment and institution, 2009/10

		Region of Institution											
		North East	North West	Yorkshire & Humber	East Midlands	West Midlands	East of England	London	South East	South West	Northern Ireland	Scotland	Wales
Region of Employment	England	94%	91%	95%	95%	94%	91%	89%	91%	89%	6%	21%	36%
	North East	54%		1%		1%			1%				
	North West	5%	61%	9%	3%	3%	2%	1%	2%	1%		1%	4%
	Yorkshire & Humber	9%	4%	48%	3%	1%			3%	1%	1%	1%	1%
	East Midlands	3%	3%	8%	39%	4%	2%	1%	2%	1%		1%	1%
	West Midlands	1%	2%	4%	8%	43%	1%	1%	3%	3%		2%	6%
	East of England	2%	3%	3%	8%	5%	46%	4%	7%	3%		2%	2%
	London	11%	8%	12%	17%	15%	27%	66%	23%	15%	2%	8%	7%
	South East	4%	6%	7%	12%	9%	11%	12%	41%	17%	1%	3%	8%
	South West	3%	2%	2%	4%	4%	1%	1%	6%	49%		1%	7%
	Northern Ireland	1%	1%						1%		85%	1%	
	Scotland	1%		1%	1%	1%			2%	4%		70%	
	Wales		2%	1%	1%	1%			1%	1%			58%
	Overseas	4%	5%	4%	2%	4%	9%	10%	4%	5%	9%	8%	5%

**Key**

	Largest proportion
	2nd largest proportion
	3rd largest proportion

Source: e-skills UK analysis of data from HESA, 2009/10

Note: Figures may not add up due to rounding

Looking in more detail at leavers (from all subjects) entering IT & Telecoms occupations it can be seen that leavers are most likely to take up Software Professional roles.

Table 33: Leavers from HE entering to IT & Telecoms occupations, 2010

<b>Occupational group</b>		
<b>IT &amp; Telecoms Managers</b>	<b>10.9%</b>	
Information and communication technology managers		2.5%
Information managers		1.8%
Computer operations managers		6.1%
Telecommunications managers		0.5%
<b>IT Strategy &amp; Planning Professionals</b>	<b>8.7%</b>	
IT strategy and planning professionals		0.8%
IT consultants and planners		7.6%
Telecommunications consultants and planners		0.3%
<b>Software Professionals</b>	<b>49.5%</b>	
Software professionals		4.1%
Software designers and engineers		18.9%
Computer analysts and programmers		12.1%
Network/systems designers and engineers		6.1%
Web developers and producers		8.2%
<b>IT &amp; Telecoms Technicians</b>	<b>16.4%</b>	
IT operations technicians (network support)		6.6%
IT user support technicians (help desk support)		9.8%
<b>IT &amp; Telecoms Assistants</b>	<b>5.5%</b>	
Database assistants		5.5%
<b>IT &amp; Telecoms Engineers</b>	<b>2.3%</b>	
Telecommunications engineers		0.9%
Cabling engineers		0.0%
Computer engineers		1.2%
<b>Other IT &amp; Telecoms occupations</b>		12.4%
Web designers		6.9%
<b>Total</b>	<b>100%</b>	100%

Source: e-skills UK analysis of data from HESA, 2010

Note: Figures may not add up due to rounding

## 8.2 Further Education

This section uses statistics provided by the 'Data Service' – an independently managed organisation, established and funded by the Department of Business, Innovation and Skills (BIS) and supported by the Skills Funding Agency. Though figures from the Data Service (i.e. in the following sections) relate to England only, an analysis of equivalent data for Northern Ireland, Scotland and Wales can be found in the appropriate report for each respective nation.

### 8.2.1 Apprenticeships

#### 8.2.1.1 Programme starts

The number of students starting an IT & Telecoms related Further Education (FE) apprenticeship rose by 43% over the 2008/09 to 2009/10 period compared with an increase of 17% for all FE apprenticeships. As a result, IT & Telecoms as a proportion of the total was seen to rise from 4% to 4.5% over the same period.

Nearly two thirds (63%) of IT & Telecoms related programme starts were onto the 'IT & Telecoms Professional' apprenticeship, an increase of 76% on the previous year. A further 34% were onto 'IT User' apprenticeships.

*Nearly two thirds (63%) of IT & Telecoms related programme starts were onto the 'IT & Telecoms Professional' apprenticeship, an increase of 76% on the previous year*

Table 34: Apprenticeship programme starts by sector framework code<sup>82</sup>, 2005/06 – 2009/10

Sector Subject Area	Number of Starts					% of IT & Telecoms Total
	2005/06	2006/07	2007/08	2008/09	2009/10	
Communications Technologies (Telecoms)	2,800	1,600	1,300	200	180	1%
IT & Telecoms Professional	-	-	600	4,500	7,940	63%
IT Professional	-	-	100	100	140	1%
IT Services and Development	1,200	1,600	1,700	-	10	<1%
IT User	2,400	2,600	3,100	4,000	4,300	34%
<b>IT &amp; Telecoms related total</b>	<b>6,400</b>	<b>5,800</b>	<b>6,800</b>	<b>8,800</b>	<b>12,570</b>	100%
<b>All course total</b>	<b>175,000</b>	<b>184,400</b>	<b>224,800</b>	<b>239,900</b>	<b>279,700</b>	

Source: e-skills UK analysis of data from The Data Service

Notes:

- indicates a base value of less than five

The following data sources have been used; Work-based learning (WBL) – 2007/08 and earlier years (W13 final), 2008/09 (E13 final), 2009/10 (E13 final)

Volumes are rounded to the nearest ten except for the grand totals which are rounded to the nearest hundred

<sup>82</sup> Full-year numbers are a count of the number of starts at any point during the year. Learners starting more than one framework will appear more than once. Programme-Led Apprenticeships recorded in WBL ILR returns are included in these figures

### 8.2.1.2 Achievements

The number of achievements on IT & Telecoms related apprenticeship FE courses has grown by 99% since 2005/06, totalling 7,770 in 2009/10.

*Achievements on IT & Telecoms related apprenticeship FE courses have grown by 99% since 2005/06*

'IT & Telecoms Professional' courses accounted for the highest proportion of achievements (51%) and 'IT Professional' the lowest (0.3%) during 2009/10.

Whilst 'IT Services and Development' and 'Communications Technologies' apprenticeships both experienced a decline in the number of achievements between 2005/06 and 2009/10 (due to the introduction of the new 'ITP' framework), achievements on 'IT User' courses increased by 96%.

**Table 35: Apprenticeship achievements by sector framework code<sup>83</sup>, 2005/06 – 2009/10**

Sector Subject Area	Number of Achievements					% of IT & Telecoms Total
	2005/06	2006/07	2007/08	2008/09	2009/10	
Communications Technologies (Telecoms)	1,200	1,000	1,300	900	470	6%
IT & Telecoms Professional	-	-	-	1,700	3,990	51%
IT Professional	-	-	-	-	20	<1%
IT Services and Development	1,100	900	1,700	600	160	2%
IT User	1,600	2,200	1,800	2,500	3,130	40%
<b>IT &amp; Telecoms related total</b>	<b>3,900</b>	<b>4,100</b>	<b>4,800</b>	<b>5,700</b>	<b>7,770</b>	100%
<b>All course total</b>	<b>98,700</b>	<b>111,800</b>	<b>112,600</b>	<b>143,400</b>	<b>171,500</b>	

Source: e-skills UK analysis of data from The Data Service

Notes:

'-' indicates a base value of less than five

The following data sources have been used; Work-based learning (WBL) – 2007/08 and earlier years (W13 final), 2008/09 (E13 final), 2009/10 (E13 final)  
Volumes are rounded to the nearest ten except for the grand totals which are rounded to the nearest hundred.

<sup>83</sup> Full-year numbers are a count of the number of achievements at any point during the year. Learners achieving more than one framework will appear more than once. Programme-Led Apprenticeships recorded in WBL ILR returns are included in these figures

## 8.2.2 National Vocational Qualifications (NVQs) and Scottish Vocational Qualifications (SVQs)

### 8.2.2.1 Awards by level

Of the 1,021,100 NVQ/SVQs awarded in 2009/10, only 3.5% were in an IT & Telecoms discipline. Aside from being relatively scarce in number, IT & Telecoms related awards also tend to have been at a lower level than average and, whilst 30% of all NVQ/SVQs were at level 3 or above, only 17% of IT & Telecoms related awards were at this level.

*69% of IT & Telecoms related NVQ/SVQ awards are at level 2*

Table 36: NVQ/SVQ awards by sector subject area and level, 2009/10

	<b>IT &amp; Telecoms awards</b>	<b>All UK awards</b>
<b>Level 1</b>		
Number	4,800	49,700
Proportion of total (%)	13%	5%
<b>Level 2</b>		
Number	24,700	674,700
Proportion of total (%)	69%	66%
<b>Level 3</b>		
Number	6,000	260,600
Proportion of total (%)	17%	26%
<b>Levels 4 &amp; 5</b>		
Number	*	36,000
Proportion of total (%)	0%	4%
<b>Total</b>	35,600	1,021,100
	100%	100%

Source: e-skills UK analysis of data from the Vocational Qualifications Database

Notes:

Numbers rounded to nearest 100

\* = less than 50

### 8.2.2.2 Awards by gender

Despite the long running problem with attracting females into IT & Telecoms related courses and occupations, the percentage of females obtaining an IT & Telecoms related NVQ/SVQ during 2009/10 was found to be above average at 53% compared with 51% for NVQ/SVQ awards as a whole.

Table 37: NVQ/SVQ awards by sector subject area and gender, 2009/10

	IT & Telecoms awards	All UK awards
<b>Male</b>		
Number	16,700	503,100
Proportion of total (%)	47%	49%
<b>Female</b>		
Number	18,900	517,900
Proportion of total (%)	53%	51%

Source: e-skills UK analysis of data from the Vocational Qualifications Database

Note: Numbers rounded to nearest 100

## 8.3 Vocationally Related Qualifications (VRQs)

### 8.3.1 Awards by level

Of the 2,118,600 VRQs awarded in 2009/10, just under one in five (18%) were IT & Telecoms related. IT & Telecoms related VRQ awards tend to be at a lower level than VRQs as a whole, although more than 80% are at level 2 or above.

*Three quarters of IT & Telecoms related VRQ awards are at level 2*

Table 38: Number of VRQs awarded by sector subject area and level of study, 2009/10

		Information and Communication Technology	All UK Awards
<b>Level 1</b>	<b>Number</b>	68,600	382,000
	<b>% of Total</b>	18%	18%
<b>Level 2</b>	<b>Number</b>	288,300	1,278,900
	<b>% of Total</b>	76%	60%
<b>Level 3</b>	<b>Number</b>	23,700	457,700
	<b>% of Total</b>	6%	22%
<b>Total Awards</b>	<b>Number</b>	380,600	2,118,600
	<b>% of Total</b>	18%	100%

Source: e-skills UK analysis of data from the Vocational Qualifications Database

Notes:  
Figures may not add up due to rounding  
Numbers rounded to nearest 100

Numbers of awards are only for those awarding bodies submitting VRQ data to the Vocational Qualifications Database

### 8.3.2 Awards by gender

The proportion of females awarded an IT & Telecoms related VRQ was lower than males (45% and 55% respectively) during 2009/10 but at a similar level to the national average of 46%.

Table 39: VRQ awards by sector subject area and gender, 2009/10

		<b>Information and Communication Technology</b>	<b>All UK Awards</b>
<b>Male</b>	<b>Number</b>	208,600	1,144,600
	<b>% of Total</b>	55%	54%
<b>Female</b>	<b>Number</b>	172,000	974,000
	<b>% of Total</b>	45%	46%

Source: e-skills UK analysis of data from the Vocational Qualifications Database

Notes:

Figures may not add up due to rounding  
Numbers rounded to nearest 100

Numbers of awards are only for those awarding bodies submitting VRQ data to the Vocational Qualifications Database

## 8.4 The ITQ

The ITQ was designed by e-skills UK in partnership with employers. At level 2 the ITQ qualifies as a 'Full Level 2' qualification<sup>84</sup>, reflecting its size, complexity and breadth of learning.

In 2010/11 there were 176,000 ITQ registrations<sup>85</sup> (58% at Level 2) and 114,000 certifications, an increase of 310% and 302% respectively on the previous year's totals.

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<sup>84</sup> The 'Full Level 2' is considered as a foundation for employability and lifelong learning. It is recognised by the Qualifications and Curriculum Authority and Learning and Skills Council as equivalent to 5 GCSE passes

<sup>85</sup> The total for all levels of ITQ from all Awarding Bodies

## 8.5 Schools and Colleges

As a result of Scotland's differing qualification system this section begins with the provision of data for England, Wales and Northern Ireland and is followed by a section specific to Scotland.

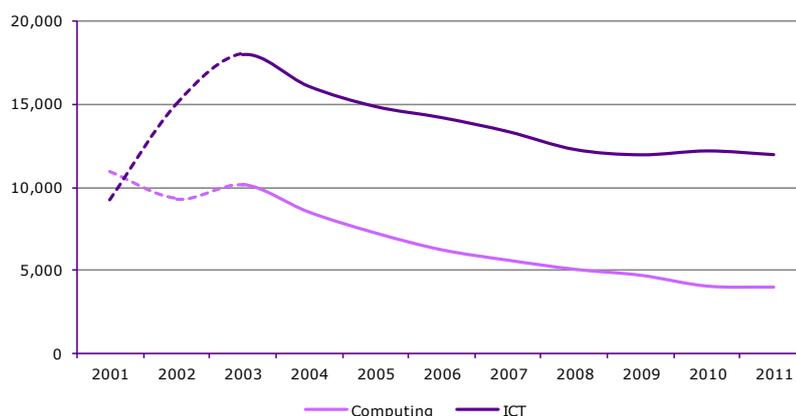
### 8.5.1 A-Levels

Data has been analysed for Computing and ICT A-Levels and not for Applied A-Levels. Computing A-Level sets out to develop a broad range of specialist skills and knowledge relating to IT. ICT instead sets out to encourage students to be 'discerning users of ICT'. Broadly speaking these are, equivalent to 'IT professional' and 'IT user' related qualifications and the content of the Computing A-Level is more relevant to IT related Higher Education and IT related employment than A-Level ICT.

The graph below shows how the number of students taking A-Level Computing and ICT courses has continued to decline in recent years, falling by 43% over the 2003-2011 period. If Applied A-Levels (Single and Double Awards) are included there is a decline of 18% since 2007 when the Applied Awards were introduced.

*Uptake of IT related A-Levels continues to decline*

Figure 35: Number of students taking A-Level Computing and ICT courses, 2001-2011



Source: e-skills UK analysis of data from the Joint Council for Qualifications and Department for Education (2001-2011)

In 2011 a total of 4,000 Computing A-Levels were undertaken, representing 0.5% of all A-Levels sat in the UK. The number of students taking Computing A-Levels has fallen by 61% since 2003 and fell by 2% over the 2009-10 period alone. By comparison, other STEM subjects (Maths, Chemistry, Physics etc) all experienced an increase in student numbers between 2010 and 2011 with Chemistry, for example, associated with an increase of 10% over the period.

*The number of students taking Computing A-Levels has fallen by 61% since 2003*

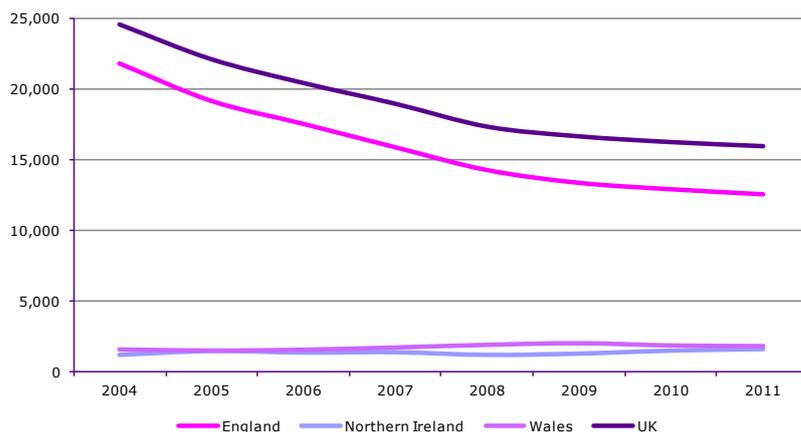
By comparison, despite a decline of 2% over the past year, a much larger number students undertook A-Levels in ICT during 2011 than in Computing and, at 11,960, ICT A-Levels now account for 1.4% of all A-Levels sat in the UK. The proportion of females undertaking ICT A-Levels has remained relatively stable in recent years and in 2011 females accounted for 39% of those taking this subject.

Both Computing and ICT have a lower grade profile than that of other A-Levels and, whilst 27% of all A-Level entries were graded A\* or A in 2011, the figures for Computing and ICT were just 17% and 12% respectively. In terms of achievements, Computing enjoys a slightly higher rate of achievements than ICT with 63% of qualifiers achieving grades A\*-C compared to 61% for ICT (and 76% for all A-Levels). The proportion of A\*-C grades awarded to Computing and ICT students in 2011 was slightly up on the previous year.

A comparison of A-Level data for the different UK nations (excluding Scotland) shows that in England (with the largest number of entrants) the uptake of IT related courses has declined significantly in recent years whilst in Wales and Northern Ireland the overall trend is upwards (though in Wales a decline has occurred in each of the past two years).

*In England between 2004 and 2011 the uptake of IT related A-Levels has declined whilst in Wales and Northern Ireland the trend has been generally increasing*

Figure 36: Uptake of IT related A-Levels by UK nation, 2004-11



Source: e-skills UK analysis of data from the Joint Council for Qualifications

### 8.5.2 GCSEs

There are a number of IT & Telecoms related GCSE courses open to students considering GCSE choices in England, Northern Ireland and Wales, including: a GCSE in ICT, a GCSE Double Award in Applied ICT and a short course GCSE in ICT.

*The number of students taking IT related GCSEs has declined by 70% since 2005*

Following an increase in the number of IT related GCSEs between 2004 and 2005 the number of students taking these qualifications fell during each of the successive years, with the number declining by 70% since 2005. Moreover, in the case of 'Applied ICT GCSEs', the numbers have fallen by 93% over the 2005-11 period.

Table 39: Uptake of ICT GCSEs in England, Wales and Northern Ireland, 2004-11

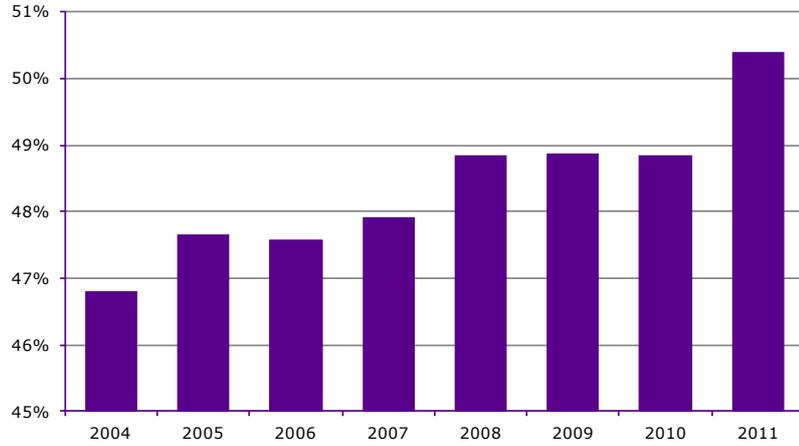
Year	Full course ICT GCSE	Short course ICT GCSE	Applied ICT GCSE
2004	98,835	104,565	41,435
2005	103,400	109,490	49,080
2006	109,600	107,790	44,555
2007	99,655	96,055	27,655
2008	85,600	80,840	16,060
2009	73,520	61,445	9,160
2010	61,020	44,890	5,810
2011	47,130	29,930	3,385

Source: e-skills UK analysis of data from the Joint Council for Qualifications

Though the absolute number of students has declined significantly in recent years, the proportion of female students taking these courses has increased slightly (up 3.5 percentage points since 2004) and females now constitute 50% of all students taking ICT GCSE.

*Females now constitute 50% of all students taking ICT GCSE courses, up 3.5 percentage points since 2004*

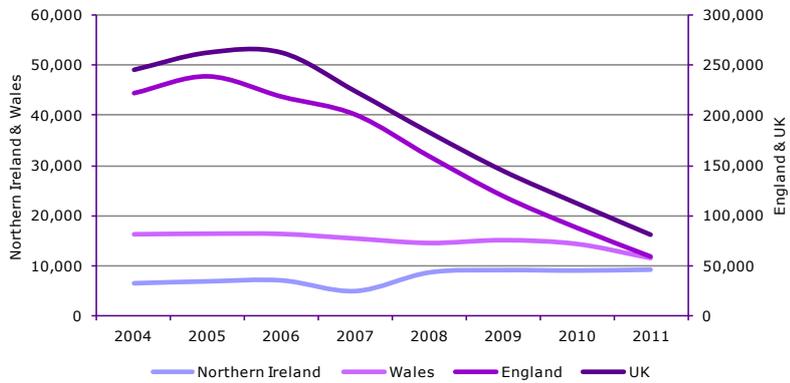
Figure 37: Proportion of female entries to all ICT GCSE courses, UK



Source: e-skills UK analysis of data from the Joint Council for Qualifications

The following chart shows how the uptake of IT related GCSEs in England and Wales has declined over time and how the uptake in Northern Ireland has stabilised over the last three years.

Figure 38: Uptake of IT related GCSEs by UK nation, 2004-11



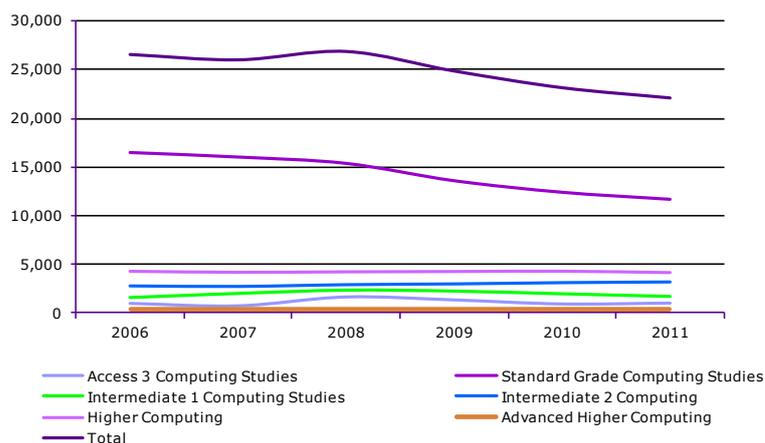
Source: e-skills UK analysis of data from the Joint Council for Qualifications

### 8.5.3 Scotland

The trend in uptake of IT related qualifications in Scotland is similar to that seen in the rest of the UK. Since 2006, uptake of Computing/Computing Studies courses in Scotland has declined by 17% with Standard Grade Computing Studies declining in the past year by 6%.

*Since 2006, uptake of Computing/Computing Studies courses in Scotland has declined by 17%*

Figure 39: Uptake of Computing/Computing Studies in Scotland, 2006-11



Source: e-skills UK analysis of data from the Scottish Qualifications Authority

Computing is the most popular IT related qualification at both Higher and Advanced Higher levels, accounting for 66% of all IT related Higher attainments and 77% of all IT related Advanced Higher attainments in 2010/11.

In total there were 4,820 attainments in IT related Highers and Advanced Highers in 2010/11, of which 75% were male.

### 8.6 Gender

A gender imbalance is generally prevalent across the UK on IT related courses and, with the exceptions of A-Level ICT and GCSE courses, this is worsening over time throughout the education system:

Table 41: Gender balance on IT related courses

Qualification	Proportion (%) of females 2002	Proportion (%) of females 2011	Change
Acceptances to IT related HE courses, UK domicile	17%	15%*	-2%
A-Level Computing	11%	8%	-3%
A-Level ICT (IT user skills)	35%	39%	4%
IT & Telecoms professional occupations	22%	18%	-4%

Source: e-skills UK analysis of data from UCAS, Department for Education, Joint Council for Qualifications and the ONS Labour Force Survey

Note: \* 2010 data



## 9.0 The wider population's use of IT

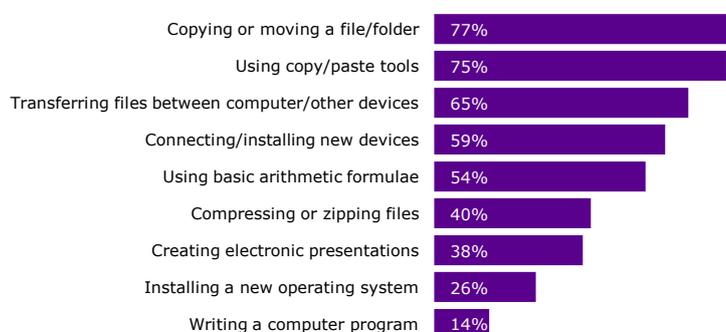
This section looks at the general levels of IT usage within the UK and the level of IT skills held by the workforce. A variety of sources are referenced herein including the Office for National Statistics (ONS) 'Internet Access - Households and Individuals survey (2011)<sup>86</sup>, the Department for Business, Innovation and Skills (BIS) 'Skills for Life Survey (2011)' and internal surveys carried out by e-skills UK and the National Skills Academy for IT.

### 9.1 Introduction

Latest estimates from the Office for National Statistics suggest that approximately 87% of people aged 16 or over have used a computer at some time in their lives and that in many cases they have used computers to undertake a wide range of activities including computer programming.

*Over 1 in 10 (13%) of people aged 16 or over have never used a computer*

Figure 40: Computer activities carried out by users in the UK



Source: ONS Internet Access - Households and Individuals, 2011

#### 9.1.1 IT user skills assessment

Though relating to England only, a recent report from BIS<sup>87</sup> shows that, in general, when asked to perform a range of common, practical IT tasks (in a test environment), IT users tended to demonstrate a higher level of skill when carrying out email related activities with 52% of survey participants assessed as being at NVQ level 2<sup>88</sup> in this particular area.

*It is estimated that only one quarter or less of people in the UK have word-processing or spreadsheet skills at NVQ level 2 or above*

Table 42: Practical assessment results for IT skills, England 2011

	Entry level 2/ below	Entry level 3	Level 1	Level 2/ above
Word processing	43%	16%	15%	25%
Emailing	31%	9%	8%	52%
Spreadsheets	39%	27%	17%	17%
Multi-choice (written)	9%	12%	26%	53%

Source: BIS: Skills for Life Survey (2011)

<sup>86</sup> Figures relate to Great Britain only as opposed to the UK as a whole

<sup>87</sup> Within the BIS report mention is made to ICT skills however this term has not been used here owing to the fact that discussion is limited to IT skills/activities only

<sup>88</sup> Level 2 is equivalent to GCSE grades A\*-C and adults with this level of IT skills are able to demonstrate different methods for organising and presenting a variety of information, taking into account fitness for purpose and audience

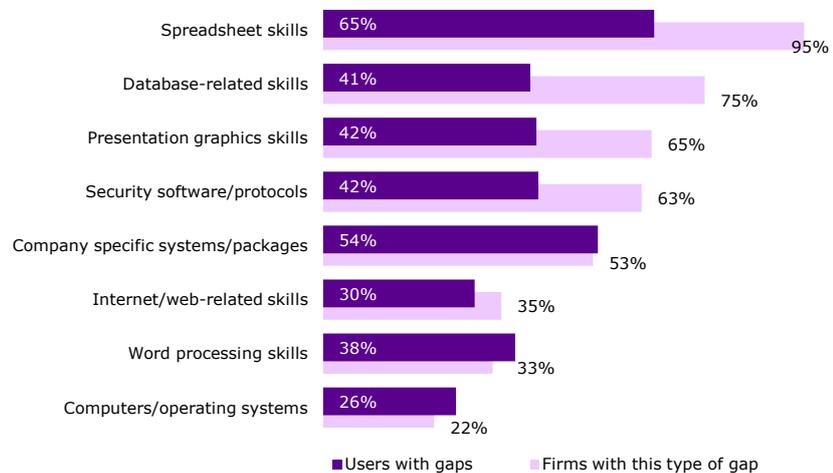
*Two in five firms with skills gaps state that there are gaps between the skills held/needed by IT users within their business*

By comparison, the assessed level of word-processing and spreadsheet skills in particular that were held by survey participants tended to be much lower with the majority being thought to hold skills at just entry level 3 or below<sup>89</sup>.

### 9.1.2 IT users' skills and the incidence of related skills gaps

Amongst firms reporting the existence of skills gaps within their workforce (11% according to results from the National Skills Academy for IT - see section 7), approximately two fifths (42%) identified gaps relating to the IT skills held by computer users within their company. IT user skills gaps appeared most prevalent amongst firms in Wales and those operating in the public sector<sup>90</sup> and were also seen to increase with firm size from just 8% of micro firms to 14% of small firms, 20% of medium sized firms and 25% of large firms with 250 or more staff.

**Figure 41: Incidence of computer users with gaps in their IT skills, by nature of skills gaps**



Source: National Skills Academy for IT - Employer survey, 2011

*Gaps in the skills of IT users are most commonly thought to arise with respect to their spreadsheet skills*

Gaps were most often thought to exist in the spreadsheet skills held by computer users and virtually all firms (95%) with IT user skills gaps identified a mismatch in this area. Moreover, amongst computer users employed within these firms, almost two thirds (65%) were thought to have skills gaps of this nature.

After spreadsheet skills, gaps were most often observed in the ability to use company specific systems/packages (54% of firms reporting user skills gaps) though the proportion of users in these firms with gaps was lower than was the case for database related skills, presentation graphic skills and security skills.

### 9.1.3 Effects of mismatches in IT user skills

On average, just under one quarter (24%) of companies reporting gaps in the IT skills of their computer users were of the view that staff were underperforming as a consequence (i.e. on average users with gaps in their IT skills were thought to be working at 78% of their full potential). The likelihood of reduced performance was however, much greater amongst IT & Telecoms businesses, large firms and those operating within the primary sectors where over one half of firms with IT user skills gaps stated this to be the case.

<sup>89</sup> Adults with IT Entry Level 3 skills are able to interact with and use an IT system to meet required needs, as well as present information in ways that are fit for purpose and audience

<sup>90</sup> Caution low bases

### 9.1.4 Managing user skills in the workplace

Again, as with IT & Telecoms professionals it may be reasonable to assume that some, short term IT user skills gaps could arise as a result of changes in the workforce/business and that in some cases they may be unavoidable to a degree. Again however, when probed about the duration of IT user skills gaps a large proportion (39%) of firms stated that they had been in existence for six months or more and in over one third of cases (37%) this was viewed as an unavoidable issue.

Table 43: Incidence of IT user skills gaps by duration and evitability

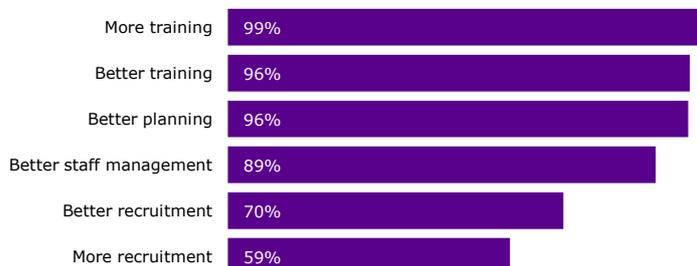
	Short term	Long term	Total
All cases	61%	39%	100%
Unavoidable	22%	37%	27%
Avoidable (by better planning, more training or other means)	78%	63%	73%

Source: National Skills Academy for IT - Employer survey, 2011

On a positive note however, IT user skills gaps were thought of as being avoidable in almost three quarters of cases (73%) – with better planning, more training, better training and better staff management all identified by virtually all affected businesses as cost effective means of fully or at least partially doing this.

*IT user skills gaps thought avoidable in almost three quarters of cases*

Figure 42: Percentage of employers identifying selected methods as a cost effective means of avoiding/reducing the incidence of IT user skills gaps



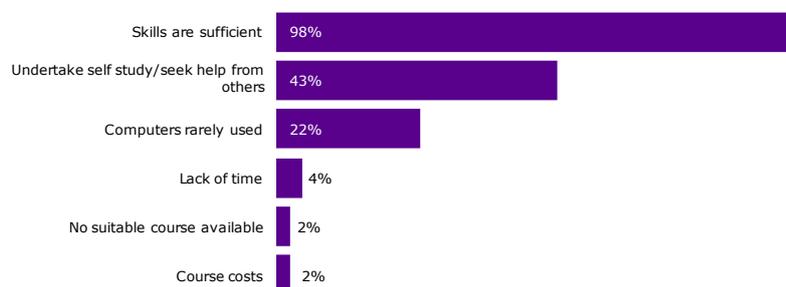
Source: National Skills Academy for IT - Employer survey, 2011

*Only around one quarter of people using the internet are thought to have undertaken an IT training course during the past three years*

### 9.1.5 Incidence of IT user skills development

Despite the relative importance of IT & Telecoms skills to the UK economy there still no comprehensive and up-to-date sources of data on the incidence/nature of IT user skills training provided by UK employers (see Technology Insights 2011). The most current insight into IT user skills training from central sources is provided by the Office for National Statistics (ONS) 'Internet Access survey of Households and Individuals, 2011' which shows that amongst adults who had ever used the internet - some 44% have never undertaken a computer training course<sup>91</sup>, around one third (32%) had only undertaken a course over three years ago and just one quarter (25%) had taken a course during the past three years.

Figure 43: Reasons for not undertaking IT training



Source: ONS Internet Access - Households and Individuals, 2011

In most instances the fact that IT skills training had never been undertaken was put down to the fact that the skills held by the individual were (thought by the individual) to be of a sufficient level however in a small number of cases, barriers such as cost and availability of courses were also cited as being a reason.

### 9.1.6 Nature of IT user skills development

Specific details of the IT training courses undertaken over the past year are not available from ONS however it can be seen from the limited data available that in general the IT user skills of those living in Great Britain are much more likely to be either self-taught and/or learnt from friends/colleagues.

Figure 44: Means by which IT skills have been acquired



Source: ONS Internet Access - Households and Individuals, 2011

*IT skills most often are self-taught or learnt from friends or colleagues*

<sup>91</sup> Of 3 hours or more

## 10.0 Variations across the UK

As highlighted within chapter 3, skills and technology policies are devolved to each nation and, as such, are planned and implemented in accordance with a series of national (and in places sub-national/regional) skills strategies including:

- In Scotland – ‘The Scottish Economic Recovery Plan’ and ‘Skills for Scotland: Accelerating the Recovery and Increasing Sustainable Economic Growth’, with the aim of simplifying the skills system to accelerate growth.
- In Northern Ireland – ‘Success through Skills: Transforming Futures’ with an emphasis on increasing skills levels and reducing sectoral balances through promoting STEM subjects such as Computer Science.
- In Wales – ‘Economic Renewal: a new direction’ and ‘Skills that Work for Wales’, broadening and deepening the skills base in support of economic growth and prosperity.

This section adds to the work undertaken in the development of these documents, highlighting aspects of national variance for the IT & Telecoms sector which will be of importance to those responsible for the delivery of related policy actions/interventions. In this way it is hoped that the needs of the IT & Telecoms sector are given the vital status required for the UK and its constituent nations/regions to bring about the increase in skills required to close the productivity gap with other leading nations and capitalise upon a potential £47 billion uplift for the UK economy over the next 5-7 years.

### 10.1 Scotland

As the second largest nation, Scotland accounts for approximately 8% of the UK population, workforce, workplaces and GVA. GVA per head is roughly equal to the UK average (98%) as are earnings amongst those working within companies based there (i.e. 98%).

If actions are taken to increase the effective implementation of ICT technologies in Scotland over the next 5-7 years this could facilitate an uplift to the Scottish economy of around £3.7 billion which in turn could translate into 39,000 new jobs, across many occupations and sectors. This in turn would enable Scotland to attain and maintain its rightful position as a leading ICT enabled nation. These actions will be influenced by a variety of factors which have been identified in the course of this research:

- There are proportionately less IT & Telecoms firms and IT & Telecoms workers in Scotland than in the UK as a whole,
- There are currently 100,000 people employed in the IT & Telecoms workforce in Scotland representing 4% of total employment. Of those working in IT & Telecoms just under three quarters (72,000) are IT & Telecoms professionals – 39% of which are employed within the IT & Telecoms industry itself (the remaining 61% working within the wider economy in Scotland),
- Advertised demand for IT & Telecoms professionals in Scotland has grown by 31% over the past year compared with a figure of 21% for the UK as a whole,
- It is forecast that approximately 9,600 new entrants to the IT & Telecoms professions will be needed each year between 2012 and 2015 to meet the increasing level of demand from Scottish employers. To meet increased demand requires increased supply and thus uptake of IT related courses. However at secondary level, uptake has fallen by 22 percentage points since 2005.
- While employment in Scotland is forecast to increase at 0.5% per annum between 2012 and 2020, the IT professional workforce within the IT industry is forecast to grow at 1.91% per annum, almost four times this rate,
- The proportion of IT & Telecoms professionals in Scotland holding an HE level qualification is notably higher than the UK average (75% compared with 62% for the UK) whilst the proportion of IT &

Telecoms industry staff holding qualifications at this level is also above the norm (comparison figures of 62% and 59% respectively),

- Development activity for IT & Telecoms professionals working in Scotland is slightly below average however, with 24% reportedly in receipt of education and training each quarter compared with 25% of those working in IT & Telecoms roles across the UK more generally,

## 10.2 Wales

Wales is the third largest nation and accounts for around 4% of the total population, workforce, business community and GVA. GVA per head in Wales is significantly lower than in other nations and regions (74% of the UK average) as are reported earnings (i.e. £450 per week or 90% of the UK figure).

As with Scotland, Wales is under represented in terms of IT & Telecoms workers/workplaces and could potentially realise a GVA uplift of £1.5 billion over the next 5-7 years if the existing IT & Telecoms infrastructure is improved and the adoption of ICT technologies amongst the wider business community/workforce is accelerated and expanded. This uplift in turn could translate into 18,000 new jobs, across many occupations and sectors. In developing an action plan to ensure that this occurs the following observations may need to be taken into consideration:

- There are currently 44,000 people employed in the IT & Telecoms workforce in Wales i.e. representing 3% of total employment. Of these people, 36,000 are employed as IT & Telecoms professionals – 31% working within the IT & Telecoms industry and 69% within the wider economy,
- Advertised demand for IT & Telecoms professionals in Wales has grown by 27% over the past year compared with a figure of 21% for the UK as a whole,
- While overall employment in Wales is forecast to increase by 0.67% per annum between 2012 and 2020, the number of IT professionals working within the IT industry is forecast to grow at 1.37% per annum, over twice the average rate for the workforce as a whole,
- The proportion of IT & Telecoms professionals in Wales holding an HE level qualification is below the UK average (56% compared with 62% for the UK) as is the proportion of IT & Telecoms industry staff holding qualifications at this level (comparison figures of 55% and 59% respectively).
- At 25%, the proportion of IT & Telecoms professionals working in Wales that receive job related education and training each quarter is equal to the UK average,
- The number of applicants to HE courses in Computing and Telecoms Higher Education courses in Wales gradually increased between 2006 and 2009 but subsequently declined by 5% in 2010. At 650 the number of applicants, is still 20% down on the 2002 figure.
- To meet the needs of Welsh employers, an additional 3,100 new entrants to the IT & Telecoms professions will be needed every year through to 2015.

### 10.3 Northern Ireland

The smallest of the UK nations, Northern Ireland represents just 3% of the total population, workforce, and business community. Northern Ireland has proportionately fewer companies in the IT & Telecoms sector than the UK average, and like Wales, lower levels of GVA per head (79% of the UK average) and rates of pay (88% of the average).

Despite the smaller business/employment base, it is still calculated that improvements in the adoption/utilisation of digital technologies in Northern Ireland could raise GVA by almost £0.7 billion pounds over the next 5-7 years. This uplift in turn could translate into 10,000 new jobs, across many occupations and sectors. Particular issues for consideration when planning actions to facilitate the change necessary to realise these benefits would be:

- There are currently 28,000 people employed in the IT & Telecoms workforce in Northern Ireland i.e. representing 4% of total employment. Of these people, 21,000 are employed as IT & Telecoms professionals – 43% working within the IT & Telecoms industry and 57% within the wider economy,
- Advertised demand for IT & Telecoms professionals in Northern Ireland has grown by 24% over the past year compared with a figure of 21% for the UK as a whole,
- While employment in the overall Northern Ireland workforce is forecast to increase at 0.72% per annum between 2012 and 2020, the IT professional workforce working in the IT industry is forecast to grow at 2.16% per annum, three times as fast as the average employment growth in Northern Ireland,
- The proportion of IT & Telecoms professionals in Northern Ireland holding an HE level qualification is notably higher than the UK average (70% compared with 62% for the UK) whilst the proportion of IT & Telecoms industry staff holding qualifications at this level is also above the norm (comparison figures of 64% and 59% respectively),
- Development activity for IT & Telecoms professionals working in Northern Ireland appears to be well below average, with only around 19% reportedly in receipt of education and training each quarter compared with 25% of those working in IT & Telecoms roles across the UK more generally,
- An additional 2,300 new entrants into IT & Telecoms positions will be needed every year to 2015 to meet the predicted demand from employers,
- The number of students taking IT related GCSEs in Northern Ireland grew by over a third (35%) between 2005 and 2011 even as a decline of approximately 69% was recorded for the UK as a whole.



## 11.0 Current and future skills priorities

This section summarises the current and future skills issues and priorities for the IT & Telecoms professional workforce and IT users identified within the earlier sections of this report

### 11.1 IT & Telecoms professionals

#### 11.1.1 Current skills priorities

##### Advertised demand

On average, there were approximately 116,000 vacancies for IT & Telecoms staff advertised in the UK during each quarter of 2011 – the equivalent of around one in ten actual positions (i.e. there were estimated to be 1.16 million IT/Telecoms professionals employed throughout the year). The level of demand for IT/Telecoms professionals appears to have recovered substantially over the past two years following the decline induced by the UK recession between 2008 and 2009.

The majority of adverts for IT & Telecoms positions placed during 2011 were in the areas of Development, Design or Support and Systems Developers in particular were found to be the IT & Telecoms professionals most sought after by recruiters in 2011 (accounting for 28% of all positions advertised over the year).

The 'technical' skills most often sought by employers were: SQL, C, C#, .NET, Java, SQL SVR, ASP, JavaScript, Agile and HTML.

##### Occupational profile

Around four out of ten IT/Telecoms professionals (38%) will typically hold a managerial/strategic role in the organisation, one in three (33%) are employed as Software Professionals and a similar proportion (31%) work either as IT Technicians, Assistants or Engineers.

Analysis of employment trends over the last ten years show how a shift to higher level employment has taken place with the largest rate of employment growth occurring for ICT Managers (up in number by 28%). By comparison, there have been substantial decreases in the number of people working in Assistants or Engineering roles.

##### Recruitment and skills shortages

Amongst employers seeking to recruit IT & Telecoms staff during 2011, just under one in seven (14%) reported having difficulties filling the positions advertised. Of these, a similar proportion (15%) stated that they were experiencing IT & Telecoms related skills shortages - equating to around 5,700 IT & Telecoms vacancies that were hard-to-fill and 3,100 that were difficult to fill due to a lack of applicants with the required skills, qualifications and/or experience.

The issue of IT/Telecoms related recruitment difficulties was still more acute within the IT & Telecoms sector however where just under one half of firms with IT & Telecoms positions reported having difficulty finding applicants to fill them.

IT & Telecoms related skills shortages were most frequently associated with 'Professional' level openings (i.e. as opposed to Managerial, Technician, Assistant or Engineer grade posts) with around four in five (79%) of businesses experiencing IT & Telecoms related skills shortages stating that they were occurring in this area.

In particular, skills shortages were cited by recruiters seeking to fill positions for Programmers/Software Developers and Web Design/Development Professionals.

The job-related skills most commonly cited by employers as being hard to find amongst applicants for IT & Telecoms positions were: .NET, ASP.NET, Dynamics, SharePoint, Visual Basic, Visual Studio, C# and PHP.

## Skills matching in the workplace

Although IT & Telecoms staff are generally able to show a high level of educational attainment, it appears that the work related skills they possess do not always align with those required by their employers. Around one in ten organisations are aware of gaps in the skills of their employees (11%) and of these firms, over one third (34%) report there being gaps in the skills of their IT & Telecoms staff.

The issue of IT & Telecoms skills gaps (i.e. gaps in the skills of IT staff) is particularly acute within the IT & Telecoms sector, where amongst the 17% of firms with skills gaps, 70% report gaps in the skills of their IT & Telecoms staff.

The majority of firms with IT & Telecoms skills gaps are aware of gaps in both the technical and non-technical skills of their IT & Telecoms staff (71% and 67% of businesses respectively) and on average, skill gaps are identifiable amongst approximately 71% of those holding IT & Telecoms positions within these firms.

When technical skills gaps are apparent they are most commonly thought to arise in respect to Microsoft skills – particularly ASP.NET, C and .NET which together with PHP and Linux represented the top 5 technical skills gaps cited by employers.

For employers where non-technical skills gaps exist the most common areas are: sales related and interpersonal skills though gaps in business/related skills are also common.

### 11.1.2 Future skills

#### The next 12 months

Looking at the future use of specific technologies/IT related business processes within their organisations, a large proportion of firms anticipate an increase in their use of cloud computing and mobile computing/applications over the coming year and many predict an implementation of business process management, virtualisation, business analytics and mobile computing/applications.

As companies introduce, increase or adapt the IT/Telecoms systems required by their businesses, they will also need to ensure that they have access to a ready pool of labour with the skills needed to facilitate these actions. However, skills related skills shortages and gaps are forecast to remain over the coming year and amongst IT & Telecoms firms and SMEs in particular, companies are twice as concerned about the availability of skilled IT & Telecoms staff over the next 12 months as are other businesses in the UK.

More specifically, in the near future it is thought that IT & Telecoms related recruitment difficulties are likely to be most apparent for firms seeking to fill positions for Programmers and Software Development Professionals or Web Design and Development staff.

### Employment forecasts to 2020

Employment of IT professionals between 2012 and 2020 is forecast to grow at 1.62% per annum – nearly twice as fast as the UK average.

Historic growth trends within the IT & Telecoms employment are set to continue, with the strongest growth predicted to arise in high skill areas/occupations, particularly Software Professionals, ICT Managers and IT Strategy & Planning staff.

The number of people working as Software Professionals in particular is forecast to grow at a rate nearly two and a half times the average (for all occupations) and this group of workers will account for over a third of all IT & Telecoms professionals by 2020. By contrast, there will be a decline in the number of people working as IT/Telecoms Assistants or Engineers over the same period.

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The changing nature of skills in the UK will continue to be primarily in high value roles such as-

- project management,
- systems architecture,
- business process management,
- change management,
- security,
- risk management,
- analytics,
- web/internet development.

There will however continue to be an increasing need for customer, consumer and business-oriented skills as well as sophisticated technical competencies.

### Emerging trends and associated skills needs

Specific technologies with important skills implications are: Cloud Computing; Green IT; Social and Mobile Computing; 'Big data'/Analytics, Smart Computing and Security and Data Protection.

Security and data protection is an issue across many new technologies and IT & Telecoms professionals need the skills to develop integrated security solutions which will fix the vulnerabilities of underlying architecture and infrastructures.

Cloud computing will require project and integrated solutions management skills as well as architecture, infrastructure, networking, security and quality assurance testing skills.

IT & Telecoms professionals involved in Green IT will need relevant skills in environmental impact assessment and management, technology utilisation and re-cycling together with technical design skills related to power management.

For businesses to take advantage of the use of information and analytics for competitive advantage they need staff with advanced skills in data modelling, simulation and analytics.

With mobile technologies the skills challenges will be around developing new security models for managing and securing devices and services and managing risk.

Employers report that increasingly IT & Telecoms professionals are increasingly required to have the core business skills to solve real business issues and facilitate change within the firm, as new products and services are designed and deployed.

As information technology and services become more embedded in everyday life, both business and social, IT & Telecoms professionals need the interpersonal skills to be able to deal with and better understand customer challenges and consumer choices.

## 11.2 Use of IT by the wider population

### 11.2.1 Current skills priorities

Latest estimates from the Office for National Statistics suggest that approximately 87% of people aged 16 or over have used a computer at some time in their lives and though detailed information about the level of IT skills held is not currently available, for two of the most commonly used applications – word processing and spreadsheets - it is estimated that only one quarter or less of people in the UK are at NVQ level 2 or above.

For employers, this level of IT skills often appears to be insufficient as two in five (42%) firms with skills gaps within their workforce, identify IT skills as one of the areas in which these gaps exist.

IT user skills gaps appear most prevalent amongst firms in Wales and those operating in the public sector and are seen to increase with firm size from just 8% of micro firms to 14% of small firms, 20% of medium sized firms and 25% of large employers. Gaps are most often thought to exist in the spreadsheet skills of computer users and virtually all firms (95%) with IT user skills gaps identify a mismatch in this area. Moreover, amongst the computer users employed within these firms, almost two thirds (65%) are thought to have skills gaps of this nature.

After spreadsheet skills, gaps are most often observed in the ability of staff to use company specific systems/packages (54% of firms reporting).

On average, just under one quarter (24%) of companies reporting gaps in the IT skills of their computer users are of the view that staff underperform as a consequence (i.e. on average users with gaps in their IT skills were thought to be working at 78% of their full potential).

### 11.2.2 Future skills priorities

- Making the most of technology is arguably the single most important action that can be taken to improve productivity within the UK economy. To achieve this all individuals need increasingly sophisticated IT skills which can be used not only to secure/retain employment but also to enable and enrich their daily lives.
- In the workplace, the key to this generic IT up-skilling will lie in particular with the four and a half million managers and leaders who will need to grasp the strategic implications of technology and have the skills to realise its potential.

However, outside of the workplace not all are engaged with new technology and it is estimated that approximately 8.2 million UK adults are still off-line and hence excluded from the benefits that IT/technology can bring about. More specifically, the groups most likely to be 'digitally excluded' are the families with single parents, those aged 65 or over and the unemployed.

Digital exclusion is seen as going hand in hand with social exclusion - the former serving to exacerbate the latter and hence bringing the digitally excluded online and enabling them to attain pre-requisite skills for life in a technology driven world is a key priority. Only then can this community avoid being left out of the wide and growing range of personal benefits accessing the web brings e.g. improved educational attainment, improved skill levels, improved job level and income, savings from online shopping, and better access to public services and health services.

## 12.0 Global ambition and e-skills UK's strategic objectives

This section sets out a vision for the UK's role in the digital economy and recommended actions to support that vision.

### 12.1 Vision

The UK has one of the most competitive technology industries in the world, a highly respected technology skills pool, and a particular expertise in the application of technology to deliver business benefit. Our vision is that the UK is recognised as a global leader in delivering business value from technology. This means:

- **The IT & Telecoms workforce** will be recognised as the best in the world for solving business problems and increasing business competitiveness across all sectors;
- **Managers and leaders** in every sector will have the ability to fully exploit the strategic potential of technology, establishing the UK as the most competitive nation with the most productive businesses;
- **All individuals** will have the IT user skills needed for full participation in employment and society; and
- **Educators** will have the knowledge and skills to support the development of a world-class IT skills pool.

### 12.2 Rationale for change

Strategic action to accelerate the development of the skills pool in line with this vision is essential for the future. Information Technology and Communications systems are at the heart of every organisation, they underpin the delivery of high quality, cost effective public services, and they are central to the fabric of our daily lives. IT is a major source of competitive advantage. Globalisation has radically shrunk the world, and applying technology to innovate, to reach new markets and to drive performance improvements are now pre-requisites for survival. Increasingly work can be sourced from any country and, in this environment, countries with the best use of technology and the best supply of skills are emerging as the global winners.

The UK has one of the best track records in the world for developing IT-enabled business solutions. We have great strengths in technology innovation, internet exploitation and games. For the UK to maintain a leadership position in technology-intensive sectors and the newly emerging world order, we need a vibrant, highly skilled workforce of IT professionals – the experts who create, implement and derive value from the systems, services and communications backbone on which everyone depends. We need all managers and leaders in all sectors to understand the strategic implications of technology and have the ability to realise its potential in their organisations. We need every individual to have the digital literacy skills that are increasingly a pre-requisite for employment, social interaction, and access to government services.

### 12.3 The challenges

IT & Telecoms is at the heart of the modern economy, supporting the value add of practically all organisations in every sector. It is fundamentally affecting companies in all sectors and making the most of technology is arguably the single most important step that can be taken to improve productivity across the UK economy.

For businesses across all sectors, there are significant opportunities to be had by investing in and optimising ICT. The challenge is to ensure technology is inextricably linked to business strategy and processes throughout the organisation, delivering increased productivity, adding value, enabling innovation and opening up new markets. For an organisation to exploit the transformational potential of technology requires a new level of business innovation, for example in devising new business models and in taking advantage of new sources of information. Not only do all individuals need increasingly sophisticated skills in the use of IT for social and economic

*Countries with the best use of technology and the best supply of skills are emerging as the global winners*

*Making the most of technology is arguably the single most important step that can be taken to improve productivity across the UK economy*

purposes, the UK's 4.5 million managers and leaders need to grasp the strategic implications of technology and have the skills to realise its potential.

Issues of security and data protection remain crucially important, now becoming aspects of a company's brand rather than back office IT issues. Of particular note is the fact that smaller companies in all sectors, especially those without their own IT & Telecoms professionals, face significant challenges in understanding the threats and opportunities arising from this changing environment.

Underneath the overall growth in the IT & Telecoms workforce lies a complex picture of restructuring and skills shift: higher skilled, multi-discipline jobs are in growth; the number of people in many 'traditional' roles is shrinking; and talent is increasingly sourced globally. Employment of IT professionals to 2020 is forecast to grow nearly twice as fast as the UK average, and attracting high quality recruits into the IT & Telecoms workforce is critical for the competitiveness of all sectors of the economy. To sustain continued growth, the UK's IT & Telecoms workforce must constantly develop the 1.5 million people in the existing workforce, as well as train over 129,000 new entrants to IT & Telecoms professional job roles each year.

The sector needs a vibrant, well-skilled recruitment pool from multiple sources, with a particular focus on business and higher level technical skills. However, the choices of young people are not supporting the growth of the sector. Gender imbalance is prevalent across IT related courses, and this is worsening over time throughout the education system; students and their advisors often have an extremely poor understanding of IT related careers; and young people commonly hold negative perceptions as a result.

There are also concerns about the curriculum in schools. Widespread negative experience with the ICT GCSE is an important factor in the drop in students' interest at A-level and although data for the past three years has shown a rise in the number of applicants to Computing degrees, for the period 2001-2010 numbers fell by 38%.

A coherent, strategic approach to skills is fundamental to enabling the economy to derive maximum benefit from the power of technology; transforming competitiveness and productivity through the creation of appropriate technology related skills. With this, the UK can be a global leader in technology. Without it, the country will become a second rate player in a high technology world.

For the UK therefore, the need for broader, deeper and continually changing skills affects not only the 1.5 million people in the IT & Telecoms workforce, but also the 4.5 million business managers and leaders who need to understand how to realise the potential of IT, and those in the 22 million jobs which require skills in the use of IT. In particular, the UK needs to develop:

- A vibrant, highly skilled IT & Telecoms workforce – increasingly the 'hybrid' professionals who can bridge both technology and business;
- The capability of leaders and managers in all sectors to manage the inextricable link between business strategy and technology strategy and deployment;
- The skills of every individual to use IT to maximise their contribution to business and society.

With IT capability driving enterprise, jobs and economic growth across every sector of the economy, a coherent strategy for technology skills across the UK is fundamental to the UK's prosperity in the years ahead.

*The sector needs a vibrant, well-skilled recruitment pool from multiple sources, with a particular focus on business and higher level technical skills*

## 12.4 Recommended strategies

Employers remain committed to addressing skills pipeline issues, such as the curriculum in schools and universities, and the gender divide. There is also increasing interest in collaborative action to make it easier to recruit and train new entrants to the sector and to improve the mobility and development of the existing workforce. Alongside this, the continuing challenges of the economic environment places particular emphasis on products and services that reduce cost or increase return on investment.

Based on the analysis and skills priorities set out in this document, and taking account of the current environment, e-skills UK will work together with partner organisations to deliver on three key strategic objectives alongside its core activities:

### 1. Inspire future talent

To motivate talented students to pursue IT & Telecoms related careers and better prepare all young people for work in a technology-enabled world.

We will galvanise employer investment in young people so that:

- An increasing proportion secure employment in the growing IT & Telecoms workforce, via industry-valued full time degrees, part-time degrees and apprenticeships;
- New mainstream qualifications are established, which appeal to students and are valued for their rigour and relevance by the most demanding universities and employers;
- A generation of young people – especially women - are inspired to pursue IT-related education and technology-rich careers.

### 2. Support IT & Telecoms professionals

Develop the IT & Telecoms professional skills pool as the best in the world for deriving business benefit from technology.

We will galvanise the investment of employers and individuals in IT & Telecoms professional skills so that:

- The sector is maximising its potential for employment and economic growth by attracting and developing talent;
- New recruits are undertaking the training they need to become more productive more quickly, including through increased uptake of Apprenticeships and part-time degrees and increased use of IT Professional Standards;
- More IT & Telecoms professionals are up-skilling in order to maximise their business contribution and career potential.

### 3. Increase digital capability

Trigger increased investment in the IT capability of all individuals and businesses in every sector.

We will galvanise the collaborative action of employers and government so that:

- Individuals seeking employment can understand and access training to achieve a clear minimum standard of digital literacy.
- Employers in every sector have a better understanding of how to deliver business value from IT.

To enable all of the above, we will:

- Maintain the quality and vitality of our employer leadership and wider employer engagement;
- Underpin all of our work with world-class labour market intelligence;
- Ensure there is a coherent qualifications strategy for the sector which is driven by the needs of employers and learners;
- Bring together effective partnerships to improve the impact and value for money of action on skills.



## Annex A: IT & Telecoms professional occupations

e-skills UK has been licensed to address skills issues relating to all IT & Telecoms professionals working in the UK irrespective of the industry sector in which they are employed. More specifically, this means workers identified by the following Standard Occupational Classification (SOC) codes:

SOC (2000)	Summary	Related Job Titles
1136 INFORMATION AND COMMUNICATION TECHNOLOGY MANAGERS	Plan, organise, direct and co-ordinate the work necessary to operate and provide information communication technology services, to maintain and develop associated network facilities and to provide software and hardware support.	<ul style="list-style-type: none"> <li>• Computer Manager</li> <li>• Computer Operations Manager</li> <li>• Data Processing Manager</li> <li>• IT Manager</li> <li>• Systems Manager</li> <li>• Telecom Manager</li> </ul>
2131 IT STRATEGY AND PLANNING PROFESSIONALS	Provide advice on the effective utilisation of information technology in order to solve business problems or to enhance the effectiveness of business functions.	<ul style="list-style-type: none"> <li>• Computer Consultant</li> <li>• Software Consultant</li> </ul>
2132 SOFTWARE PROFESSIONALS	Responsible for all aspects of the design, application, development and operation of software systems.	<ul style="list-style-type: none"> <li>• Analyst Programmer</li> <li>• Computer Programmer</li> <li>• Software Engineer</li> <li>• Systems Analyst</li> <li>• Systems Designer</li> <li>• Games Developer</li> <li>• Web Designer/ Developer</li> </ul>
3131 IT OPERATIONS TECHNICIANS	Responsible for the day-to-day running of computer systems and networks including the preparation of backup systems, and the performance of regular checks to ensure the smooth functioning of such systems.	<ul style="list-style-type: none"> <li>• Database Manager</li> <li>• IT Technician</li> <li>• Network Technician</li> <li>• Systems Administrator</li> <li>• Web Master</li> </ul>
3132 IT USER SUPPORT TECHNICIANS	Responsible for providing technical support, advice and guidance for customers or IT users within an organisation, either directly or by telephone, email or other network interaction.	<ul style="list-style-type: none"> <li>• Help desk Operator</li> <li>• Helpline Operator (computing)</li> <li>• IT Helpline Support Officer</li> <li>• Support Technician (computing)</li> <li>• Systems Support Officer</li> </ul>
4136 DATABASE ASSISTANTS AND CLERKS	Create, maintain, preserve and update information held in electronic databases, computer files, voice-mailboxes and email systems.	<ul style="list-style-type: none"> <li>• Computer Clerk</li> <li>• Data entry Clerk</li> <li>• Data Processor</li> <li>• VDU Operator</li> </ul>

Cont...

5242 TELECOMMUNICATIONS ENGINEERS	Install, maintain and repair public and private telephone systems.	<ul style="list-style-type: none"> <li>• Technical Officer (telecommunications)</li> <li>• Telecommunications Engineer</li> <li>• Telephone Engineer</li> <li>• Telephone Installation Engineer</li> <li>• Telephone Technician</li> </ul>
5243 LINE REPAIRERS AND CABLE JOINTERS	Install, maintain, test and repair overhead, underground, surface and submarine electricity and telecommunications cables.	<ul style="list-style-type: none"> <li>• Cable Jointer</li> <li>• Telegraph Linesman</li> <li>• Telephone Linesman</li> <li>• Telephone Wireman</li> </ul>
5245 COMPUTER ENGINEERS, INSTALLATION AND MAINTENANCE	Install, maintain and repair personal computers, mainframe and other computer hardware.	<ul style="list-style-type: none"> <li>• Computer Engineer</li> <li>• Computer Maintenance Engineer</li> <li>• Computer Service Engineer</li> <li>• Computer Service Technician</li> </ul>

For simplicity, and to avoid issues of data suppression, in certain sections of the report, occupational codes have been summarised in the following manner to aid the reader.

SOC level	SOC Major Group	IT & Telecoms grouping	IT & Telecoms occupations	IT & Telecoms SOC codes
1	Managers and Senior Officials	IT & Telecoms Management	<ul style="list-style-type: none"> <li>• ICT Managers</li> </ul>	<ul style="list-style-type: none"> <li>• 1136</li> </ul>
2	Professional occupations	ICT Professionals	<ul style="list-style-type: none"> <li>• IT Strategy &amp; Planning Professionals</li> <li>• Software Professionals</li> </ul>	<ul style="list-style-type: none"> <li>• 2131</li> <li>• 2132</li> </ul>
3	Associate Professional and Technical	IT & Telecoms Technicians	<ul style="list-style-type: none"> <li>• IT Operations Technicians</li> <li>• IT User Support Technicians</li> </ul>	<ul style="list-style-type: none"> <li>• 3131</li> <li>• 3132</li> </ul>
4	Administrative and Secretarial	IT & Telecoms Assistants	<ul style="list-style-type: none"> <li>• Database Assistants &amp; Clerks</li> </ul>	<ul style="list-style-type: none"> <li>• 4136</li> </ul>
5	Skilled Trades Occupations	IT & Telecoms Engineers	<ul style="list-style-type: none"> <li>• Telecommunication Engineers</li> <li>• Line Repairers &amp; Cable Jointers</li> <li>• Computer Engineers</li> </ul>	<ul style="list-style-type: none"> <li>• 5242</li> <li>• 5243</li> <li>• 5245</li> </ul>
6	Personal Service Occupations			
7	Sales/Customer Service Occupations			
8	Process, Plant and Machine Operatives			
9	Elementary Occupations			

## Annex B: IT & Telecoms industrial classifications

In the same way that specific SOC codes are employed to identify the core occupational focus of our activities (or 'footprint') Standard Industrial Classification (SIC) codes are used to define the industrial sectors for which e-skills UK are licensed by Government. These codes are as follows:

<b>SIC 2003</b>	
22.33	Reproduction of computer media
64.2	Telecommunications
72	Computer & related activities
72.1	Hardware consultancy
72.2	Software consultancy & supply
72.21	Publishing of software
72.22	Other software consultancy & supply
72.3	Data processing
72.4	Database activities
72.5	Maintenance & repair of office, accounting & computing machinery
72.6	Other computer related activities

<b>SIC 2007</b>	
18.20/3	Reproduction of computer media
58.2	Software publishing
58.21	Publishing of computer games
58.29	Other software publishing
61	Telecommunications
61.1	Wired telecommunications activities
61.2	Wireless telecommunications activities
61.3	Satellite telecommunications activities
61.9	Other telecommunications activities
62	Computer programming, consultancy & related activities
62.01	Computer programming activities
62.01/1	Ready-made interactive leisure & entertainment software development
62.01/2	Business & domestic software development
62.02	Computer consultancy activities
62.03	Computer facilities management activities
62.09	Other information technology activities
63.1	Data processing, hosting & related activities; web portal
63.11	Data processing, hosting & related activities
63.12	Web portals
95.1	Repair of computers & communications equipment
95.11	Repair of computer & peripheral equipment
95.12	Repair of communication equipment

## Other relevant SIC codes

e-skills UK has an interest in the elements of management and consultancy concerned with technology and business change:

70.22/9	Management consultancy activities (other than financial management)
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e-skills UK also has a shared interest in technology manufacturing, a sector for which SEMTA has been designated as the lead SSC with responsibility for skills and related issues:

26.2 Manufacture of computers and peripheral equipment	
	26.20 Manufacture of computers and peripheral equipment
26.3 Manufacture of communication equipment	
	26.30 Manufacture of communication equipment
	26.30/1 Manufacture of telegraph and telephone apparatus and equipment
	26.30/9 Manufacture of communication equipment (other than telegraph and telephone apparatus and equipment)
	27.31 Manufacture of fibre optic cables

Other codes of relevance include wholesale and retail sale of ICT equipment for which Skills for Logistics and Skillsmart have been designated as the lead SSCs with responsibility for skills and related issues:

46.5 Wholesale of information and communication equipment	
	46.51 Wholesale of computers, computer peripheral equipment and software
	46.52 Wholesale of electronic and telecommunications equipment and parts

47.4 Retail sale of information and communication equipment in specialised stores	
	47.41 Retail sale of computers, peripheral units and software in specialised stores
	47.42 Retail sale of telecommunications equipment in specialised stores
	47.42/1 Retail sale of mobile telephones in specialised stores
	47.42/9 Retail sale of telecommunications equipment (other than mobile telephones) not elsewhere classified in specialised stores

To avoid issues of data suppression and for comparison purposes, industry codes have sometimes been combined to form the following broad groups:

IT Services (SIC codes: 58.21, 58.29, 62.01, 62.01/1, 62.01/2, 62.02, 62.03, 62.09, 63.11, 63.12 and 95.11)

IT Manufacturing (SIC codes: 18.20/3 and 26.20)

IT Wholesale/Retail (SIC codes: 46.51 and 47.41)

Telecoms Services (SIC codes: 61.10, 61.20, 61.30, 61.90 and 95.12)

Telecoms Manufacturing (SIC codes: 26.30/1, 26.30/9 and 27.31)

Telecoms Wholesale/Retail (SIC codes: 46.52, 47.42/1 and 47.42/9)

## Annex C: Glossary

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ASHE	Annual Survey of Hours and Earnings
BIS	UK Department for Business Innovation and Skills
CPHC	Council of Professors and Heads of Computing
DfE	Department for Education
DLHE	Destination of Leavers from Higher Education
FE	Further Education
GCSE	General Certificate of Secondary Education
GDP	Gross Domestic Product
GVA	Gross Value Added
HE	Higher Education
HEI	Higher Education Institution
HESA	Higher Education Statistics Agency
HND	Higher National Diploma
ICT	Information and Communications Technology
IDBR	Inter Departmental Business Register
JACS	Joint Academic Coding System
JCQ	Joint Council for Qualifications
LEP	Local Enterprise Partnership
LFS	Labour Force Survey
NVQ	National Vocational Qualification
ONS	Office for National Statistics
PROCOM	The IT Professional Competency Model
SIC	Standard Industrial Classification
SME	Small or Medium Sized Enterprise
SOC	Standard Occupational Classification
SSC	Sector Skills Council
SQA	Scottish Qualifications Authority
UCAS	Universities and Colleges Admissions Service





**e-skills UK, the Sector Skills Council responsible for: Business and Information Technology, including Software, Internet & Web, Computer Games, IT Services, Telecommunications and Business Change.**

e-skills UK is the Sector skills Council for Business and Information Technology, rated 'outstanding' in the relicensing of Sector Skills Councils in 2010. We work on behalf of employers to ensure the UK has the technology skills it needs to succeed in a global digital economy.

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