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Strategic Skills Assessment

for the

Digital Economy

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Contents

Summary

Context

Decisive action on digital skills is the most effective way to secure a greater share of the world's value added work and long-term economic stability. Based on up-to-date, authoritative research, this report demonstrates why this is the case, sets out a compelling vision for the UK's future in a digital world, and identifies the action needed in order to realise that vision.

The Digital Economy

Digital technology is the single biggest lever for productivity and competitiveness

Digital technology is the single biggest lever for productivity and competitiveness across every sector of the economy. It will underpin the majority of future job creation in Western economies, and the export of global technology services and world-class content offers substantive opportunities for wealth generation. However, delivering on this promise depends on:

- A vibrant, growing, highly skilled workforce of the <u>Technology professionals</u>, who create and generate value from the systems, services, software and communications backbone on which everyone depends, and the <u>Content professionals</u> who create and generate value from digital content, from television to film to online publishing.

- An increasingly large pool of <u>technology-capable business people</u>, who understand the strategic implications of technology and have the ability to realise its potential for business innovation, productivity and competitiveness.

- <u>Every individual</u> developing the IT user skills to secure employment, to interact socially and to access government services.

The UK Technology industry delivers £71 billion of GVA p.a.

➢ Technology-intensive sectors deliver well over half of UK GVA. The Technology industry alone makes a direct contribution of £71 billion of GVA p.a. (8.4% of the UK total) and the Content industries £31 billion (3.6% of the total). The IT industry has a GVA per job which is nearly three and a half times that of the average for the UK.

➢ 2.5 million people (1 in 11 of the working population) are employed in the Technology and Content sectors. Within that, growth in Technology occupations has been double that of the economy overall for the years 2001-2009, and is forecast, even on the 'downside' post-recession scenario set out in this report, to grow at an average of 4 times the rest of the economy for the coming decade.

The UK Content industries are amongst the strongest in the world

➢ The UK is the largest producer of TV & Radio content in Europe, has the third largest filmed entertainment market globally, and has the largest publishing industry in Europe. It is also renowned for its music output and creativity.

➢ Exports of services by the Content industries totalled £7 billion a year, a particularly significant performance in relation to the size of the workforce. Further, of the top 200 global box office successes of 2001–2008, 31 films are based on stories and characters created by UK writers. Together they have earned more than $15 billion at the worldwide box office

➢ Online advertising has already grown to 19% of industry revenues, and, in the music industry, 95% of all UK single sales are now digital.

Better use of technology offers a £35 billion productivity boost across all sectors

➢ The UK is respected for its digital skills pool, ranked 6th in the world for IT competitiveness due to the strength of human capital. However, the UK scores at the bottom of the European tables in relation to companies across the economy implementing technology-enabled business processes.

➢ 80% of the 8.5% productivity advantage the US has over the UK is down to better use of digital technology. Technology offers an additional £35 billion productivity boost to the UK economy if exploited more fully across all sectors.

Skills drivers

The Technology professional workforce has continued to grow through recession

The recession is affecting all sectors. In Technology, the number of vacancies has more than halved in the last year. However, there were still 78,000 vacancies for Technology professionals in the second quarter of 2009, and positive growth was maintained in the number in employment in the 12 months to June 2009 (up 0.7%). The Content industries are suffering more, with TV, for example, being particularly impacted by a drop in advertising spend.

Other forces for change in relation to the digital economy include globalisation and the pressure for constant innovation; technology driven factors such as convergence of platforms, devices and services; and social factors such as the drive for low carbon and the rise of social networking.

Sustainable business models are the biggest challenge to the Content industries

In terms of the Technology sector, globalisation, changes in telecoms and broadband capability, and cloud computing are causing dramatic change. In the Content industry, the biggest challenge is to create sustainable business models in a world where digital technology advances are fundamentally disrupting traditional approaches. The internet has created a situation where many consumers expect unlimited access to high quality, professional content such as music and news without charge and illegal downloading and file sharing is rife. However, historically, recessions have played a role in triggering innovation and new business start-ups, and analysis by the National Endowment for Science, Technology and the Arts (NESTA) points to the potential for growth by businesses taking advantage of digital technologies to develop new business models.

The digital revolution is fundamentally changing every sector of the economy

The digital revolution is directly affecting all parts of the economy, with organisations in every sector needing to understand and grasp the opportunities it offers. This ranges from the integration of technology in the business processes of the financial services industry to online trading in retail, from the transformation of customer service in passenger transport to the bespoke systems used by the government to protect national security. In all sectors, it is the combination of highly skilled Technology professionals, technology-savvy business leaders and competent IT users that enable an organisation's effective participation in the digital economy.

Current skills environment

Recruitment issues are constraining Technology industry performance and growth

Despite the recession, finding insufficient suitable applicants for Technology posts is still very common, being reported by 43% of Technology industry employers who are recruiting. Skills shortages are most often reported by firms recruiting for programming, technical support and technology management roles. 92% of companies with problems recruiting Technology professionals report negative impacts on their company's activities, for example in customer service, quality standards and new product development. In addition, the sector is suffering from skills gaps amongst the current workforce as a result of globalisation and convergence. Those companies reporting skills gaps say that they affect over three quarters of their Technology professionals. The main development needs are at, or to, senior levels, focused particularly on IT programme management, supplier management and service management and delivery.

Content companies suffer from technology-related skills shortages and gaps

Digital Content industries, have long had an over supply of potential new entrants. Yet there are critical skills in short supply when recruiting, for example management and leadership, monetisation of content, production for multi-platform content, broadcast engineering and Visual Effects. Digital multi-skilling is important across the industries to enable digital media workflow from content creation and production to metadata management. In the existing workforce, new skills are needed to meet the demand for quality content on any platform, and this multi-platform capability is a prevalent skills gap among the workforce.

The education system is failing to prepare young people for the digital economy

There are many issues in the education system in relation to Technology, for example the drop in UK applicants to Computing degrees (down 50% in the last 5 years); the dramatically negative effect of the 14-19 curriculum and teaching skills; and the gender imbalance (90% of A-level Computing students being male). Old fashioned views and / or lack of information about Technology careers prevail. Considering the education system in relation to the Content industries, there are issues with the content of related Further and Higher Education courses and, whilst there is oversupply in Media courses, too many courses produce graduates with insufficient specialisms to meet sector needs.

Digital industries have little involvement with public providers or qualifications

In terms of the development of those already in the Technology and Content sectors, there are huge discrepancies in levels of training according to size of company. In addition, the qualifications landscape is very complex, the training environment is fragmented, and most training does not lead to awards recognised outside of an individual organisation. Private training can be expensive and public providers have an extremely low level of participation in the continuing professional development (CPD) of the workforce.

Digital skills are now essential right across the workforce in all sectors

To sustain the UK economy, businesses in all sectors need to rapidly move up the maturity curve in exploitation of technology. All business managers and leaders need a strategic understanding of how to apply technology for business benefit. But the smaller the company and the older its leaders, they less likely they are to embrace technology. Further, workers at all levels in the labour market need constantly increasing skills in the day to day use of office applications. Virtually all positions being recruited for across the job market demand IT user skills. Today, 36% of development need for IT user skills is at 'advanced' level or higher (level 3 plus). In three years time, 53% of the upskilling need will be at this level. In addition, there is a significant need for increased volumes of lower level skills development as workers who do not currently use digital technology at work need to do so.

Future skills needs

550,000 new Technology professionals will be needed in the next five years

Looking to the future, global spend on digital technology is anticipated to grow 3.3% in the coming year, and UK IT spend is expected to grow at 1.8% compound annual growth rate (cagr) through to 2013. Within that, software and services will grow at 3.2% and 2.4% cagr respectively. Based on detailed scenario planning, 'growth projections for the Technology sector have been developed. Using the conservative 'downside' scenario, it is predicted that the Technology professional workforce will grow at an average of 1.2% p.a. between 2009 and 2019, which is four times the forecast for the UK as a whole. The strongest growth will continue to be in high skill areas. Considering both replacement demand and growth, over the period 2009-2013 an average of 110,500 jobs each year need to be filled by people moving into Technology professional roles. Over half will come from another profession and a fifth from the education system.

The skills to produce and monetise content for multi-platform is a top priority

Both Technology and Content sectors will need to respond effectively to the opportunities and threats posed by globalisation and digital technology advances. Both will need increasingly high levels of skills, and greater technical capability. Hybrid skills (technical, business, creative, interpersonal) will be increasingly important. Existing shortages and gaps will be exacerbated with greater demand for scarce skills. Particular priorities in the Content sector will be the ability to produce content for distribution on multiple technology platforms, and the ability to monetise that content.

The Content industries are at risk of losing talent

The current economic climate is very challenging for the Content industries; the freelance labour pool is set to grow with more people moving into freelance roles as companies make redundancies. This is a phenomenon reminiscent of the 1980s, during which time employees were made redundant when the number of TV channels, and opportunities for broadcasting content, increased. In addition, the representation of women and ethnic minorities in the Creative Media industries is in decline. Some of these people have or could end up leaving the sector at this crucial time, taking their experience and talent with them. The risks these factors pose need to be addressed to sustain the vitality of this strategically important sector.

Geography

The workforces of the Technology and Content sectors are distributed across the UK, Whilst there is little difference between regions in terms of types of skills, there are particular concentrations of industries and industry sub-segments in different geographies, often proactively encouraged by regional policy.

For example, some regions are starting to encourage the development of clusters of digital industries in order to boost regional capabilities. Examples include the BBC move to the North West of England, and the establishment of Software City in Sunderland. Digital Technology and Creative / Media are high priorities within Regional Economic Strategies across England.

Global ambition

The UK has some of the most competitive Technology and Content industries in the world, a highly respected digital skills pool, and a particular expertise in the application of technology to deliver business benefit. The vibrancy of the Content industries, with their prodigious, high quality output, makes the UK a world-class player and the market leader in Europe. **This report proposes that the UK could, and should, set out to be a global leader in delivering value from digital technology and in creating world-class digital content.**

This vision includes the UK being one of the most attractive locations in the world for companies in all sectors to base high value technology-enabled businesses - in particular the strategically important areas of low carbon, life sciences, financial services, and advanced manufacturing and engineering - and a magnet for the world's most highly skilled Technology professionals. It includes the UK being the production base of choice for Content to be delivered on any device and across any platform, and being a creative hub for innovation and development.

A coherent, strategic approach to skills is fundamental to achieving this vision. With this, the UK can be a global leader in the digital economy. Without it, the country will become a second rate player in a high technology world. The government's renewed focus on strategically important, growth sectors in the UK enables a more coherent approach to addressing the skills needs of the digital economy. Recommendations in this report build on the opportunities offered through the Higher Education Framework 'Higher Ambitions' and the National Skills Strategy 'Skills for Growth'.

We need to ensure the school curriculum meets the needs of a new generation of 'digital natives'; we need to deepen links between employers and universities; we need to address diversity issues so that the sectors benefit from the whole talent pool; and we need to ensure our existing workforce maintains world class digital skills in a rapidly changing environment. Employers are committed to playing their part. In partnership with government and educators, the UK has the capability to be a global leader in delivering value from digital technology and in creating world-class digital content, with the consequent benefits in terms of job and wealth generation across the whole economy.

1.   Context

This section sets out the context and purpose of the report, defines its scope and introduces the reference sources on which it is based.

1.1   Background

The network of Sector Skills Councils has been asked to provide intelligence for Government on six areas identified in *'New Industry, New Jobs'*[1] as having particular potential for growth: Low Carbon; Digital Britain; Life Sciences and Pharmaceuticals; Advanced Manufacturing; Engineering Construction; and Professional and Financial Services.

This report, which addresses 'Digital Britain', has been created by the Sector Skills Councils e-skills UK (responsible for Business and Information Technology), in partnership with Skillset (responsible for Creative Media industries) and Creative & Cultural Skills (responsible for industries including Advertising, Music and Design).

1.2   Purpose

The UK must be a global leader in the digital economy in order to secure a greater share of the world's high value added work and a sustainable future. This report provides an authoritative analysis of the UK's skills needs in support of that aim. The report's objectives are to:

-    Define the economic and societal contributions of digital skills;

-    Offer a compelling vision for the UK's future in a technology-enabled world;

-    Identify the action needed on skills in order to realise that vision.

1.3   Scope

This report is focused on the creation and ability to derive benefit from digital technology and digital content. Its scope includes:

➢   Digital Technology: the Technology (IT & Telecoms) industry.

➢   Digital Content: the digital output of the Content industries (defined as Creative Media[2], Advertising, Music and Design industries).

➢   Professionals responsible for Digital Technology and Digital Content in all industries.

➢   Digital skills across the whole economy – the ability of organisations to exploit technology for business benefit and the ability of all individuals to participate in the digital economy.

Annex A defines the terminology used within this report.

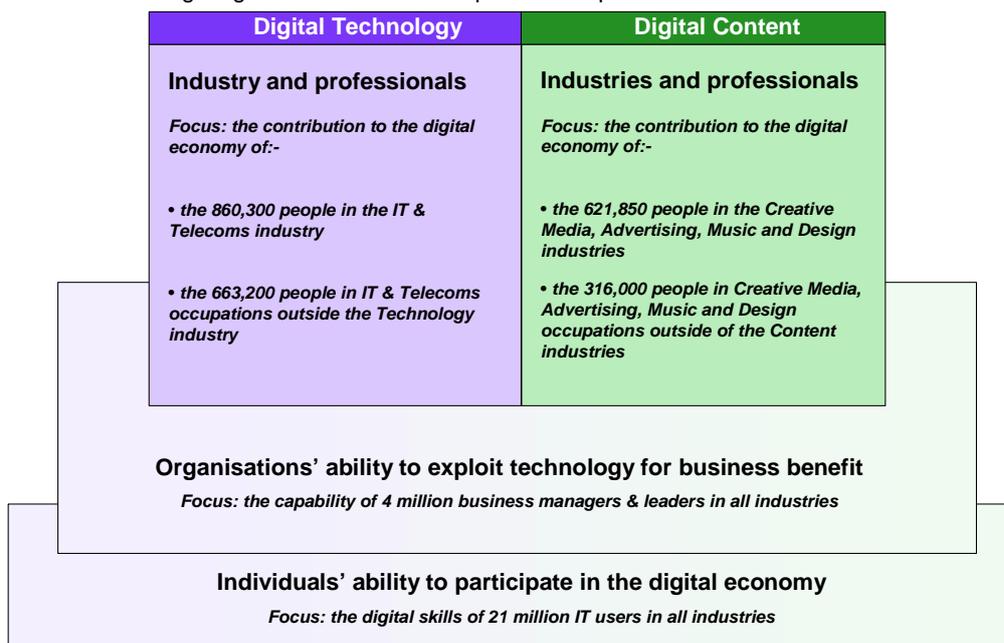[1] 'Building Britain's Future: New Industry, New Jobs', Department of Business, Enterprise and Regulatory Reform, April 2009

[2] Where Creative Media is defined as being TV, Film, Animation, Commercials, Pop Promos, Corporate Production, Facilities and Interactive Media, with closest fit Standard Industrial Classification Codes being those for Radio & TV; Video, Film & Photography; and Publishing.

Schematic of report scope

The following diagram illustrates the scope of this report.

Digital Technology	Digital Content
Industry and professionals	**Industries and professionals**
Focus: the contribution to the digital economy of:-	*Focus: the contribution to the digital economy of:-*
• the 860,300 people in the IT & Telecoms industry	*• the 621,850 people in the Creative Media, Advertising, Music and Design industries*
• the 663,200 people in IT & Telecoms occupations outside the Technology industry	*• the 316,000 people in Creative Media, Advertising, Music and Design occupations outside of the Content industries*

Organisations' ability to exploit technology for business benefit
Focus: the capability of 4 million business managers & leaders in all industries

Individuals' ability to participate in the digital economy
Focus: the digital skills of 21 million IT users in all industries

This document has been developed from material provided by e-skills UK (material relating to Technology) and by Skillset and Creative & Cultural Skills (material relating to Content). Note that this report does not cover the complete footprints of Skillset and Creative & Cultural Skills, both of which have responsibilities beyond the scope of this report. Annex B provides further detail of the sub sectors covered, the responsibilities of the contributing Sector Skills Councils, and the inter-relationship between Technology, Content and the Creative Industries definition used by government.

1.4   Research data

The analysis in this document is based on reliable data from high quality sources. This includes sector-endorsed primary research from Sector Skills Councils and secondary data sources such as the Office of National Statistics Annual Business Inquiry (ABI), Labour Force Survey (LFS) and Inter-Departmental Business Register (IDBR); the DCMS Creative Industries Economic Estimates Statistical Bulletin 2009; and Working Futures 2007-2017[3].

Wherever possible, data is related back to Standard Industrial Classification (SIC) codes and Standard Occupational Classification (SOC) codes used in these secondary sources. However, given the cross-cutting and emerging nature of the subject matter, this work also recognises the limitations of SIC and SOC codes, particularly in terms of the Content industries. Annexes D and E provide further detail on employment data, SIC / SOC limitations and key reference sources used.

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[3] Warwick Institute for Employment Research (IER) and Cambridge Econometrics, December 2008

2.   The Digital Economy

This section explains the strategic importance of the digital economy, and the contribution of the Technology and Content sectors.

2.1   Introduction

This paper is based on the premise that the UK should pursue an ambitious strategy to secure a greater share of the world's high value added work. It explains why, to achieve this, the UK should become a global hub for digital talent, and for the high value technology-enabled and content-driven businesses that depend on that talent.

Digital technology is the single biggest lever for productivity and competitiveness across every sector of the economy, it will underpin the majority of future job creation in western economies, and the export of global technology services and world-class content offers substantive opportunities for wealth generation. Making the most of the digital opportunity depends on creativity, innovation and quality in both content and technology.

Digital Britain set an ambitious agenda to ensure the UK is at the leading edge of the global digital economy. This includes the urgency of upgrading to a full rollout of digital infrastructure in the UK; the importance of investment in quality digital content and online services; and the need to ensure that everyone can participate in the digital society through action on universal connectivity and digital media literacy.

This research shows that, for the UK to maintain a leadership position in the digital economy, we need:

- A vibrant, growing, highly skilled workforce of 'Digital Professionals'. This comprises the **Technology professionals** who create and generate value from the systems, services, software and communications backbone on which all businesses and individuals depend; and the **Content professionals** who create the compelling educational, entertainment and commercial and public service content that benefits consumers round the world.

- An increasingly large pool of **technology-capable business people**, who understand the strategic implications of technology and have the ability to realise its potential for business innovation, productivity and competitiveness. This includes the 4 million leaders and managers in all sectors who need to be able to exploit technology to innovate, reach new markets, generate revenue, improve customer service and increase productivity.

- **Every individual** to develop the IT user skills to secure employment, to interact socially and to access government services. This includes the needs of the 21 million people who are already users of technology as part of their day-to-day work.

2.2   Employment

2.5 million people are employed in the Technology and Content sectors

1.5 million people are employed in the Technology sector (the Technology industry and in Technology occupations in other industries). This represents 1 in 18 of the working population, and 1 in 13 of the private sector workforce. A further 937,850 people are employed in the Content sector (the Content industries and in Content occupations in other industries). The table below shows employment within the Technology and Content industries, employment in Technology and Content occupations within other industries, along with the additional pool of people available for work in these industries but not contracted at the point of the survey. Annex D provides a further breakdown of employment data.

EMPLOYMENT AND TOTAL LABOUR POOL: TECHNOLOGY AND CONTENT SECTORS					
		Industry	Other industries	Not contracted	Total
TECHNOLOGY					
In employment					
Software		493,100	381,900		875,000
Other IT & Telecoms		367,200	281,300		648,500
Total employed		**860,300**	**663,200**		**1,523,500**
Additional available for work					
IT & Telecoms professionals				52,000	52,000
Total Labour Pool		**860,300**	**663,200**	**52,000**	**1,575,500**
CONTENT					
In employment					
Creative Media	Radio & TV	57,000	19,800		76,800
	Video, film & photog.	111,500	23,000		134,500
	Publishing	179,400	24,500		203,900
	Other Creative Media**	69,850	0		69,850
Advertising		94,400	168,000		262,400
Music		12,900	29,700		42,600
Design		96,800	51,000		147,800
Total employed		**621,850**	**316,000**		**937,850**
Additional available for work					
Creative Media freelancers**				50,000	50,000
Adv, Music & Design freelancers***				49,000	49,000
Total Labour Pool		**621,850**	**316,000**	**99,000**	**1,036,850**
TOTAL LABOUR POOL		**1,482,150**	**979,200**	**151,000**	**2,612,450**

Source: Office for National Statistics Labour Force Survey (ONS LFS) April-June 2009, except for those marked ** / *** which are not covered by SIC / SOC and are sourced from Skillset and Creative & Cultural Skills primary research respectively (see Annexes D2, D3 / E).

Of the 149,000 companies in the Technology industry, 99% are organisations of less than 200 people. 28% of the industries' workforce is employed in companies of less than 10 people, compared to a UK average of 21%. However, 36% of the Technology industry, 35% of Creative Media industries and 63% of the Advertising, Music and Design industries workforces are employed in 1% of their industries' workplaces.

Overall, 34% of those working or available for work in the Creative Media industry are freelance, with a particular dominance in those areas most closely involved in the production process. This includes the majority of the workforce in some occupational groups, such as production, camera and lighting[4].

Growth in Technology occupations 2001-2009 was double the economy overall

Between 2001 and 2009, employment in Technology occupations grew 5% (from 1,061,000 to 1,113,000), compared to 2.6% for all sectors, and has nearly doubled in size since the early 1990s. The fastest growing occupations over recent years have been 'ICT Managers' and 'ICT Strategy and Planning professionals'. 38% of all Technology professionals are now employed in these occupations, and a further 30% are software professionals. There have, in contrast, been substantial decreases in employment in other Technology occupations such as database and engineering roles, as globalisation increasingly impacts on the employment mix. In Creative Media occupations, there has been a decrease of 2% (from 184,000 to 179,000) between 2001 and 2009[5].

Technology and Content professionals are twice as likely to be qualified to level 4

In the UK, qualifications at Level 4 or higher (undergraduate or degree level) are held by 61% of those in Technology occupations, and 57% / 57% of those in Creative Media and in Advertising, Music and Design industries respectively. This is nearly double that of the working population overall. The freelance workforce in particular tends to be very highly qualified[6]. However, these qualifications are often not related to the person's profession.

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Changing recruitment practice is increasing the age profile in Technology

In Technology occupations, the proportion of those aged 16-29 has dropped from 33% in 2001 to 22% in 2009. This is a result of globalisation; the need for hybrid technical / business capability means the sector often favours workers with a level of business experience in other occupations over young recruits from the education system. The very strong preference of employers of IT & Telecoms staff is to recruit experienced people, and, where recruitment is from full time education, graduates. Less that 1% of those employed in Technology occupations are under 18 years old[7]. In the Creative Media industries, 40% of those employed are under 35 years old (the UK average is 33%)[8], and in each of Advertising, Music and Design, the majority of the workforce is under 40[9].

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[4] Skillset 2009 Employment Census

[5] All data ONS LFS Apr-June 2001 and 2009

[6] ONS LFS Apr-June 2009, Skillset 2008 Creative Media Workforce Survey, Skillset/UK Film Council Feature Film Production Workforce Survey 2008, Skillset Photo Imaging Workforce Survey 2007; and Creative & Cultural Skills research (see Annexes D3 / E)

[7] ONS LFS April-June2001 and 2009

[8] ONS LFS Apr-June 2009, Skillset 2008 Creative Media Workforce Survey, Skillset/UK Film Council Feature Film Production Workforce Survey 2008, Skillset Photo Imaging Workforce Survey 2007

[9] Creative & Cultural Skills research (see Annexes D3 / E)

Deep rooted gender imbalances limit the recruitment pool

Gender imbalances are evident across the workforce. Only 17% of Technology professionals are female, meaning the sector misses out on a significant talent pool[10]. In the Creative Media industries, 42% of people are female[11], but proportions vary by occupation, there has been significant decline in recent years in some areas, and representation of older women is particularly low[12]. In the Advertising, Music and Design industries, the women who comprise 34% of the workforce are just as likely as men to have a qualification at level 4 or above, yet men are six times more likely to earn above £29,000[13]. Creative Media has experienced a sharp drop in representation from Black, Asian or Minority Ethnic (BAME) backgrounds between 2006-2009, down to 6%. In Advertising, Music and Design, (compared to a UK average in the working population of 9%)[14].

2.3 Economic contribution

Technology industry delivers £71 billion p.a. direct GVA contribution

The UK's Technology industry produces an annual Gross Value Added (GVA) of over £71 billion, 8.4% of the UK total. The IT industry delivers a GVA per job that is more than three and a half times that of the average for the UK (£83,000 per person)[15]. A further £31 billion (3.6%) comes from the Content industries as shown below.

GVA CONTRIBUTION: TECHNOLOGY AND CONTENT INDUSTRIES				
TECHNOLOGY - 2007 data			**£M**	**% of UK total**
	Software	Software including software services and excluding games & e-publishing	£31,040	3.68%
		Games (estimate)	£1,200	0.14%
		e-publishing	£643	0.08%
		Sub total	**£32,883**	**3.90%**
	Other IT & Telecoms		£38,195	4.53%
		Total Technology	**£71,078**	**8.43%**
CONTENT – 2006 data			**£M**	**% of UK total**
	Creative Media	Radio & TV	£5,100	0.61%
		Video, film & photography	£3,800	0.45%
		Publishing	£9,500	1.13%
	Advertising***		£1,100	0.13%
	Music***		£4,200	0.50%
	Design (estimate)***		£6,800	0.81%
		Total Content	**£30,500**	**3.63%**

Sources:
- For Technology: ONS ABI 2007, except for the Games estimate which is from Technology Strategic Board Creative Industries Technology Strategy 2009-2012 (games is included in software in ONS data).
- For Creative Media: ONS ABI 2006 data as reported in DCMS Creative Industries Economic Estimates Statistical Bulletin, January 09 (which excludes Creative Media elements not covered by SIC).
- For Advertising, Music & Design: Creative and Cultural Industries Impact and Footprint 2008, which is developed from ABI 2006 data.
  Note Technology & Creative Media data excludes some freelancers / all non-VAT registered sole traders.

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[10] ONS LFS April-June 2009

[11] Skillset 2009 Employment Census, Skillset/UK Film Council Feature Film Production Workforce Survey 2008

[12] Balancing Children and Work in the Creative Media Industries, Skillset 2006

[13] Creative & Cultural Skills Research (See Annexes D2 / E)

[14] ONS LFS Apr-June 2009, Skillset 2009 Employment Census, Skillset/UK Film Council Feature Film Production Workforce Survey 2008, Skillset Photo Imaging Workforce Survey 2007

[15] ONS Annual Business Inquiry 2007

Over the decade 1997-2006, GVA growth was 8% p.a. for software; 6% for Video, Film & Photography; and 2% for each of Radio & TV, Publishing and Advertising[16], against a UK average of 3%. In the Music industry there has been a decline of nearly a third of GVA between 2004-2006[17], linked to changes in music production and distribution brought about by the use of new digital technologies.

Technology also underpins 55% of UK GVA and 80% of US productivity advantage

55% of UK GVA comes from technology-intensive sectors[18], and half of Europe's productivity gains in recent years can be attributed to IT investments[19]. However, US multinational firms are, on average, 8.5% more productive than UK domestic owned firms, and 80% of this advantage is explained by better use of IT[20]. Leading factors in achieving these productivity gains are investment (hardware, software, broadband); management and leadership (capabilities in the strategic management of technology); and the IT-enablement of employees (technology availability and skills).

Technology offers additional £35 billion productivity boost across all sectors

The effective exploitation of ICT is one of the biggest levers the country has in achieving wholesale productivity gains across the economy. Based on historical evidence, it has been possible to assess the future productivity gains that could be accrued by different sectors and geographies. It is estimated that the continued adoption and exploitation of ICT could generate an additional £35 billion of GVA to the UK economy over the coming 5 to 7 years, provided companies – particularly smaller firms – take action on the key factors of management and leadership skills (strategic exploitation of technology), investment (hardware, software, broadband) and the IT-enablement of employees[21].

These benefits assume the rate of investment in ICT is maintained at current rates. The research concludes that, if more were invested, especially by small firms (because of their relatively poor level of adoption of technology), then there are greater opportunities for productivity improvement. Even relatively straight forward IT-enablement of employees produces a measurable impact on productivity. For example, ONS analysis has concluded that, in the manufacturing sector, companies experience a 2.9% improvement in productivity for every 10% of employees that are internet-enabled[22].

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[16] DCMS Creative Industries Economic Estimates Statistical Bulletin, January 09. Note the DCMS software definition is more limited than the definition used in the this report (where software also includes software services)

[17] Creative & Cultural Skills research (see Annexes D3 / E)

[18] e-skills UK analysis of Office of National Statistics: Change in GVA by industry

[19] '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, Centre for Economic Performance, London School of Economics

[20] 'IT investment, ICT Use and UK Firm Productivity', Rafaella Sadun, Shikeb Farooki, Giles Gale, Mark Lever, ONS

[21] ' IT & Telecoms Insights 2008: the impact of ICT on productivity', e-skills UK / Adroit Economics and Regeneris Consulting

[22] As reported in 'IT & Telecoms Insights 2008: Competitiveness of the UK IT & Telecoms Sector', e-skills UK

The move to digital is transforming the Content industries

There is increasing evidence of the importance of digital technology to every part of the Content industries. Excluding software, 70% of the remaining value and most of the remaining growth potential of the Creative industries sector lies in the Content industries[23].

In addition to the effect of technology convergence on broadcasting (considered later in this report), of particular note is the growth of online advertising. Although UK total advertising revenue and employment is declining, with employment down 19% since 2006[24], internet advertising revenues have continued to rise throughout the recession. By 2008, online adspend reached £3.6 billion (19% of the sector total)[25]. Another source states that online grew 4.6% from 1H08 to 1H09, and was the only media sector to show growth in advertising[26]. The upsurge in social networking sites is fuelling growth, and online music and video sales are also increasing, with 16-24 year olds in particular driving the market[27].

In the Music industry, digital sales are increasing, although not as fast as the decline in physical sales. Digital now accounts for 20% of music spending globally, up from 15% in 2007, and mobile music sales are increasing. In the UK, by 2008, the digital share of the music market was 16% and 110 million singles tracks were purchased online in the year, a 42 per cent increase on 2007[28]. In the cinema, 310 of the UK's 3,610 screens are now digital – the highest number in Europe. 69 UK screens are already 3D capable[29].

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[23] Technology Strategy Board Creative Industries Technology Strategy 2009-2012. Software delivers 42% of creative industries GVA. Content (TV & Radio; Video, Film & Photography; Publishing; Advertising) delivers a further 42%. Other creative sectors deliver 18%.

[24] Creative & Cultural Skills research (see Annexes D3 / E)

[25] Advertising Industry Statistics, Advertising Association (AA) 2009, http://www.adassoc.org.uk/aa/index.cfm/adstats/

[26] Fact Sheet – Online Adspend – H1 2009, Internet Advertising Bureau (Note different definition to AA above)

[27] IFPI Digital Music Report 2009

[28] BPI Statistical Handbook, 30th edition

[29] UK Film Council Statistical Yearbook 2009

2.4   UK global competitiveness

The UK is in a strong position to take advantage of the opportunities of the digital economy, thanks to its highly skilled UK workforce, world-class base of science and creativity, and open market philosophy.

The UK is 6th in the world for IT competitiveness due to strength in human capital

The Economist Intelligence Unit's annual benchmarking shows the UK to be 6th out of 66 countries in terms of global IT competitiveness in 2009, behind the US, Finland, Sweden, Canada and the Netherlands. The UK's best ranking was 3rd on human capital, behind the US and South Korea. An important element within this indicator was the capacity to develop the business skills as well as the mainstream IT skills of Technology professionals.

Other indicators were 'support for the IT industry' (UK ranked 4th); 'IT infrastructure' (6th); 'overall business environment' (7th); 'legal environment' (11th); and 'innovation' (12th). The UK's relatively poor performance in terms of the last two indicators is caused, in part, by differing approaches to protection of Intellectual Property. The report points out that a patent proceeding which might cost £1M in the UK could cost as little as £200,000 in Germany, and that these high costs can be prohibitive for SMEs in particular.

The UK leads Europe in content creation

Exports of services by the Content industries totalled £7 billion a year[30], a particularly significant performance in relation to the size of the workforce. The UK is the largest producer of TV & Radio content in Europe, with only the US generating more value from TV exports. It has the largest publishing industry in Europe, and the third largest filmed entertainment market globally, after the USA and Japan. In 2008, almost one in six film viewings at cinemas globally was of a British film, equalling 15% of the global box office[31].

In advertising, the UK is the third biggest in the world after the USA and Japan, with London overwhelmingly chosen as the European hub for major agencies. The UK Advertising market has the largest share of internet advertising revenue of any market in the world, including the USA, at 14%[32].

In music, the UK is the 4th largest producer, behind the US, Japan, Germany[33]. Digital sales account for 16% of the UK music market, which is, in terms of proportion of domestic market, the third largest in the world (behind the US at 39% and Japan at 19%)[34]. The UK's Design industry is currently rated as 4th in the world behind only the US, Japan and Korea[35].

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[30] DCMS Creative Industries Statistical Estimates January 2009 (Radio & TV; Video, Film & Photography; Publishing; Advertising and Design).

[31] Statistical Yearbook, UK Film Council 2009

[32]Social Media Futures: the future of advertising agencies in a networked society. A 10 year perspective. IPA, 2009

[33] Creative & Cultural Skills research (see Annexes D3 / E)

[34] IFPI Digital Music Report 2009

[35] International Design Scoreboard: Initial Indicators of International Design Capabilities, IFM and University of Cambridge

The UK is strong in internet usage but weak in business technology exploitation

The recent European Commission Digital Competitiveness Report 2009[36] analyzes the digital competitiveness of 27 European countries. The UK scores particularly highly in terms of 'eCommerce', with the highest proportion of enterprises selling online. It is second in IT user skills, third in ICT sector share of total GDP, and in the top quartile for broadband and internet usage.

However, the UK scores extremely poorly in all of the report's 'eBusiness' indicators with the lowest or near to lowest scores of all 27 countries for the proportion of enterprises sharing information electronically with customers / suppliers; exchanging business documents automatically; sending / receiving e-invoices; and using applications for integrating internal business processes. This suggests significant scope for productivity improvement across the economy.

Focus on Creative industries

The Technology Strategy Board Creative Industries Strategy 2009-2012 reports that the UK has the largest creative sector in the world relative to GDP, and that the UK is a world leader in culture and media, consistently in the top three achieving countries. This strong foundation for the digital future will be referenced later in this Digital Economy report as a particular strength and opportunity for growth.

The following provides an overview of the Creative industries. The data is sourced from DCMS Creative Industries Economic Estimates January 2009, and these definitions are used by the Technology Strategy Board and NESTA. Annex B2 provides more detail, including the breakdown by sector within 'content' and 'other' categories.

Creative industries contribution	Total	Proportion of Creative industries		
		Software*	Content**	Other***
Total creative employment (industry and occupations)	1,978,200	32%	35%	33%
Employment growth 1997-2007 (average p.a.)	2%	5%	-1% to 2%	1% to 5%
GVA contribution	£57.3Bn	43%	41%	16%
GVA growth 1997-2006 (average)	4%	8%	2% to 6%	0% to 5%
Number of businesses	157,400	48%	24%	28%

*Software here is a narrower definition than included in this report (which also includes software services).

**Content here comprises Creative Media (TV & Radio; Video, Film & Photography; Publishing) and Advertising only. Data for Music and Design is not available.

***Other comprises Architecture; Art & Antiques; Designer Fashion; Music and the Visual & Performing Arts.

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[36] Europe's Digital Competitiveness Report, Commission of the European Communities, August 2009

3.   Skills drivers

This section sets out the drivers of the skills environment, current and future, in addition to the productivity and competitiveness imperatives set out in section 2. This includes current economic conditions, other global forces for change, and the policy environment.

3.1   Current economic conditions

The recession is affecting all sectors, although Technology has fared significantly better than the economy overall. Whilst employer demand is down in terms of advertised vacancies, employment of Technology professionals is holding up well, with positive growth (0.7%) in the number in employment 2008-09[37]. There are three key reasons for this relative strength: the adoption of increasingly flexible business models following the dotcom bubble of 2001; the critical nature of technology systems for almost all companies in every sector; and the growing understanding of the potential of digital technology to help companies weather the downturn. Software and services spending is relatively resilient, but smaller firms suffer from limited capital availability and manufacturers of hardware are affected as consumers delay spending on equipment.

The Content sector is suffering more. TV has been particularly badly hit, largely due to the downturn in advertising revenues and shift to online advertising. The Content sector overall is struggling with reduced revenue and difficulties in accessing finance, and, amongst other content creators, Advertising is currently experiencing a high rate of business failure as a result of recession[38]. However, analysis by NESTA points to the potential for growth by businesses taking advantage of digital technologies to develop new business models. Historically, recessions have played a role in triggering new business start-ups. The 1990s dot.com boom and crash resulted in the birth of the blogosphere and new technology-enabled services like eBay and Skype, triggered by 'technological IT wizards' being made redundant and having opportunity to experiment and create. The Creative industries are recognised for high levels of innovation across the board[39], and there are suggestions that this type of recession-triggered transformational innovation is happening again now in design and advertising[40].

Across all sectors, technology is having a direct effect on companies' ability to cope with the current economic crisis. A study of 7,200 SME decision makers in the UK showed that companies with a positive attitude towards technology were having a better experience of the recession than technology laggards by 69% to 34%[41]. Technology was cited as helping to save firms money (30%), to find advice (32%) and find new customers (28%). 73% of the companies said that websites were important and 2/3rds were selling online.

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[37] ONS LFS April-June 2008 to April-June 2009

[38] Creative Blueprint Research Paper series 1 – impact of the recession, March 2009

[39] DTI Occasional Paper No 6 Innovation in the UK: Indicators and Insights, July 2006

[40] Creative & Cultural Skills research (see Annexes D3 / E)

[41] Vanson Bourne / BT, 2009

3.2   Global forces for change

3.2.1   Overview

To understand the changing global environment in terms of the digital economy and predict implications over a 10 year horizon, e-skills UK has undertaken research with Gartner Executive Programs which brings together the visions of leading global industry analysts and influential business leaders. A number of key forces for change were identified, which are shaping the development of technology, the nature of business, the wider economy and the way in which society interacts. These include:

- **Business and economic factors** such as the impact of globalisation; the imperative of technology-enabled business transformation; and the pressure for constant innovation in technology-intensive products and services.

- **Technology driven factors** such as increased standardisation and industrialisation of IT; convergence of platforms, devices and services; and the consequent impact on markets and business models.

- **Social factors** such as environmental concerns and the desire for 'green IT'; the rise of social computing and increased power to the consumer to determine content and services; and the impact of the new generation of digital natives and the expectations they bring to the workplace and the market.

Eleven specific trends or forces for change over the period 1995 to 2020 were defined which are expected to have significant impacts across the digital landscape. The first six were 'foundational trends', representing key areas with implications for future changes in skills. The further five 'emerging trends', represent fast moving areas that are creating new opportunities and demanding new skills[42].

The six 'foundational trends' suggest increased future needs in relation to the industrialisation of technology delivery (in particular business analysis, systems design and global supplier management); security and data protection; convergence of technology with software-intensive platforms and new network capability; business transformation; technology-enabled innovation; and addressing the gender balance. Of particular note is the extent to which IT departments are becoming custodians of an organisation's business processes and business intelligence, and the leaders of business change.

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[42] Further information is available in e-skills UK's 'IT & Telecoms Insights' publications, www.e-skills.com/research.

The following five emerging trends have particular implications for new skills needs:

- Information and analytics: The relative value of IT is shifting from the technology based processing of information to the exploitation of technology to increase business competitiveness. Analytics involves applying intelligence to information to gain new insights, and to enable companies to realise competitive advantage. Pattern based strategies are attracting much attention, with organisations seeking competitive advantage through finding, modelling and adapting to exploit indicators that form patterns in the market place. This has particular implications for content creators, who need to be ahead of the game in terms of intelligent / semantic search technologies.

- Low Carbon: Environmental considerations are now at the core of many customer, brand and operations decisions. Digital technology is both part of an environmental problem and central to environmental solutions. Addressing environmental concerns in a commercially sustainable way is demanding new skills, from technical design of power management (smart grids) through to the development of new services to assess environmental metrics.

- Consumerisation and convergence of technology: The convergence of computing, communications and content platforms have blurred the lines between technology for business and technology for the home. Consumers require their information, services and products to be available on their platform of choice – from PCs to mobile devices to games consoles. This places increased demands on information and network architectures, and innovation in areas such as information display, transaction processing and service assurance.

- The rise of social computing: Social computing is powered by a set of internet based technologies commonly referred to as Web 2.0, which shift customer-company relationships on the web to peer-to-peer social networks. Unlike web storefronts, these channels are not controlled by companies; instead communities of interest form opinions and value products, services and brands. Understanding and harnessing the power of collaborative computing and social networking will be increasingly essential for all businesses.

- Digital natives: Digital natives - those born after 1985 who have grown up in an IT-intensive environment - are not only customers in terms of digital technology and digital content, but also the source of the next generation digital workforce. Their expectations - from products and services to working style and speed of change - are very different from past generations, and companies will need to work out how to adapt to best meet their needs and utilise their talents.

3.2.2 Focus on globalisation and convergence

The world is changing at an unprecedented pace. Globalisation, technological advances and the growth of emerging economies present intense challenges to all sectors of the economy. Technology systems provide effective access to global markets, fundamentally changing the products and services that organisations offer and the way they need to operate.

Convergence is having profound implications on the relationship between technology and content. Customers are increasingly looking for high speed access to content and applications using any device. There are growing markets for high quality, UK-produced digital content in all formats, across all media, and there are increasingly high expectations in terms of sophisticated, professional content. A new generation of internet services is being born. A new level of technology advance and convergence is starting to emerge in fields such as artificial intelligence and robotics; biotechnology and life sciences; and energy and environment systems.

Networks and software are at the heart of this technology-enabled, converged world – central to the internet, business operations, communications, leisure activities and scientific innovation. Broadband infrastructure and Web 2.0 technologies are enabling an explosion in internet uptake. 87% of enterprises in the UK have broadband access. The UK has one of the highest shares of internet connected households in Europe, and is one of the frontrunners for a wide variety of internet services[43]. Spending on the internet, television and mobile telephony is now regarded by most UK households as a higher priority than almost everything except food[44], and there is an upsurge of user-generated content and software applications (widgets), enabled by social networking technologies.

Nowhere is the transformation caused by technology more dramatic than in the Content industries. The upsurge of online content and services is the primary area of growth, yet presents a major challenge to the sustainability of companies' business models.

"The good thing is we're sitting on the hottest currency in the digital age – music. Lots of the Web 2.0 destinations are driven by music - MySpace, YouTube, there are tons of those destinations. The bad news is it's damn hard to make money."

Marcel Engh, Sony Music Europe[45]

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[43] Europe's Digital Competitiveness Report, Commission of the European Communities, August 2009

[44] Ofcom Annual Report 2009

[45] http://www.mpaonline.org.uk/Publications/iMPAct_Magazine/index.html

3.3 Digital Technology perspective

<u>Globalisation</u>

As a result of globalisation, there is a complex picture of major restructuring and skills shift underway in the Technology workforce. The sourcing of certain IT activities from well skilled, lower cost countries (geosourcing) is now well established and will continue. This gives rise to challenges in the development pathways for new recruits, as many of the traditional entry level roles are less prevalent in the UK. However, globalisation also facilitates growth: lower development and delivery costs make more business cases for technology-enabled projects viable. This is supporting the continued growth in IT professional employment in the UK, with particular demand for high level skills.

<u>Telecoms and broadband</u>

The Telecoms industry is undergoing substantial change, with Telecoms providers offering IT services and IT providers offering telecoms services using packet-based Internet Protocol (IP) networks. New technologies such as WiMAX (Wordwide Interoperability for Microwave Access) offer new means of delivery of voice / data services; the surge of digital content (common content on multiple devices and multiple media on individual devices) has particular implications for product configuration management, maintenance and billing systems; and the potential for wide scale introduction of Radio Frequency Identification Devices (RFID) brings an increased focus on information management processes. Operational technology - for example sensors, ambient devices and the ability of software to monitor assets and processes real time - drives the need for a unified view of information across an enterprise.

The importance of broadband continues to grow as more IT services and applications are delivered over the internet for both business and domestic use. For example, the smartphone, with its exploitation of novel applications, is the fastest growing segment of the telecoms market, and will represent 15% of mobile device sales worldwide by 2010[46]. High speed internet access is also having a big impact on the computer games industry, with the Massively Mutliplayer Online Game (MMOG) market undergoing particular growth globally, although the UK is as yet very under-represented in the MMOG market.

<u>Cloud computing</u>

Digital technology is undergoing a sea change as more applications move off individual sites and software functionality is provided online. This 'cloud computing' is a new paradigm involving internet-based services (including storage and software applications) and intelligent clients (including handheld devices, PCs and servers). Organisations will be able to lower the capital costs of technology and the maintenance costs of legacy applications and infrastructure, and increase the amount of the IT budget available for innovation. The efficiency gains from this 'cloud computing' could benefit entire economies, but its exploitation depends on the quality of the broadband infrastructure and the digital skills pool.

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[46] Worldwide IT Spending Outlook, Gartner October 2009

3.4   Digital Content perspective

3.4.1 The business model challenge

The online environment is fundamentally disrupting business models of companies in the Content industries. There is rapid movement to a world where creative content is conceived, published, distributed, advertised and consumed digitally. The online environment erodes geographic boundaries and is causing a revolution for both producers and users. Ubiquity of broadband coverage, the availability of high quality mobile devices and the interactivity offered by Web 2.0 have changed the way individuals consume content.

Today, anyone can generate content such as music or video, and distribute it via the internet. However, economic and quality factors suggest that sites that had, to date, focused exclusively on User-Generated Content (UGC) may well have to scale back some of their offerings, and offer content that is more professionally produced, which can generate revenue[47]. Audience fragmentation is driving growth in demand; in the last ten years, for example, cable and satellite subscription revenue has tripled, while DVD revenues have increased fifteen-fold, and downloading has enabled audiences to access more content in more personalised ways[48]. There will continue to be long term growth in demand for range and complexity of digital media content on multi-platforms.

New techniques will rapidly move from cutting edge to industry standard. Those not able to exploit new opportunities will increasingly be left behind. For example, until relatively recently it was not easy to convert large volumes of video footage or audio into digital form. With broadband developments, the landscape is changing dramatically and expectations for digitised content are high. Another change content creators need to quickly grasp is the opportunity offered by intelligent / semantic search technologies which use 'pattern based' strategies to exploit indicators that form patterns in the market place.

Businesses using traditional business models and linear value chains from the analogue age are increasingly finding themselves ill equipped to succeed. For creators of content, new 'digital' business models are increasingly viewed as the future in terms of both production and revenue. However, control over assets is problematic, with traditional approaches to copyright and IPR not necessarily effective in the online environment. Peer sharing and piracy are significantly challenging content creators' ability to earn from their own intellectual property. For example, a survey by UK Music has found that 86% of 14-24 year olds have copied CDs, despite the vast majority knowing that it is not legal[49]. Creating sustainable businesses in a world where many expect unlimited access to content without being charged is a major challenge.

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[47] Media Predictions, TMT Trends 2009, Deloitte

[48] Ibid

[49] Music Experience and Behaviour in Young People, UK Music, 2009

3.4.2 Sector views

In <u>TV and Radio</u>, the UK is particularly recognised for the quality of its public sector broadcasters alongside regulated subscription services such as BSkyB and Virgin Media. Exploiting broadband infrastructure to offer users 'on demand' services, the BBC launched the iPlayer in 2007, and similar offerings have since been released by ITV, Channel 4 and Sky. The TV and radio industries are going through one of the most profound periods of restructuring and challenge in their history, in the face of convergent media and changing audience tastes and behaviour. As content created for television broadcast is increasingly available via the internet, 'content is king' and audiences seek programmes and content rather than channels and schedules. This convergence and change is happening at a faster rate than predicted, adding structural challenges to those posed by the downturn in the economic climate. Falling advertising revenue has already impacted directly on the sector, with significant job losses and reductions in commissioning and training budgets.

The UK has a strong heritage in IP creation in <u>Video, Film and Photography</u>. In the Film sector, over the period 2001-2007, 30 of the top 200 films globally were based on stories and characters created by British writers. In 2008, British films accounted for 31% of UK box office receipts and 15% of the global box office. Figures up to 2007 show an upward trend in exports, to a record £1,050 million[50]. The UK also has a significant position in the <u>Animation</u> market, although a decline in commissions from commercial broadcasters and their advertisers presents a major threat to traditional 2D animators who are already affected by the growth of off-shoring to low cost centres of production. <u>Interactive Media</u> is growing and becoming ever more sophisticated. In this area, bringing technical and creative talent together to explore new types of content development, business models, legal and collaborative frameworks is the greatest challenge.

The <u>Facilities</u> sector underpins television and moving image production in the UK, and to a growing extent the creative talents of overseas producers, by providing specialised technical services, technology and their associated skilled personnel. The sector faces profound changes in technology and overseas competition. Those involved in the sector, directly and indirectly, must ready themselves to compete globally and find new opportunities in the global digital market place. The lack of available financing due to the recent economic situation is causing increasing damage to the sector, with many companies unable to raise capital to invest in new equipment.

Companies in the <u>Publishing </u>industry, particularly newspapers, are adversely affected by the impact of the recession on advertising and consumer spending, yet are having to make information available online on an unprecedented scale. Google has made over half a million public domain books searchable online or downloadable, and digital content distribution to electronic devices is growing, with content starting to appear for an ever

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[50] UK Film Council Statistical Yearbook 2009

widening set of devices - from the Kindle and Sony e-Book reader, to the publishing of Harper Collins' 100 Classic Book Collection for Nintendo DS.

In Advertising, technology presents opportunities to advertise in new ways, such as through podcasts, text messages, online RSS feeds, blogs, message boards, and mobile gaming. Social networking is having a significant influence. Facebook and Myspace, for example, had a combined membership of 300 million users in 2008, which offers a massive market for advertising revenue[51]. The strong growth of internet advertising is set to continue, along with increasing focus on mobile, and the market overall is forecast to increase post-recession by as much as 52% over the period to 2020[52]. The growth in digital may also be accompanied by increasing convergence with technology in a way that provides new opportunities. For example TV will become far more interactive, and viewers could experience advertisements and purchase products at the same time. There is a growing market for advertising within computer games. The ability to target consumers on an individual basis will be increasingly important, as will overcoming the behaviour of consumers who wish to avoid advertising, for example using podcasts and pop-up blockers.

In the Music industry, the effects of digitisation are numerous, from convergence of product delivery onto digital platforms, to the ease of creating and recording new music, to digital publishing and marketing. 95% of all UK single sales are now digital[53], and the future is likely to be driven by the adoption of music delivery platforms which enable on-demand access regardless of location. The sector has seen the emergence of a raft of aggregator and intermediary new entrants in the digital arena, developing new models for the monetisation of music services and products (e.g. Spotify, Last.fm). Having control of the technologies that deliver music to an increasingly global audience will be key to sustainability, but issues of protecting IP and royalties are causing significant challenges and falling profits. There is tension between those with an open source / open business philosophy and those who want to lock down assets with digital rights management technologies.

Digital technology has also had a major impact on the Design sector, including shortened design timescales, faster communication, the emergence of rapid prototyping and businesses requiring fewer people carrying out more tasks. The majority of designers think skills needs are changing and the most commonly cited reason is technological advance[54].

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[51] The Digital Year in Review, Dan Calladine (WARC),
http://www.warc.com/ArticleCenter/Default.asp?CType=A&AID=INDEXSEARCH88849&Tab=A

[52] The Long Term Advertising Expenditure Forecast, Advertising Association, 2009

[53] BPI Statistical Handbook, 30th edition

[54] Creative & Cultural Skills research (see Annexes D2 / E)

3.5　The wider workforce

Digital technology 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 individuals in all walks of life. This section provides information about drivers of skills for other sectors in relation to the digital economy. For businesses across all sectors, there are significant opportunities to grow by creating and deploying information and technology-intensive products and services in a global marketplace. 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. 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 Technology professionals, face significant challenges in understanding the threats and opportunities arising from this changing environment.

The following provides some examples of the impact of technology on different sectors of the economy. The **financial services** industry has a particularly heavy dependence on information, with leading edge exploitation of technology pivotal to business success. This is reflected in the make up of the industry's workforce, with 8% of those employed being Technology professionals (14% of the UK's Technology professional workforce)[55]. The current financial crisis has demonstrated the need for operating models that adapt quickly to the needs of business. Technology helps address the priorities of cost and efficiency, productivity, customer experience, risk and compliance, growth and competitive advantage. Online security and the development of new payment systems continue to be challenges, and were major sources of investment for all financial institutions before the economic downturn.

Technology has transformed the **retail** sector by improving productivity and increasing competition. Up-to-date IT systems and efficient business processes are essential in driving up service quality and driving down cost. Online trading enables retailers to deliver products and services around the clock, and retailers have been shifting to online as part of multi-channel strategies. Smaller companies are now also making the most of online opportunities, using sites such as eBay and Amazon to quickly and cheaply set up online shops. Products previously designated as 'resistant' (e.g. clothing) are now enjoying increased sales and the concept of personal shopping online has taken off. Sites are offering interactive online advice based on the items a customer has viewed, or how long they have stayed on a page[56].

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[55] ONS LFS April – June 2009

[56] 'Understanding the Impact of Online Trading on the Occupations and Skills within the UK's consumer facing business sectors', IFF Research for a consortium of SSCs, 2008

Websites retain marketing / information as their key role, but future technological development is expected to rapidly change the nature of the customer journey, as has been seen with the recent explosion of Web 2.0 technology. For many sectors, the changes brought about behind the scenes by e-commerce are greater than those evident on their websites. Those who are using e-commerce most successfully tend to think of it as a way to save money as much as a way to make it, and this is likely to be an area in which businesses will be increasingly investing in future.

In the **passenger transport** sector, as well as transforming customer service and sales, websites and digital devices are used as information and transactional channels for large, diffuse workforces. Reaching staff this way is economical, fast and secure, as well as enabling all employees to receive the same communications in appropriate formats.

The final example offered here is the **public sector**, which is heavily reliant on technology to improve services, increase efficiency, securely share information, reduce fraud and waste, and increase national security. This ranges from the implementation of online government services to health informatics to the leading edge use of technology to support the armed forces.

In all sectors, it is the combination of highly skilled Technology 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 proportion of the UK's Technology workforce employed in key sectors of the economy, along with the GVA contribution of those sectors.

Key

Outer Circle: Contribution of sector to UK GVA

Inner Circle: % of the UK's Technology professional workforce employed in the sector
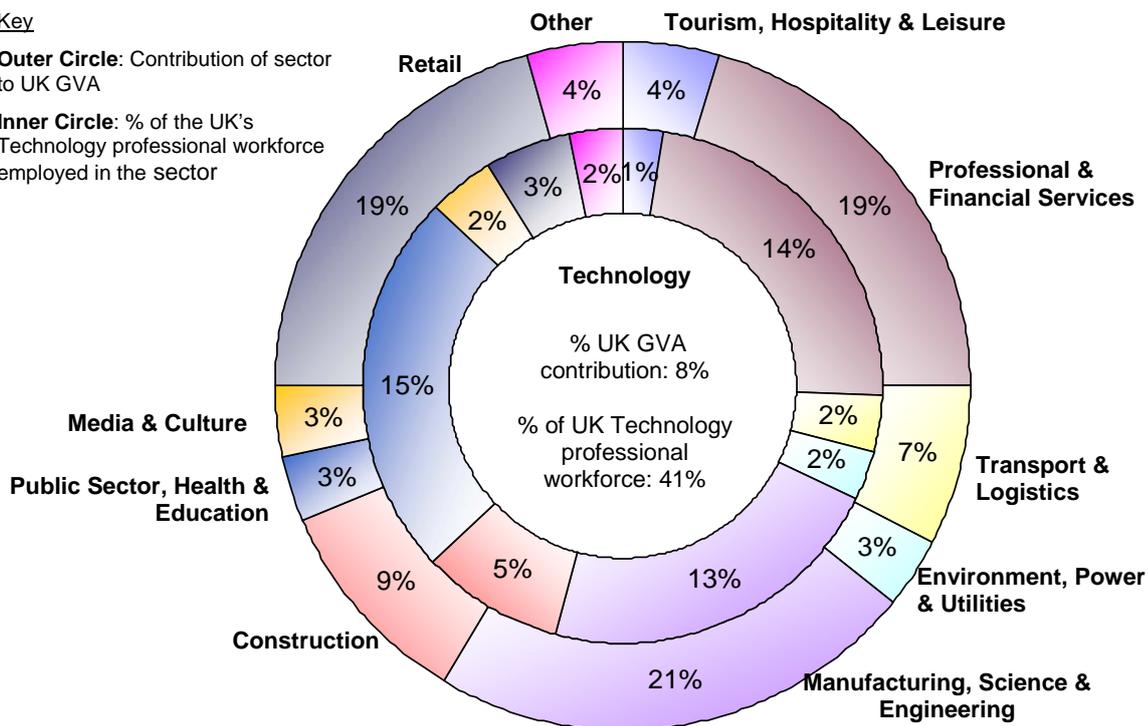
Source: e-skills UK analysis of ONS ABI 2007 (for GVA) and ONS LFS (April - June 09)

3.6   Policy environment

Government policy is increasingly recognising the centrality of digital skills to the UK economy now and in the future. *'Building Britain's Future'* sets out the Government's plan for moving out of the downturn and building a better, fairer and more prosperous society. Evolving policy is focusing on how government intervention can have the most beneficial impact, in particular to aid economy recovery. This new direction of "industrial activism" is described in two publications:

- *'New Industry, New Jobs'*, which sets out a strategic vision for recovery supported by a more active and directed industrial policy to drive growth and create the high-value jobs of the future;

- *'Jobs of the Future'*, which outlines where new jobs could be created in the economy of the future as a result of emerging global trends.

Government policy is placing priority on sectors, clusters of sectors and cross-sector themes which are likely to have a significant impact on the future economy. '*New Industries, New Jobs'* includes the following in addition to digital: advanced manufacturing; professional and financial services; low carbon industries; engineering construction; and life sciences and pharmaceuticals, all of which are highly dependent on technology-enabled innovation and digital skills. '*Digital Britain'* complements these publications as a key part of the industrial activism strategy. It highlights the action needed to ensure Britain has the world-class digital infrastructure and skilled talent it needs to succeed in a global economy.

Following on from the above strategies, the Higher Education Framework '*Higher Ambitions'* and the National Skills Strategy '*Skills for Growth'* have recently been published, setting out new approaches within the education and skills system in support of industrial activism.

- '*Higher Ambitions'* sets out plans for new types of Higher Education programmes, including expansion of Foundation Degrees and Apprenticeship progression options. It describes an intent to help universities make a bigger contribution to economic recovery and future growth, for example encouraging new programmes that meet the need for high level skills for key sectors, including those highlighted in *'New Industry, New Jobs'.* There will be enhanced support for Science, Technology, Engineering and Maths subjects and other subjects that underwrite competitive advantage.

- '*Skills for Growth'* complements this with plans to promote the skills that matter for economic prosperity in modern Britain, to expand the Advanced Apprenticeship system, and to ensure that key sectors for growth and employment are better supported through the skills system.

4.   Current skills environment

This section sets out the current skills environment in terms of skills shortages, skills gaps needs and skills supply for each of Digital Technology, Digital Content and the wider workforce.

4.1   Digital Technology

4.1.1   Skills shortages

Over the last year, there has been a significant fall in recruitment demand for Technology professionals, with the number vacancies more than halving from the beginning of 2008 to June 2009. However, there were still 78,000 vacancies in the second quarter of 2009[57], with the most advertised roles being systems development, systems design and technical support (77% of all vacancies being across these three areas).

As demand for recruits has fallen, so has the incidence of recruitment difficulties (i.e. skills shortages) reported by prospective employers. However, finding insufficient applicants with the appropriate skills, qualifications or experience is still a very common issue. This is most notable in the Technology industry itself where around 43% of those recruiting were reporting a lack of suitable candidates for Technology posts at the start of the year[58]. Earlier research showed that micro establishments (1-10 employees) were more likely than any others to rate applicants' skills levels as below those required by the firm[59].

Skills shortages are currently most often reported by firms recruiting for programming, technical support and IT & Telecoms management posts. In the Games industry, for example, difficulty in recruiting programmers is by far the biggest skills challenge. In a recent survey, 50% of Games employers surveyed reported that skills shortages were holding back business growth, and of those experiencing skills shortages, 74% highlighted vacancies for programmers as hard to fill[60]. More generally, employers often report issues with the business, technical and sector specific knowledge of candidates for Technology occupations[61].

92% of companies experiencing problems recruiting Technology professionals reported a negative impact on their company's activities, the most common effect being difficulties in meeting customer service objectives, followed by difficulties in meeting quality standards, and delays in developing new products or services (39%)[62].

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[57] Salary Survey Publication, Quarterly Survey of Appointments Data and Trends, 2002 - 2009

[58] e-skills UK 2009 employer survey

[59] IT & Telecoms Insights 2008: Employer Skills Needs Survey, e-skills UK 2008

[60] State of the UK Video Game Development Sector, Tiga January 2009

[61] e-skills UK 2009 employer survey

[62] IT & Telecoms Insights 2008: Employer Skills Needs Survey, e-skills UK 2008

4.1.2 Skills gaps

Globalisation and convergence are having major impacts on the skills needs of the UK's current Technology workforce. Around one in ten (11%) companies with Technology professionals consider the skills held by these workers to be at a level below that needed of them, and these skills gaps appeared to be primarily the result of staff being unable to train due to work commitments (77% of employers with gaps stating this to be the case).

In general, skills gaps are most often thought to exist in the areas of business and technical skills. Over three quarters of all Technology professionals in firms reporting gaps were thought to be lacking in their sector knowledge, experience, client / customer interaction or other non-technical / interpersonal skills[63]. Earlier research has shown that companies reporting skills gaps amongst their Technology professionals report an adverse effect on their business[64]. For example, in the Games industry, employers who reported skills gaps were most likely to experience them amongst programmers (53%) and to report serious commercial consequences such as delay in the development of new products[65].

e-skills UK has quantified the up-skilling requirement through the metric of 'development units' where one development unit equals movement of one level (e.g. level 3 to 4, or level 4 to 5) within one type of skill[66]. To bring the skills of Technology professionals in line with those currently required by their employers would require the delivery of around 9.8 million development units, whilst a further 13.1 million units would then be required to maintain alignment with employer needs over the coming 3 years[67].

Currently the main development need is at, or to, senior levels, focused in particular on programme management, supplier management, and service management and delivery. In addition, there is a need for up-skilling amongst Telecoms occupations from levels 2 and 3 into higher levels. Over the coming three years, workforce development needs will be distributed more evenly across the range of Technology professional roles, including increased focus on skills at technician /associate level (levels 3 and 4). Business and personal skills were highlighted in the e-skills UK 2009 employer survey as major areas of skills gaps in the workforce; currently over a third of development activity is required in this area including significant leadership development needs.

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[63] e-skills UK 2009 employer survey

[64] IT & Telecoms Insights 2008, e-skills UK

[65] State of the UK Video Game Development Sector, Tiga January 2009

[66] A sub-skills group within the IT Professional Competency Framework

[67] e-skills UK 2009 employer survey

4.1.3 Skills supply: the education system

Considering the education system and the workforce of the future a suite of issues affect the growth of the digital economy. For example:

<u>In Higher and Further Education</u>

o   The number of UK applicants to Computing degrees has fallen by 50% in the last five years down to only 14,000 people in 2008, despite the importance of this subject as a source of talent into the 1.1 million strong and growing Technology professional workforce.

o   Barriers remain in creating cross-disciplinary pathways in education that would add significant value for the Technology sector. To support progression into Technology careers, there is strong demand from employers for more degree courses to reflect the need for greater levels of business competencies as well as deep technical capability. Building on e-skills UK's Information Technology Management for Business degree (ITMB) as an example, industry needs to be more engaged with Higher Education to help shape provision, support delivery and provide work experiences that enable graduates to become more work ready.

o   More widely, to help address the UK's productivity challenges, there is a pressing need to incorporate education about technology and its strategic potential across degree currcicula in all subjects.

<u>In schools and colleges</u>

o   There are major issues with the 14-19 technology curriculum. Neither IT-related A-levels or GCSEs are respected by employers or Higher Education, and disjoints in terms of progression are evident through the system.

o   The ICT GCSE is a primary cause of the decline in student interest in IT-related education and careers. e-skills UK's research amongst 1,000 students showed that students presume that their school ICT courses, which focus on the day to day use of IT and which they invariably find mundane and boring, are an indicator of the content of IT-related degree courses and IT professional careers.

o   Compounding curriculum issues, there are also major issues with the teaching of IT in schools and colleges. Many teachers without relevant qualifications are teaching the subject, and the lack of teacher skills in this area is widely recognised as a major inhibitor to a high quality educational experience.

o   A gender imbalance is prevalent on IT-related courses, with, for example, 90% of A-level Computing students and 85% of applicants to Computing degrees being male.

o   There are significant issues with careers advice. Students generally are not receiving high quality advice to help them understand the opportunities across the Technology sector and make appropriate subject choices. e-skills UK's BigAmbition careers information site has been established to help rectify the gap of relevant careers information, advice and guidance for the Technology industry.

4.1.4 Skills supply: workforce development

The likelihood of Technology professionals receiving job-related education / training has fallen in recent years to below the UK average, and, in the second quarter of 2009, only 23% were thought to have received education / training during the previous 13 weeks compared to 27% of the wider workforce[68]. Earlier research showed that, while overall, 50% of Technology companies provided training for their Technology professionals, this ranged from 78% of large companies down to 18% of companies with less than ten employees[69].

Where education / training has been received, it is most likely to have been technical in nature, delivered off-the-job and from an education or training provider, although employer premises, home learning and training centres are all common options for delivery. It is often quite likely to be delivered on an ad-hoc basis as over one third of firms are thought to identify and address the training and development needs of Technology professionals only as and when they arise[70].

The learning and qualifications landscape for Technology professionals is very complex and fragmented. Particular issues in terms of the development of the current workforce include the following:

o   Recruitment and development of Technology professionals is complicated by the fact that most training does not lead to awards recognised outside of the organisation.

o   Private providers are, by far, the most prevalent source of training for Technology professionals. The extremely low level of participation by public providers is both an inhibitor to skills development from a sector perspective, and a missed opportunity to access a large and profitable market from the provider perspective. Given that the majority of the development need for Technology professionals is for those already holding graduate level qualifications, there is particular opportunity for increased participation by HE, in partnership with employers and private providers.

o   The current infrastructure is not well geared to the needs of smaller companies and contractors. Private training can be very expensive and is not always sufficiently responsive to individual company needs, while public provision tends to focus on lower skills levels and full qualifications which are not generally a good match to employer requirements.

The recently announced development of a National Skills Academy for IT is intended to make a significant difference to addressing these workforce development issues.

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[68] ONS LFS April – June 2009

[69] IT & Telecoms Insights 2008: Staff Training in the UK , e-skills UK 2008

[70] e-skills UK 2009 employer survey

4.2 Digital Content

4.2.1 Skills shortages

Most areas of the Content industries have long been characterised by an oversupply of potential new entrants. One result of this has been a high level of voluntary or unpaid working, with nearly half the workforce in Creative Media reporting having worked unpaid in order to get into the industry[71]. Mismatch of applicants' skills to the needs of the job is a common issue, and experience in work is often a much greater priority than academic qualifications. In Advertising, for example, 84% of employers say applicants lacked appropriate skills yet only 3.7% lacked appropriate qualifications[72].

Across the Content industries, skills in short supply from new entrants include production skills for multi-platform content, understanding of intellectual property legislation, management and leadership, and commercial acumen. In the Creative Media industries, the most common areas of training identified by employers are related to new and digital technology (one in four people). In addition, management and leadership skills to take advantage of and monetise this digital content is a priority for the sector (cited by one in ten people)[73]. In Advertising, Music and Design, creative roles are the hardest to recruit for, and the key skills missing in these roles are cited as IT and technical[74].

Multi-skilling competence is a significant requirement of digital media workflow, from content creation and production to metadata management. Yet there is a shortage of new people in the industry equipped with 'T-skills' - highly specialised in one core field, but with broad skills and knowledge to utilise their specialism across teams and platforms[75].

Broadcast engineering has long been recognised as a skills shortage area[76]. A combination of lack of new recruits; inappropriateness of training provision in further, higher and commercial education; an ageing profile of the workforce; lack of a framework for continuing professional development; and the rapid impact of technological change has meant that many companies feel this area is a priority for action[77].

Visual Effects (VFX) is dependent on highly specialised technical and artistic skills that are also in considerably short supply globally. Visual effects companies are recruiting from all over the world to meet the demand for specialised technical roles, and VFX has been placed on the Home Office skills shortage list[78].

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[71] Skillset 2008 Creative Media Workforce Survey; Skillset 2005 Survey of the Audio Visual Industries' Workforce; Skillset 2003 Workforce Survey

[72] Creative & Cultural Skills 2006: Skills Needs Assessment

[73] Skillset Archives Skills Strategy, 2009; Skillset Creative Media Workforce Survey 2008

[74] Creative & Cultural Skills 2006: Skills Needs Assessment

[75] A Skills Review for the TV & Radio Sector, Skillset, 2009

[76] Skillset Creative Media Workforce Survey, 2008; Skillset Balancing Children and Work in the Audio Visual Industries, 2006; Skillset 2005 Survey of the Audio Visual Industries' Workforce; Skillset 2003 Workforce Survey

[77] Final Summary Report from the M.TEST Project and Recommendations, Skillset/IABM, February 2009 (not published)

[78] Skillset Submission to the Development of MAC Shortage Occupation Lists, 2009

4.2.2 Skills gaps

One in two companies in the Creative Media industries reports skills gaps, and the most commonly reported are those concerned with specific software applications, and understanding and exploiting digital technological advances. New skills are needed to meet demand for quality content on *any* platform; this multi-platform capability is the second highest skills gap among the workforce[79]. The most recent research shows this is one of the top three skills gaps resulting from the recession, cited by one in four[80].

Management, leadership and business skills are major development needs across the workforce in all Creative Media industries, particularly in relation to project and production management for multi-platform[81]. On a senior management level, gaps in negotiation and leadership skills are frequently associated with the challenges of managing the change from traditional to digital.

In Advertising, Music and Design industries, there are skills gaps amongst the generations of the workforce not familiar with IT. This is most pronounced at senior level, and agencies are struggling to employ senior strategic talent with suitable digital knowledge. At this level, digital skills must be combined with other core skills like strategic planning. In particular, the ability to create sustainable business models by monetizing intellectual property in a digital environment are critical to survival. This depends on business skills, understanding of intellectual property legislation globally, and a grasp of the strategic potential of technology. This is both a skills gap and shortage and the industry needs all new leaders and managers to have this awareness. The impact of skills gaps on these industries is predominately lost business (26%), as well as delay in the production and development of new products and services (22%), and an increased workload for other employees (21%)[82].

Overall, Content professionals need to become increasingly multi-faceted. Ideas often need to be multi-disciplinary and media neutral so that they can be applied down a number of channels. The increasing importance of digital content has led to a growth in the value of specialists in this discipline, expanding existing roles and creating entirely new roles. This has the knock on effect of increasing employee churn and higher salaries. Across industry, people are required to have a broader understanding of technologies related to their function, be it software, hardware or communication technology.

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[79] Skillset 2008 Creative Media Workforce Survey, Creative Blueprint: The Sector Skills Agreement for the Creative and Cultural Industries, Creative & Cultural Skills 2008

[80] From Recession to Recovery, Skillset 2009

[81] From Recession to Recovery, Skillset 2009; Skillset Creative Media Workforce Survey, 2008; A Skills Review for the TV & Radio Sector, Skillset, 2009

[82] Creative and Cultural Industries Workforce Survey, Creative and Cultural Skills 2009

4.2.3 Skills supply: the education system

Considering the education system and the workforce of the future, a suite of issues affect the growth of the Digital Content industry. For example:

In Higher and Further Education

o   There are 13,000 media programmes at Further and Higher Education levels serving an estimated 50,000 students. Although this provides valuable skills into the wider community, it represents oversupply in terms of the Creative Media industries, and too many courses produce graduates with insufficient specialisms to meet employer needs. Similarly, in Design and Music, there is an oversupply of courses and graduates compared to the jobs available. In Advertising, there is a lack of course provision that caters to the industry.

o   Employers are keen to promote greater uptake of Sector Skills Council backed courses and accreditation services, which identify provision that best meet industry needs. This includes the Skillset Academies, the Skillset accreditation of degree programmes, and the new Creative & Cultural Skills Industry Select programme.

o   Barriers remain in creating cross-disciplinary pathways in education that would add significant value for the Content sector. To support progression into digital content roles, there is a need to bring students together across disciplines to collaborate, innovate and pursue new research and development. Industry needs to be more engaged with Higher Education to help shape provision, support delivery and provide work experiences that enable graduates to become more work ready.

In schools and colleges

There are significant issues with careers advice. Students generally are not receiving high quality advice to help them understand the opportunities across the digital sectors and make appropriate subject choices. The online sites Skillset Careers[83] and Creative & Cultural Skills' Creative Choices[84] have been established to help rectify the gap of relevant careers information, advice and guidance for the Content industries.

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[83] www.skillset.org/careers

[84] www.creative-choices.co.uk

4.2.4 Skills supply: workforce development

Demand for training remains high in the Creative Media industries. In Skillset's Creative Media Workforce Survey of 2008, the most common areas of training were reported as relating to multi-platform content and new and digital technology (one in four employers identifying this need). One in two people declared a current need for training. Six in ten had undertaken training in the previous year, receiving an average of 11 days each (an increase from 7 days in 2005). Comparing employees with freelancers, freelancers were more likely to need training (60%). A smaller proportion of freelancers had undertaken training (43% v. 65%) but those who had taken training had undertaken more (an average of 13 days v. 9 days)[85].

Barriers to training are a challenge for the Creative Media industries. In Skillset's 2008 survey, nine in ten in the workforce reported barriers or obstacles to training. Overall, the most common were that fees are too high (40%), employers were unwilling to pay for training (34%), and it was difficult to assess the quality of courses (27%). There were considerable differences between the experiences of employees and freelancers. A far higher proportion of freelancers than employees reported virtually every type of barrier. For example, freelancers were more likely to say fees were too high (reported by 62% of freelancers vs 34% of employees), and to fear losing work due to committing time to training (37% vs 7%). The only barriers more widely reported by employees than freelancers were difficulty assessing the quality of courses, and employers being unwilling to pay for training[86]. More recently, one in two Creative Media companies said their ability to deliver training has been affected by the recession[87].

A particular issue in terms of workforce development for the digital economy is the key role of leaders and managers in the Content industries in creating new business models and exploiting the opportunities provided by digital platforms. SMEs in particular need help, which is not currently widely available, to understand the potential, find new approaches to content creation and Intellectual Property exploitation, and develop new business models for growth.

In Advertising, Music and Design, businesses in general feel they are doing worse or the same, economically, than this time last year[88].This has led the vast majority of businesses in these industries to reduce their training budget and the amount of training accessed. 8 in 10 have no budget at all, or spend less than £1000 p.a. on investment in new skills[89].

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[85] Skillset 2008 Creative Media Workforce Survey

[86] Ibid.

[87] Skillset From Recession to Recovery, 2009

[88] Creative and Cultural Industries Workforce Survey, 2009

[89] Creative Blueprint: The Sector Skills Agreement for the Creative and Cultural Industries, Creative & Cultural Skills 2008

In Design, there is evidence of a lack of continuous professional development among practising designers, with only 16 per cent of designers on average having had job-related training in the past three months, significantly below the UK average[90]. The evidence paints a picture of an industry that learns primarily on the job and where formal training and development is the exception rather than the rule.

4.2.5 Skills supply: diversity

A particular issue in terms of skills supply into the Creative Media industries is the changing profile in terms of women and Black, Asian and Minority Ethnic representation, which has fallen sharply in recent years in some sub-sectors, along with an increase in people leaving the industries in their thirties and forties[91]. In addition, the industry's traditional reliance on an extremely young workforce may in the future be challenged by the changing demographics of fewer young people coming through the education system.

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[90] Design Blueprint, Creative & Cultural Skills and Design Council 2008

[91] Skillset Creative Media Workforce Survey, 2008; Skillset Balancing Children and Work in the Audio Visual Industries, 2006; Skillset 2005 Survey of the Audio Visual Industries' Workforce; Skillset 2003 Workforce Survey, Creative Blueprint: The Sector Skills Agreement for the Creative and Cultural Industries 2008

4.3 The wider workforce

4.3.1 Business managers and leaders

To support innovation, and to achieve the competitiveness and productivity benefits the UK needs, a significant number of people in every sector - including the UK's four million leaders and managers - need to grasp the strategic implications of technology and have the skills to realise its potential. The UK urgently needs to rapidly move up the maturity curve in terms of attitudes to technology; it should be no more acceptable for those in leadership roles to lack an understanding of technology than it is to lack an understanding of finance.

However, many leaders do not as yet have this expertise. There are direct correlations between technology uptake and both company size and the age of the decision makers in an organisation. Smaller organisations and those run by older people are much less likely to embrace technology[92], and these segments need more targeted support to improve their ability to operate in the digital economy. Companies that do not adopt digital technology miss out on the productivity and competitiveness benefits it offers.

4.3.2 IT users

For the UK to remain globally competitive, workers at all levels in the labour market need appropriate and constantly increasing skills in the day to day use of technology. Today, 77% of the UK's workforce use IT in their everyday jobs. Employers report that virtually all positions they recruit for (92%) have a requirement that applicants hold at least some basic level IT user skills[93].

There is a major upskilling need across all sectors to help the workforce keep pace with and fully utilise the proliferation of technology – from airport baggage handlers to postal workers to retail supply chain staff. Just over one in ten (11%) employers identified gaps in the IT user skills of their staff. Mismatches in the skills of IT users are most likely due to an inability of these staff to take time away from their job to undertake the training they require[94]. However, according to latest estimates from ONS, currently only around 9% of UK workers had received some form of IT training in the three months prior to interview – 1 percentage point up on the figure a year ago.

Today, 36% of the development need for IT user skills is at 'advanced' level or higher (level 3 plus). In three years time, 53% of the upskilling need will be at this level. In addition, there is a significant need for increased volumes of lower level skills development as workers who do not currently use digital technology at work need to do so[95].

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[92] ICT in England's Rural Economies, DEFRA and the Office of National Statistics as reported in 'IT & Telecoms Insights 2008', e-skills UK

[93] e-skills UK 2009 employer survey

[94] e-skills UK 2009 employer survey

[95] e-skills UK 2009 employer survey

4.4   Summary of current skills issues

Recovery from recession and growth in all areas of the economy are dependent on the country's digital capability. However:

In terms of Digital Technology:

- Technology skills shortages are holding back business growth.

- Companies reporting skills gaps say that they affect over three quarters of their Technology professionals.

- Failure to invest in the training of Technology professionals increases the smaller the company.

In terms of Digital Content:

- 50% of Creative Media companies report skills gaps, with skills for multi-platform content using new digital technologies a primary issue.

- Creators of digital content face particular issues in creating sustainable business models in a digital environment.

For both Digital Technology and Digital Content:

- The training environment is fragmented and difficult to navigate, and the qualifications structures are not well aligned to employer needs.

- The potential of Higher and Further Education is underutilised in terms of upskilling of the Technology and Content professional workforces.

- The education system is not supporting the digital economy in terms of volume or capability of new recruits. Key issues are:
  - o   The curriculum and teaching of IT-related subjects.
  - o   The gender imbalance in IT-related subjects.
  - o   The lack of cross-disciplinary pathways in education in relation to both Technology and Content professions, and insufficient emphasis on business skills.

- Careers advice relating to digital economy jobs is far from adequate.

- Gender and other diversity indicators are worsening.

For the wider workforce:

- The widespread lack of capability in smaller companies to understand how to adopt and exploit advanced digital technology has a direct impact on UK productivity.

- There is a need for accelerated investment in IT user skills, particularly for older workers, lower skilled workers and unemployed people.

5.   Future skills environment

This section sets out the anticipated future environment in terms of skills demand and skills supply, given current course and speed. Section 7 builds on this with a vision of global ambition based on acceleration of skills strategy.

5.1   Digital Technology

5.1.1 Spend

Global Digital Technology spend to grow 3.3% in the coming year

In its '*Worldwide IT Spending Forecast'* of September 2009, leading market analyst Gartner has projected that global spending on IT will grow 3.3% to $3.3 trillion next year, turning around a dip of 5.2% in worldwide spending on IT in 2009. Recovery to 2008 revenue levels of $3.4 trillion will be achieved in 2012. Software and services will show the strongest growth in 2010 at 4.8% and 4.5% respectively[96]. The total market in 2010 is predicted to be as follows:

IT & Telecoms spend worldwide (Gartner)						
Segment	2008 (actual)	2007-2008 growth (actual)	2009 (predicted)	2008-2009 growth (predicted)	2010 (predicted)	2009-20010 growth (predicted)
IT Services	$809 Bn	8.3%	$781 Bn	-3.5%	$816 Bn	4.5%
Software	$225 Bn	7.9%	$221 Bn	-2.1%	$231 Bn	4.8%
Telecoms	$1,958 Bn	5.6%	$1,879 Bn	-4.0%	$1,940 Bn	3.2%
Hardware	$380 Bn	2.5%	$317 Bn	-16.5%	$317 Bn	0.0%
Total	**$3,372 Bn**	**6.0**	**$3,198 Bn**	**-5.2%**	**$3,304 Bn**	**3.3%**

Within that total market, Western Europe, with a market share of around 25%, is expected to grow slower than the global average with a 3.0% increase from 2009 to 2010. Fastest growing will be Latin America at 8.8%, followed by the Middle East and Africa at 5.6% and Asia-Pacific at 5.0%. Japan and Eastern Europe are expected to contract further between 2009 and 2010, and the US will grow slower than Western Europe at 2.8%.

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[96] Worldwide IT Spending Forecast, Gartner October 2009

UK IT spend to grow to £56 billion by 2013

In October 2009, global market intelligence firm IDC estimated that IT spend in the UK will be £50 billion in 2009, rising to £56 billion in 2013. This represents a growth of 1.8% p.a. from 2008-2013 and a steadily increasing GDP contribution[97].

IT spend UK (IDC)				
	2008 (actual)	**2009 (predicted)**	**2013 (predicted)**	**08-13 CAGR (predicted)**
IT Services	£26,238M	£26,108M	£29,480M	2.4%
Software	£9,620M	£9,701M	£11,242M	3.2%
Hardware	£15,736M	£14,370M	£15,656M	-0.1%
Total	**£51,595M**	**£50,179M**	**£56,378M**	**1.8%**

5.1.2 Employment

Scenario planning

Two alternative scenarios for future Technology sector employment have been developed alongside standard forecasts, considering the latest economic forecasting, and analysing existing and predicted trends across each segment of the sector. The primary driver for these scenarios is differing assumptions in relation to speed of economic recovery in the UK and globally.

The 'upside scenario' is in line with the experience of the late 1990s, with the technology industry expanding well above growth rates experienced in the rest of the economy. It utilises results from the e-skills UK 2009 panel (a survey of 2,000 companies in the UK) which asks for employers' expectation in terms of employment forecasts.

The 'downside scenario' draws on supply chain analysis, focusing on sectors which buy from the technology industry (predominantly banking and finance, insurance and pension funds). Employment forecasts across the economy reflect how the key purchasing sectors are expected to perform in the short run, for example considering the impact of reductions in IT & Telecoms purchases by the financial sector in the next three years.

These scenarios present alternative views of the short term future of the sector. Emerging actual data taken from the LFS subsequent to the initial scenario forecasting show that the downside scenario is currently the best reflection of employment trends in the sector, and e-skills UK's own research supports this view. As such, the downside scenario has been designated the most likely scenario. Further detail is available within the e-skills UK Sector Skills Assessment.

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[97] The economic impact of IT, software and the Microsoft ecosystem on the economy, IDC October 2009

Technology professional workforce is growing at 4 times the UK average

The 'downside scenario' predicts that the Technology professional workforce in the UK will grow at the rate of 1.2% per annum between 2009 and 2018, which is 4 times the forecast average employment growth rate for the UK as a whole. The table below shows the growth rates by industry and occupational segments:

DIGITAL TECHNOLOGY EMPLOYMENT GROWTH		
Segment	**Current employment 2009**	**Growth rate – average p.a. 2009-2018**
IT industry	609,000	1.3%
Telecoms industry	251,000	-0.5%
Total IT & Telecoms industry combined	860,000	0.8%
IT & Telecoms professionals	**1,113,000**	**1.2%**
UK workforce all sectors	27,498,000	0.3%

Source: 'IT & Telecoms Insights: Employment Forecasts', e-skills UK / Experian 2009

The strongest growth will continue to be in high skills areas. Higher level skilled jobs currently comprise 68% of the Technology professional workforce, and by 2018 this will be 72%. In particular, software professional occupations (SOC 2132) will grow at 2% per annum leading to an increase of 66,800 jobs by 2018.

550,000 new Technology professionals needed in the next five years

Considering replacement demand and growth, over the period 2009-2013, an average of 110,500 jobs each year need to be filled by people moving into Technology professional jobs from elsewhere. 52% of these (57,800 people p.a.) will come from another profession, 19% (20,800 p.a.) from the education system, and 29% (31,900 p.a.) from other sources such as unemployment.

Over the period 2009-2013, 63% of the intake will be into managerial and senior professional positions (ICT managers, IT strategy and planning and software professionals).

Recruitment source	Average number p.a. 2009- 2013	%
Employed individuals in occupations other than IT or Telecoms	57,800	52%
Individuals joining from education	20,800	19%
Other sources[98]	31,900	29%
Total	**110,500**	**100%**

Source: Employment Forecasts, e-skills UK/Experian 2009

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[98] E.g. people entering or re-entering the workforce after a career break, after early retirement or from unemployment

5.1.3 Changing skills needs

Across the sector, there is recognition of the need for increasingly high levels of skills. For example, employers estimate that, in three years time, the focus of development activity will be at 'lead professional' level and higher. Understanding the effects of the forces for change, set out at section 3, is key to anticipating the future technology-related skills needs:

In the Technology industry, companies will have to continue to expand their capabilities and the breadth of their service offerings as the traditional model of software sales, service and support gives way to new business models and markets, driven by consumerisation and convergence. Basic technology skills and jobs are increasingly located offshore. The industry in the UK needs to develop more of the higher value skills to handle increasingly complex technology systems: leadership and relationship management; business process analysis and design; project and programme management; business intelligence, information analytics and systems architecture.

Technology professionals will require greater skills in the application of technology to improve business performance, and in conceptualising and implementing technology-enabled business change programmes. As well as continuing to have very strong technical skills in areas such as systems architecture and security, they will also need to develop greater expertise in networking and more will need skills in areas such as multi device management and design, to take advantage of converged technologies.

As IT moves deeper into the board room, IT professionals will need more skills in business processes, enterprise change and management at the portfolio, programme and project levels, along with business architecture skills, risk management and security skills. Web and internet specialist skills will be increasingly in demand, as will the project management and supplier management skills to manage outsourced work.

For Telecoms professionals specifically, there is likely to be a reduction in the staffing needed to maintain the existing core networks, as they become more robust and basic maintenance activities are performed intelligently by the network itself. There will, in contrast, be an increase in higher level network design and development skills for the new 21st Century Network, along with increased demand for software skills in general and in the following in particular: distributed and internet applications, network management and security, and information management. In addition to the increase in skills associated with the changes in the core network, there will also be a requirement for staff to create new services facilitated by the move to a common IP environment, and new skills requirements due to WiMAX expansion.

5.2   Digital Content

5.2.1 The future shape of the Content industries

Pre-recession forecasts suggested that the UK entertainment and media market would grow by 5.8% compound annual growth rate for the five years to 2012, to reach $152 billion[99]. However, since then, the Content industries have been subject to significant challenges as set out earlier in this report. Given the turbulence, it is difficult to source reliable future estimates of industry spend and employment forecasts. In early 2009, NESTA released a forecast that, between 2009 and 2013, the UK Creative industries would grow on average at 4%, more than double the rate of the rest of the economy, and, by 2013, would employ 1.3 million people. In this forecast, the Creative industries are expected to contribute £85 billion to UK GVA in 2013, up from £57 billion in 2006. This optimistic medium-term outlook is primarily due to the opportunities for innovation as increasing numbers of creative businesses take advantage of digital technologies to develop new business models, for example the digital distribution model which has been exemplified by the success of 'iTunes'[100].

At the time of writing this Report, figures were not available to show the anticipated contribution of the Content industries to forecast Creative industries numbers. However, as set out in section 2.4, the DMCS January 2009 report showed that the Content industries comprised around one third of the total employment (with software and 'other creative industries' also comprising around one third each), and 41% of the total GVA (with software 43% and 'other creative industries' 16%).

Deloitte's TMT Media Predictions 2009 provides analysis across much of the Content industries highlighting, for example, the linkage between major world events and increased use of media. In Advertising, the latest Bellweather Survey[101] indicates that recent declines in advertising budgets are easing and the *'Long Term Advertising Expenditure Forecast'*, commissioned by the Advertising Association, has forecast that spending on advertising after the recession will grow by 52 per cent over the ten years to 2020.

Many analysts predict that traditional incumbent companies will remain dominant, sometimes through acquiring companies with a strong digital presence. The opportunities presented by developing technology may be beyond the scope of almost all single companies, even large established multinationals or conglomerates. Alliances and partnerships will therefore be formed for opportunities to be realised, commonly with Technology companies, and sometimes with companies that will be competitors in other markets.

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[99] Global Media & Entertainment Outlook 2008-2012, PWC UK 2008

[100] Press release 'UK creative industry to drive significant growth to UK economy', NESTA 19/02/2009

[101] Bellweather Survey, IPA 2009

With the number of people employed in the Creative Media industries currently declining[102], and the fact that people are likely to become freelance when faced with redundancy or the threat of redundancy[103], the highly skilled freelance labour pool is likely to increase,   resulting in increasing pressure on already limited funds for investing in freelancers' skills and development. However, another consequence of the present economic climate is that it is becoming increasingly difficult for individuals to secure mortgages and other types of credit without a permanent employment contract. As a result, some individuals may be likely to leave the sector entirely, taking their skills and talent with them. There is a significant danger of losing a highly skilled and experienced cohort of the workforce in whose development there has been significant investment.

5.2.2 Changing skills needs

Across all Content industries, there is recognition of the dramatic changes brought about by the digital environment and the need to upskill to make the most of it. The following are of particular importance[104]:

- Multi-skilling: an understanding of different technology platforms and their impact on content development and digital work flow, and new approaches to working in cross-functional creative / technical teams within, and across, companies.

- Multi-platform skills: the creative and technical skills to produce content for distribution across all potential platforms, and the ability to understand and exploit technological advances.

- Management, leadership, business and entrepreneurial skills: especially project management for multi-platform development; the hybrid skills combining effective leadership with innovation, creativity and understanding of technology, and the analytical skills to understand audience interests and translate it into business intelligence.

- IP and monetisation of multi-platform content: understanding of intellectual property legislation to protect from piracy, and exploiting intellectual property internationally to take full advantage of emerging markets - with particular focus on the ability to deal with the problem of illegal downloading and copyright infringement.

- Broadcast engineering: continuing to be an area of skills shortage.

- Archiving: archiving of digital content being an area which is attracting increased attention as a challenging issue for the future.

- Sales and marketing: being particularly important in commercial radio and an emerging need in other sectors.

There needs to be particular recognition of the needs of the freelancers on whom so much of the Content industries depend.

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[102] Skillset Employment Census 2009, to be published

[103] Skillset Creative Media Workforce Survey 2008

[104] Skillset Creative Media Workforce Survey, 2008; A Skills Review for the TV & Radio Sector, Skillset, 2009

5.3 The wider workforce

5.3.1 Business leaders and managers

Increasingly, business leaders and managers will need to be able to release the transformational power of IT through a co-ordinated and integrated business and IT strategy. They will need the skills to integrate IT across all business processes and organisational structures. They will also require the skills to innovate through technology and to develop technology intensive products and services.

The skills needed are information and process design coupled with technology capabilities such as design interface and an understanding of technology systems. Business managers must develop their digital technology skills to achieve the innovation and collaboration required to be competitive[105].

Thanks to technological advances, even small organisations on a budget now have the capacity to disrupt long established companies. For example, a recent conference in the US, focused on innovation and technology advances, pointed out that in a situation where it might have cost a million dollars in the past to develop a new product a prototype, it can now be possible for someone to do it on their own in a couple of weeks[106].

5.3.2 IT users

Key knowledge workers will need increasingly high level skills in information and analytics and business analysis, collaborating with Technology professionals to design and implement new solutions and business processes.

IT users more generally will need not only increased levels of skills in basic desk top and digital technologies (including web, email, instant messaging, online document management), they will increasingly be required to use digital devices for everyday communication, dedicated devices for specialised business functions and be skilled in security management and IT support processes and tools. They will increasingly use IT in decision making, and in some cases use digital technology and digital content to create new sources of customer value.

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[105] IT & Telecoms Insights 2008: Trends and UK Skills Implications, e-skills UK 2008

[106] Michael Gillam, Director of Microsoft Medical Media Lab, November 2009

6.4   Summary of anticipated future skills issues

Wealth generation and employment growth for the future depends on having a world class digital skills pool. However:

In terms of Digital Technology:

- With the Technology sector recruiting 110,500 people a year, skills shortages (recruitment difficulties) will increase as the economy recovers.

- Skills gaps will increase as companies need increasingly complex ranges of high level skills in technology and business.

In terms of Digital Content:

- Skills shortages and gaps relating to the digital economy will increase across the Content industries as content increasingly moves online.

- There is an increasing pool of freelancers in the Content sector as a result of the recession; maintaining the vitality of the talent pool is essential to support recovery and growth post-recession.

For both Digital Technology and Digital Content:

- Technology developments will have a profound effect on the skills needs in the whole Technology and Content workforce, in particular the use of information and analytics, the need for content to be provided on multi-platforms, the rise of social computing and the impact of 'digital natives' as consumers and as employees.

For the wider workforce:

- All business leaders will need new capabilities to innovate through technology and derive the productivity and competitiveness benefits they need to survive.

- Knowledge workers will need increasingly sophisticated skills in the use of IT, including greater collaboration with Technology and Content professionals to create new value.

6.   Geography

This section provides a view of the digital economy in terms of the English regions, covering distribution, trends and the policy environment. Global competitiveness information is provided in sections 2.4.

6.1   Distribution of the workforce

The workforces of the Technology and Creative Media industries are distributed across the UK[107]. Whilst there is little difference between regions in terms of types of skills, there are particular concentrations of industries and industry sub-segments in different geographies, often proactively encouraged by regional policy. For example, some regions are more focused than others on establishing regional capabilities and some are starting to encourage the development of clusters of digital industries. Examples include the BBC move to the North West of England, and the establishment of Software City in Sunderland.

As shown in the tables below, London and the South East together provide the base for 41% of the UK Technology industry's workforce and 46% of the UK Creative Media industries' workforce. The distribution of companies follows a similar profile.

TECHNOLOGY AND CREATIVE MEDIA WORKFORCE: GEOGRAPHIC DISTRIBUTION					
Geography	UK average all industries	Technology industry		Creative Media industries	
		% of UK total	Delta to UK average all industries	% of UK total	Delta to UK average all industries
England (total)	84%	90%	6%	89%	6%
South East	14%	24%	10%	11%	-3%
London	13%	17%	4%	35%	22%
East of England	10%	9%	-1%	7%	-3%
North West	11%	9%	-2%	10%	-1%
South West	9%	8%	-1%	9%	0%
West Midlands	8%	8%	-	4%	-4%
East Midlands	7%	5%	-2%	4%	-3%
Yorks&Humber	8%	6%	-2%	7%	-1%
North East	4%	4%	-	2%	-2%

Sources:
- Technology: IDBR 2009 Analysis of UK Local Units in VAT based Enterprises.
- Creative Media: Skillset 2009 Employment Census, Skillset/UK Film Council Feature Film Production Workforce Survey 2008, Experian 2007, LFS Apr-Jun 2009. Excludes cinema exhibition.

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[107] Note: Data for Advertising, Music and Design not included in the table above. It follows a profile very similar to the all industry average except for a greater concentration in London (22%) (source: Creative and Cultural Industries Impact and Footprint, Creative & Cultural Skills 2008)

6.2   The potential for productivity gain

As explained in Section 2, the continued adoption and exploitation of ICT could generate an additional £35 billion of GVA to the UK economy over the coming 5 to 7 years. However, this will be achieved unequally across the country depending on factors such as attitudes towards technology and economic structures within the regions.

As shown in the chart below, across the UK, the benefits by geography would range from £0.8 billion in Northern Ireland to £5.4 billion in each of London and the South East.

Potential productivity uplift from ICT over the next 5 to 7 years
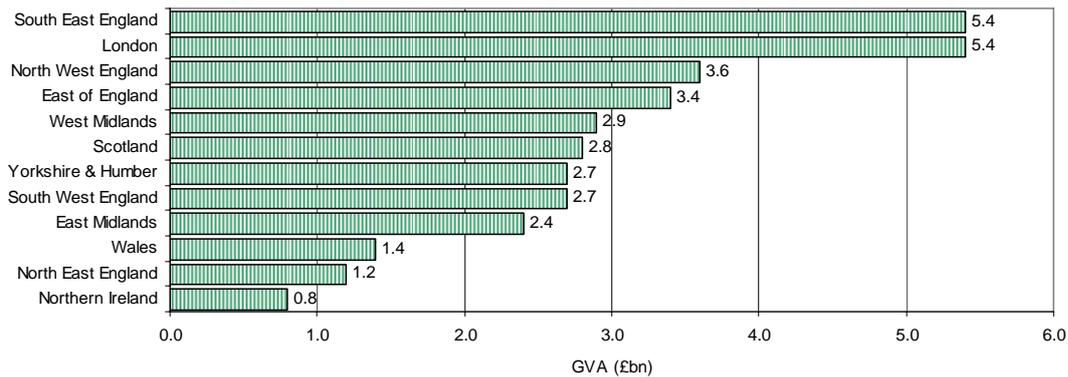
Source: 'IT & Telecoms Insights: the Impact of ICT on UK Productivity', e-skills UK / Adroit Economics and Regeneris Consulting 2008

6.3   Regional policy environment

Regions are increasingly focused on digital industries and skills as central to economic strategy. Examples include the following:

Yorkshire and Humber: Digital and new media are priority sectors, and the Regional Economic Strategy (RES) includes an intent to inspire more people to take qualifications in subjects which will support future market demands such as ICT and STEM. The 'Digital 20/20' initiative is Yorkshire and Humber's initiative to help people and organisations in the region develop the capabilities to get the most out of living, learning, working and doing business in the digital world.

North West: Using ICT more effectively and efficiently is one of the seven key factors in *'Achieving the Vision in the Regional Economic Strategy'* (2006). The objectives are to support ICT usage and digital content development; develop ICT infrastructure; invest in workforce development. 'Creative and Digital' are key sectors allocated priority status in the RES, with the intention to support development of internationally competitive Digital and Creative industries, including exploiting the creation of Media City UK and the BBC relocation.

<u>North East</u>: *'Leading the Way'*, the RES for 2006-2016 sets out plans to deliver greater and sustainable prosperity to those in the region. 'Digital media and technology' is considered part of the Commercial Creative sector, and the importance of e-business to industry in general is recognised in the strategy. The 'Digital North East' strategy is aimed at boosting the digital sectors and their impact on the region's economy.

<u>East Midlands:</u> *'A Flourishing Region'* is the East Midlands third RES, and focuses on sustainable economic growth, increased businesses competitiveness, innovativion and leaving a positive legacy for the future. The strategy recognises the importance of a quality ICT infrastructure and the need to help SMEs develop the ICT skills of their staff.

<u>West Midlands</u>: '*Digital West Midlands'* provides a framework for the development and exploitation of ICT within the public, private and voluntary sectors in the West Midlands with the ambition of increasing the take-up and use of ICT to achieve benefits in both productivity and economic growth. The RES also highlights Digital Media as one of five areas for focused investment under the 'Harnessing Knowledge' strategic objective.

<u>East of England</u>: *'Inventing our Future: Collective Action for a Sustainable Economy'* is the RES for 2008-2013. The strategy recognises that the digital economy is a key area for the region, stating that "Digital technologies are driving innovation and growth in business and revolutionising education and training, leisure and entertainment."

<u>London:</u> *'Sustaining Success: Developing London's Economy'* is the Economic Development Strategy for London which sets out a plan for sustainable, equitable and healthy growth and development of London's economy to 2016. London's ICT sector and Creative industries (of which software is a key part) are seen as world-leading sectors.

<u>South East</u>: The South East's third RES sets out to ensure that success is more widely accessible. As cross-cutting themes, Information and Communications Technology (ICT) and Creative and Cultural industries are relevant to the delivery across the full breadth of the RES. The ICT theme aims to ensure that the potential of ICT to contribute to the three headline indicators of increased GVA, increased productivity and decreased ecological footprint is fully realized. The goal of the Creative and Cultural industries theme is to provide an economic catalyst for both under-performing and growth areas.

<u>South West</u>: The RES vision is that South West England will have "an economy where the aspirations and skills of our people combine with the quality of our physical and cultural environment to provide a high quality of life and sustainable prosperity for everyone". Skills and Innovation are identified as key economic drivers, and the RES implementation plan suggests that ICT is an important tool for innovation. ICT and the Creative Industries are two of the eight priority sectors which are targeted with additional skills and business support.

7.   Global ambition

This section sets out a vision for the UK's role in the digital economy and recommended actions to support that vision.

7.1   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. The vibrancy of the Creative Media and Music industries, with their prodigious, high quality output, makes the UK a world-class player in content and the market leader in Europe. This report proposes that the UK could, and should, set out to be a global leader in delivering value from digital technology and in creating world-class digital content.

Vision: The UK is a global leader in delivering value from digital technology and in developing digital content.

In terms of technology, this means the UK being:

- One of the most attractive locations in the world for companies in all sectors to base high value technology-enabled businesses - in particular the strategically important areas of low carbon; life sciences; advanced manufacturing and engineering; and financial services.

- A magnet for the world's most highly skilled Technology professionals and the global leader in defining and setting standards for IT skills.

- A high value exporter of global technology services, such as the design, development and implementation of technology-enabled business solutions across all industries (including manufacturing, retail, financial services and public sector).

- A world leader in application development for virtual technologies, gaming technologies and other web-based interactive applications.

In terms of content, this means the UK being:

- The production base of choice for content to be delivered on any device and across any platform.

- A creative hub for innovation and development.

- A high value exporter of digital content and the commercialisation of content in a digitally networked age.

- A globally respected source of digital content talent.

7.2   Rationale for change

Strategic action to accelerate the development of the UK's digital skills pool in line with this vision is essential for the future. It is fundamental to the country's ability to derive value from upgraded infrastructures, to sustain and grow the high value jobs on which the whole economy increasingly depends, and to deliver the productivity gains achievable through improved access to technology and information.

The Technology and Content sectors are central to implementing Digital Britain. As Peter Mandelson stated in his lecture 'A New Industrial Activism'[108]: *"[We] need to widen and diversify the specialist bases of the UK economy and focus on how we further commercialise and internationalise these bases…..What we know for certain is that our specialisations must be built on knowledge and value-added. They will be in business and financial services….in the knowledge and creative industries and the technological and manufacturing process revolutions that will define the current century….".*

However, at current course and speed, the UK will drop behind. In the last year, the competitiveness of the UK's IT industry has dropped from 3rd in the world to 6th[109]. As set out earlier in this report, even in the recession, the Technology industry is continuing to report recruitment difficulties, and the UK is failing to capitalise on the £35 billion productivity gain which could be achieved through the better use of IT by smaller companies. The Content industries face unprecedented challenges as a result of the recession and the digital revolution.

The government's renewed focus on strategically important, growth sectors in the UK enables a more coherent approach to addressing the skills needs of the digital economy. The recommendations below build on the opportunities offered through the Higher Education Framework 'Higher Ambitions' and the National Skills Strategy 'Skills for Growth' (see section 3.6 'policy environment').

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[108] RSA, 17th December 2008

[109] Source: Europe's Digital Competitiveness Report, Commission of the European Communities, August 2009

7.3 Recommended strategies

Based on the analysis set out in this document, this report sets out one over-arching strategic recommendation, followed by a suite of recommendations to address the needs of the existing workforce and the future workforce respectively.

> **Strategic recommendation:** The sectors at the heart of the digital economy should continue to receive attention as sectors of strategic importance, with priority placed on their skills needs. Building on the policies set out in '*Higher Ambitions'* and '*Skills for Growth'*, government and business should work more closely together, with employers having increased influence and investment in the skills system and with government policy enabling greater tailoring of skills strategies to meet the high level skills needs of these sectors. A more strategic, flexible approach to co-investment with employers and individuals should be established for all the skills on which the digital economy depends.

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7.3.1 To develop the existing workforce

To generate wealth from the digital economy, the UK needs to continually develop its existing workforce as the best in the world for creating and deriving value from digital technology and digital content. This encompasses not only the professionals responsible for digital technology and digital content, but also the leaders and managers in all organisations, both private and public sector, who need an appetite and the capability for the strategic adoption of advanced digital technologies. In addition, all individuals need constantly increasing skills in the use of IT to fully participate in society and employment.

Specific recommendations for action are as follows:

1. **Launch a 'Digital Professional' Skills Development Fund** as part of a policy decision to accelerate the growth of the knowledge economy. This fund should leverage public funding to trigger increased investment in the development of digital technology and digital content skills by employers, and should support high level skills development (graduate and post-graduate level).

   This would rapidly increase the scale and impact of the National Skills Academy for IT, the National Skills Academy for the Creative and Cultural Industries, and the UK network of Skillset Screen and Media Academies, including:

   - Enabling greater participation of Higher Education in continuing professional development;
   - Supporting the development of new short courses and bite-sized online learning to up-skill the existing workforce and re-skill career changers entering digital careers;

- Helping employers to establish the UK as the global leader in defining and setting standards for technology skills, with a highly qualified Technology professional workforce;

- Pioneering programmes of creative and technical work-based study to address cross platform content development and the underpinning emerging collaborative processes and models which can be used to inform the development of HE provision and the change in culture required for delivery.

2. **Launch a Professional Apprenticeship and Internship Programme for the Digital industries** to incentivise employers to recruit and train graduates and grow the UK's pool of experienced, qualified 'digital professionals'.

   This programme should, for these strategically important sectors:

   - Enable graduate entrants to undertake employer-designed Apprenticeships and shorter-term Internships;

   - Provide for flexible training content designed for professional level jobs;

   - Remove barriers to SME participation;

   - Enable different employers through cross industry collaboration to operate a pooled approached to internships.

3. Enable a step change in the **capability of SMEs** to understand and exploit digital technologies for increased business competitiveness, including embedding the Business IT Guide in the "Transformational ICT" pilot delivered through the RDAs.

4. Support the development of **sustainable digital businesses** through cross industry collaborative R&D on emerging digital business models, IP, routes to market, high level business skills and business mentoring.

5. Invest in the upskilling of older workers in terms of **IT user skills**, in collaboration with employers and unions.

7.3.2 To develop tomorrow's workforce

The UK needs a vibrant, well-skilled recruitment pool to underpin the digital economy. This means the education system must lay the foundations for young people to enter highly adaptable 'digital careers', and encourage all future business managers and leaders to have a passion for technology and its potential to create value. In addition, all young people should exit the education system with a positive attitude towards technology and the digital world, and the IT skills necessary for employment.

Specific recommendations for action are as follows:

6. **Transform education in schools and colleges to support the aspirations of Digital Britain.** This includes:

   🞣 Undertaking a root and branch review of technology and media-related education up to the age of 19. The objective should be to provide a coherent, educationally sound range of curriculum options which inspire young people (boys and girls equally) in the subject matter, and which are relevant to, and supported by, Higher Education and employers. This should include:

   - A curriculum which addresses the needs of every individual to have skills in the use of IT ('Functional Skills') and in content creation, and which accommodates the vastly different existing expertise of young people.

   - Specialist curricula focused on the subject disciplines of IT and Media as GCSE, Diploma and A-level options. These qualifications should provide the educational building blocks for successful knowledge economy careers.

   🞣 Creating a step-change in the skills of teachers of IT in schools and colleges, including a comprehensive, UK-wide upskilling programme supported by employers and universities, and new incentives to attract teachers into this discipline.

7. **Implement a coherent strategy to promote 'Digital Careers',** including:

   🞣 A massive ramp up of sector-approved technology degrees (existing and new), in particular degrees that combine business and technology, supported by government bursaries for students.

   🞣 New investment in the Screen and Media Academy network with a network of digital hubs at key institutions which support cross platform research and development, and explore new business models, the development of new models of undergraduate provision and the development of new curricula.

   🞣 Turning the employer-backed e-skills UK '*BigAmbition'* programme from a successful pilot into a major national programme which changes the attitudes of a generation of 14-19 year olds towards technology-related degree courses and careers.

   🞣 Supporting the online careers sites '*Skillset Careers'* and Creative & Cultural Skills' '*Creative Choices'* which are designed to help individuals and businesses get into, and get on in, the Content industries.

   🞣 Enabling students in every school in the UK to benefit from CC4G as a girl-, boy- and family-friendly educational programme which inspires 10-14 year olds to learn about technology.

7.4   In conclusion

The decisions taken today will have a major influence on the nation's future. As this paper explains, there are three key reasons to act:

- 55% of the UK's GVA is from technology-intensive sectors, and this needs to grow over time. The ability to grow this contribution depends on the quality of the digital skills pool.

- Fully exploiting technology is the single most powerful lever the UK can employ to achieve wholesale productivity gain right across the economy. The prize is the potential to generate an additional £35 billion of Gross Value Added (GVA) within the next decade. The ability to achieve this productivity gain depends on the quality of the digital skills pool.

- Technology will underpin the majority of job creation in the Western world. The ability to generate new jobs in the UK in all sectors depends on the quality of the digital skills pool.

A coherent, strategic approach to skills is fundamental to achieving the vision set out in 'Digital Britain'. With this, the UK can be a global leader in digital technology and digital content. Without it, the country will become a second rate player in a high technology world. We need to ensure the school curriculum meets the needs of a new generation of 'digital natives'; we need to deepen links between employers and universities; we need to address diversity issues so that the Technology and Content sectors benefit from the whole talent pool; and we need to ensure our existing workforce maintains world class digital skills in a rapidly changing environment.

Employers are committed to playing their part. In partnership with government and educators, the UK has the capability to be a global leader in delivering value from digital technology and creating world-class content, with the consequent benefits in terms of job and wealth creation across the whole economy.

A long term, strategic approach is required to manage the interventions outlined above, with a Digital Skills policy and funding framework which directs and supports sustainable interventions at national and regional levels. This should be constructed and delivered through a partnership between employers, their Sector Skills Councils, educators and government.

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ANNEXES

Annex A: Definitions

'Digital technology' is defined as information technology and telecommunications hardware, software and services (including games, e-publishing, internet and web).

'Digital content' is defined as information that is published or distributed in a digital form, including text, data, sound recordings, images, and motion pictures.

'The Technology industry' comprises those companies whose primary purpose is to create and / or create value from digital technology. In SIC terms, the coverage is IT & Telecoms.

'**The Content industries'** comprise those companies whose primary purpose is to create and / or distribute content (including digital content). This is defined as being the Creative Media industries, and the Advertising, Music and Design industries. In SIC terms, the coverage is Radio & TV; Video, Film & Photography; Publishing; Advertising; Music and Design.

'The Creative Media industries' comprise TV, Film, Animation, Commercials, Pop Promos, Corporate Production, Facilities and Interactive Media. In SIC terms, the coverage is Radio & TV; Video, Film & Photography; and Publishing. (Note: SIC excludes facilities (excluding post production) and interactive media).

'Technology occupations / Technology professionals in other industries' are those in Technology occupations outside of the Technology industry. In SOC terms, the coverage is IT & Telecoms.

'Content occupations / Content professionals in other industries' are those in Content occupations outside of the Content industries. In SOC terms, the coverage is Radio & TV; Video, Film & Photography; Publishing; Advertising; Music; Design.

'The Technology sector' and **'The Content sector'** are defined as 'The Technology industry plus Technology occupations in other industries' and 'The Content industries plus Content occupations in other industries' respectively.

'The Creative industries' comprise:

- o Software, computer games & e-publishing (included in this report within 'Technology industries').
- o Radio & TV; Video, Film & Photography; Publishing; Advertising; Music; and Design (included in this report as 'Content industries').
- o Architecture; art & antiques; crafts; designer fashion; and the visual & performing arts (not included in this report).

Annex B2 provides further information about the composition of the Creative industries.

Annex C provides further information about SIC and SOC.

Annex B: Technology, Content and the Creative industries

B1   Overview

Industry sub-sectors

The diagram shows the sectors / sub-sectors covered in this work, and the responsibilities of the contributing Sector Skills Councils. Because of the inter-relationship between Technology, Content and Creative sectors, this diagram also shows the Creative Industries definition used by government.

Digital Technology

Digital Content

Designer Fashion

Architecture

Visual and performing arts

Craft

Arts & antiques

Software (including games & electronic publishing)

Radio & TV

Video, film & photography

Publishing

Advertising

Music

Design

Other IT and Telecoms

Creative Industries
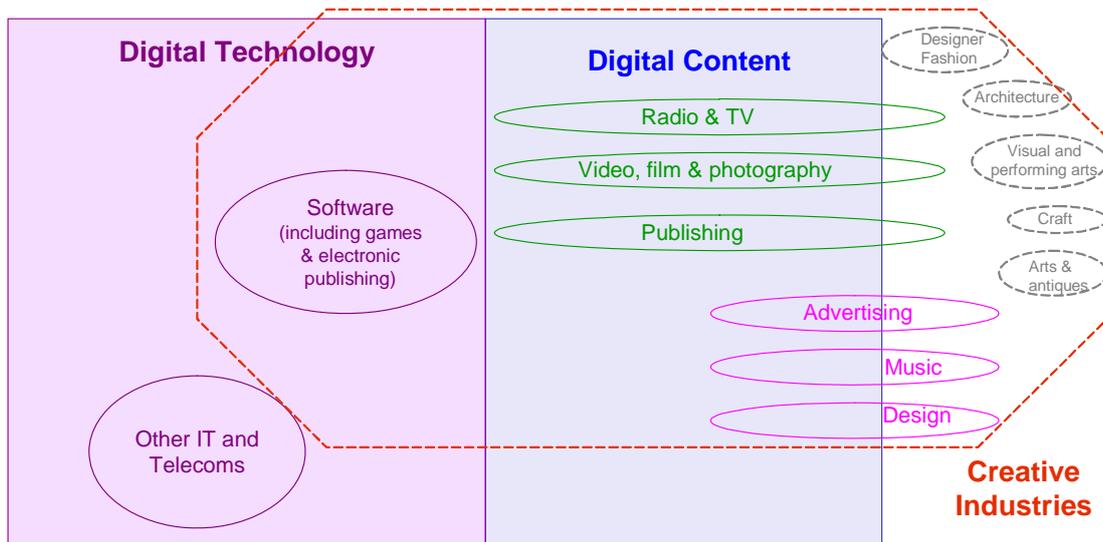
PINK = Creative and Cultural Skills
GREEN = Skillset
PURPLE = e-skills UK
GREY = out of scope

Annex B2 provides further detail about the Creative industries.

B2 The Creative Industries

The following table is built from data in the DCMS Creative Industries Economic Estimates Bulletin of January 2009. Its purpose is to show the composition of the Creative industries in relation to Technology and Content (the scope of this report).

Creative Industries Economic Estimates Bulletin of January 2009								
	Total Creative industries	Software, games and e-publishing[110]	Content			Advertising[111]	Total Content	Other[112]
			Creative Media					
			TV & Radio	Video, Film, Photography	Publishing	Advertising		
UK contribution								
Employment in industry	1,147,100	360,900	91,000	50,300	214,400	93,800	449,500	336,700
Employment in other industries	831,000	280,000	12,300	15,100	61,400	153,400	242,200	308,800
Total creative employment	1,978,200	640,900	103,400	65,400	275,800	247,200	691,800	645,500
Employment growth 1997-2007 (av.p.a)	2%	5%	1%	0%	-1%	2%		
GVA contribution (£Bn)	£57.30	£24.50	£5.10	£3.80	£9.50	£5.30	£23.70	£9.10
GVA contribution % of UK total	6.4%	2.7%	0.6%	0.4%	1.1%	0.6%	2.7%	1.0%
Average GVA growth 1997-2006	4%	8%	2%	6%	2%	2%		
Number of businesses 2008	157,400	75,000	6,000	11,000	8,200	13,200	38,400	44,000
Proportions within the Creative industries								
Employment in industry	100%	31%	8%	4%	19%	8%	39%	30%
Employment other industries	100%	34%	1%	2%	7%	18%	29%	37%
Total employment in creative	100%	32%	5%	3%	14%	12%	35%	33%
GVA contribution (£Bn)	100%	43%	9%	7%	17%	9%	41%	16%
Number of businesses	100%	48%	4%	7%	5%	8%	24%	28%

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[110] Note: narrower definition than that used within the 'software (including services)' data used within this report

[111] Data not available for Music or Design

[112] 'Other' comprising Architecture, Art & Antiques, Designer Fashion, Music and the Visual & Performing Arts

Annex C: SIC and SOC codes

C1   Standard Industrial Classification codes

The following tables show relevant codes from SIC 2003 and from SIC 2007, as the report refers to data sources using both.

SIC 2003

Sector / Sub-sector		SIC 2003	SIC description	SSC
TECHNOLOGY				
	Software (including software services, games & e-publishing)	72.20	Software consultancy & supply	e-skills UK
		72.21	Publishing of software	
		72.22	Other software consultancy & supply	
		72.30	Data processing	
		72.40	Database activities	
		22.33	Reproduction of Computer Media	
Other IT & Telecoms	Other IT	72.10	Hardware consultancy	
		72.50	Maintenance and repair of office, accounting and computing machinery	
		72.60	Other computer related activities	
	Telecoms	64.2	Telecommunications	
	Consultancy	70.22/9*	Management consultancy activities*	
	Hardware manufacture & sales	30.02	Manufacture of computers and other information processing equipment	
		32.2	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	
CONTENT				
	Radio & TV	92.2	Radio and television activities	Skillset
	Video Film and Photography	22.32	Reproduction of video recording	
		74.81	Photographic activities	
		92.11	Motion picture and video production	
		92.12	Motion picture and video distribution	
		92.13	Motion picture projection	
	Publishing	22.11	Publishing of books	
		22.12	Publishing of newspapers	
		22.13	Publishing of journals and periodicals	
		22.15	Other publishing	
		92.40	News agency activities	
	Advertising	74.40	Advertising	Creative & Cultural Skills
	Music	22.14	Publishing of sound recordings	
		22.31	Reproduction of sound recording	

Note: there are no design industry codes in SIC 2003.

SIC 2007

Sector / Sub-sector			SIC 2007	SIC description	SSC
TECHNOLOGY					
	Software (including software services, games & e-publishing)		62	Computer programming, consultancy and related activities (including business, domestic, interactive leisure & entertainment software development)	e-skills UK
			63.1	Data processing, hosting and related activities; web portals	
			58.2	Software publishing (including publishing of computer games)	
			18.20/3	Reproduction of Computer Media	
	Other IT & Telecoms	Other IT	95.1	Repair of computers and communications equipment	
		Telecoms	61	Telecommunications	
		Consultancy	70.22/9*	Management consultancy activities	
		Hardware manufacture & sales	26.2	Manufacture of computers and peripheral equipment	
			26.3	Manufacture of communication equipment	
			27.31	Manufacture of fibre optic cable	
			46.5	Wholesale of information and communication equipment	
			47.4	Retail sale of information and communications equipment in specialised stores	
CONTENT					
	Radio & TV		60.10 60.20	Radio broadcasting TV programming and broadcasting	Skillset
	Video, Film & Photography		59.11 59.12 59.13 59.14	Motion picture, video and TV programme production, post-production, distribution and projection	
			74.20	Photographic activities	
	Publishing		58.1	Publishing of books, directories & mailing lists, newspapers, journals & periodicals.	
			63.91 63.99	News agency Other information service activities n.e.c.	
	Advertising		73.11 73.12	Advertising agencies Media representation	Creative & Cultural Skills
	Music		18.20/1 59.2 32.2	Reproduction of sound recording Sound recording and music publishing activities Manufacture of musical instruments	
	Design		74.1	Specialised design activities	

C2   Standard Occupational Classification codes

SOC 2000

The following table shows relevant codes from SOC 2000 (the latest available).

Description		SOC 2000	SOC description	SSC
TECHNOLOGY				
	Software	2132	Software professionals	e-skills UK
		3131	IT operations technicians	
		3132	IT user support technicians	
		4136	Database assistants & clerks	
	Other IT & Telecoms	1136	Information & communication technology managers	
		2131	IT strategy and planning professionals	
		5242	Telecommunications engineers	
		5243	Lines repairers and cable jointers	
		5245	Comp engineer installation & maintenance	
		2423*	Management consultants	
CONTENT				
	Radio & TV	3432	Broadcasting and associate professionals	Skillset
		5244	TV, video and audio engineers	
	Video, film & photography	3434	Photographers and audio-visual equipment operators	
	Publishing	3431	Journalists, newspaper and periodical editors	
		5421	Originators, compositors and print preparers	
	Advertising	1134	Advertising & Public Relations Managers	Creative & Cultural Skills
		3433	Public Relations Officers	
		3543	Marketing Associate professionals	
	Music	3415	Musicians	
	Design	3421	Graphic Designers	

Annex D: Employment data

Technology

Technology sector workforce (A+B) 1,523,500

Technology occupations in all industries (C): 1,113,700

Technology industry workforce (A): 860,300

Technology occupations in other Industries (B): 663,200

Content

Content sector workforce (D+E) 937,850

Content occupations in all industries (F): 490,000

Content industries workforce (D): 621,850

Content professionals in other industries (E): 316,000

Total Technology and Content occupations in all industries (C+F) = 1,603,700

Total Technology and Content sector workforce (A+B+D+E) = 2,461,350

Note: in addition to those in employment (numbers above), there are a further 52,000 people in the Technology sector labour pool and a further 99,000 people in the Content sector pool available for work but not under contract at the time of the ONS survey (see Annexes D1 and D2)

D1   Technology

Employment within the Technology industry

EMPLOYMENT WITHIN THE TECHNOLOGY INDUSTRY			
Industry	**SIC 2007**	**Description**	**Total employed**
Software (including software services, computer games & e-publishing)	18.20/3	Reproduction of Computer Media	6,000
	58.21	Publishing of Computer Games	3,100
	58.29	Other Software Publishing	18,400
	62.01/1	Ready-made Interactive Leisure and Entertainment Software Development	10,800
	62.01/2	Business and Domestic Software Development	168,500
	62.02	Computer Consultancy activities	228,700
	62.03	Computer Facilities Management activities	9,700
	62.09	Other Information Technology and Computer Service activities	35,200
	63.11	Data Processing, Hosting and Related activities	10,500
	63.12	Web portals	2,200
		Sub-total	**493,100**
Other IT & Telecoms — IT	95.11	Repair of Computers and Peripheral equipment	32,100
Telecoms	95.12	Repair of Communication equipment	8,400
	61.1	Wired Telecoms activities	57,500
	61.2	Wireless Telecoms activities	82,300
	61.3	Satellite Telecoms activities	2,600
	61.9	Other Telecoms activities	39,100
HW manuf. & sales	26.2	Manufacture of computers and peripheral equipment	38,300
	26.3	Manufacture of communication equipment	22,400
	27.31	Manufacture of fibre optic cable	500
	46.5	Wholesale of information and communication equipment	28,600
	47.4	Retail sale of information and communications equipment in specialised stores	55,400
		Sub-total	**367,200**
		TOTAL	**860,300**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding)

EMPLOYMENT WITHIN TECHNOLOGY OCCUPATIONS IN ALL INDUSTRIES					
Occupation group	**SOC 2000**	**Description**	**Industry vertical[113]**	**Other Industries**	**Total employed**
Software	2132	Software Professionals	154,200	180,100	334,300
	3131	IT Operations Technicians	23,600	95,800	119,400
	3132	IT User Support	18,200	49,500	67,700
	4136	Database Assistants & Clerks	6,000	56,500	62,500
		Sub-total	**202,000**	**381,900**	**583,900**
Other IT & Telecoms — IT	1136	ICT Managers	118,500	175,800	294,300
	2131	IT Strategy & Planning	90,200	48,300	138,500
	5245	Computer Engineers	20,000	20,700	40,800
Tele.	5242	Telecoms Engineers	19,700	25,000	44,700
	5243	Line Repairer & Cable Jointers	0	11,500	11,500
		Sub-total	**248,400**	**281,300**	**529,800**
		TOTAL	**450,500**	**663,200**	**1,113,700**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding)

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[113] i.e. those in IT & Telecoms occupations within the IT & Telecoms industry.

LABOUR POOL FOR THE TECHNOLOGY SECTOR		Total
EMPLOYED		
Technology industry	**Software** (including software services, computer games and e-publishing)	493,100
	Other IT & Telecoms	367,200
Technology occupations in other industries	**Software** (including software services, computer games and e-publishing)	381,900
	Other IT & Telecoms	281,300
	Sub total employed	**1,523,500**
AVAILABLE FOR WORK BUT NOT CONTRACTED		
IT professionals available for work but not contracted	**All IT & Telecoms occupations**	52,000
	Sub total additional available for work	**52,000**
	TOTAL TECHNOLOGY SECTOR LABOUR POOL (employed plus available for work)	**1,575,500**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding)

ONS LFS data for the employed workforce is based on April – June 2009, in employment, of working age.

LABOUR POOL FOR THE TECHNOLOGY SECTOR		Total
EMPLOYED		
Technology industry	**Software** (including software services, computer games and e-publishing)	
	Other IT & Telecoms	
Technology occupations in other industries	**Software** (including software services, computer games and e-publishing)	
	Other IT & Telecoms	

D2   Content

The Content industries are not fully served by SIC as key elements sit within other, broad classifications (for example interactive media, facilities (excluding post production), and elements of advertising, music and design). This prevents discrete analysis that relies on SIC alone. There are also a significant number of freelancers who are available for work but not contracted at the point of ONS surveys. These gaps are filled by the relevant Sector Skills Councils' primary research programmes, further information about which is set out in Annex D3. Data used with this report, which is in addition to standard SIC / SOC analysis, is included in the tables below and noted with asterisks here and throughout.

EMPLOYIMENT WITHIN THE CONTENT INDUSTRIES			
Industry	**SIC 2007**	**Description**	**Total employed**
CREATIVE MEDIA			
Radio & TV	60.1	Radio Broadcasting	10,900
	60.2	TV Programming & Broadcasting activities	46,100
		Sub-total	**57,000**
Video, Film & Photography	59.11	Motion Picture, Video and Television Programme Production activities	0
	59.11/1	Motion Picture Production activities	18,500
	59.11/2	Video production activities	6,800
	59.11/3	TV Programme Production activities	23,100
	59.12	Motion Picture, Video and Television Programme Post-Production activities	2,500
	59.13	Motion Picture, Video and Television Programme Distribution activities	0
	59.13/1	Motion Picture Distribution activities	700
	59.13/2	Video Distribution activities	0
	59.13/3	TV Programme Distribution activities	500
	59.14	Motion Picture Projection activities	14,600
	74.2	Photographic activities	0
	74.20/1	Portrait Photographic activities	14,900
	74.20/2	Other Specialist Photography not Portrait	1,800
	74.20/3	Film processing	2,700
	74.20/9	Other Photographic activities; n.e.c.	25,400
		Sub-total	**111,500**
Publishing	58.11	Book Publishing	33,400
	58.12	Publishing of Directories & Mailing Lists	3,000
	58.13	Publishing of Newspapers	56,000
	58.14	Publishing of Journals & Periodicals	0
	58.14/1	Publishing of Learned Journals	700
	58.14/2	Publishing of Consumer, Business and Professional Journals and Periodicals	37,500
	58.19	Other publishing	32,000
	63.91	News Agency activities	6,800
	63.99	Other information Service activities n.e.c.	10,000
		Sub-total	**179,400**
Other Creative Media**	Interactive Media**	Creation and Development of Online Content for Multi-Platform	**34,250
	Facilities (excl. post production)**	TV and Film support services including Studio and Equipment Hire, Visual Effects, Labs and Outside Broadcast	**35,600
		Sub-total	****69,850**
		SUB-TOTAL OF CREATIVE MEDIA INDUSTRIES	*417,750*

Source: Office for National Statistics Labour Force Survey (ONS LFS) April-June 2009 (figures rounded) except for those marked **, which are from Skillset's Employment Census 2009 and Creative Media Workforce Survey 2008.

Industry	SIC 2007	Description		Total employed
ADVERTISING, MUSIC, DESIGN				
Advertising	73.11	Advertising Agencies		69,100
	73.12	Media Representation		25,300
			Sub-total	**94,400**
Music	18.20/1	Reproduction of Sound Recording		1,100
	59.2	Sound Recording & Music Publishing activities		10,600
	32.2	Manufacture of Musical Instruments		1,200
			Sub-total	**12,900**
Design	74.1	Specialised design activities		96,800
			Sub-total	**96,800**
		SUB-TOTAL OF ADVERTISING, MUSIC & DESIGN INDUSTRIES		*204,100*
			TOTAL CONTENT INDUSTRIES	**621,850**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding).

EMPLOYMENT WITHIN CONTENT OCCUPATIONS IN ALL INDUSTRIES					
Occupation group	SOC 2000	Description	Industry verticals[114]	Other industries	Total employed
Radio & TV	3432	Broadcasting Associate Professionals	40,600	11,800	52,400
	5244	TV, Video and Audio Engineers	600	8,000	8,600
		Sub-total	**41,200**	**19,800**	**61,000**
Video, Film & Photography	3434	Photographers & AV equip. operators	38,700	23,000	61,700
		Sub-total	**38,700**	**23,000**	**61,700**
Publishing	3431	Journalists, Newsp. & Periodical Editors	32,000	22,700	54,700
	5421	Originators, Compositors & Print Preps.	600	1,800	2,400
		Sub-total	**32,600**	**24,500**	**57,100**
		SUB-TOTAL: CREATIVE MEDIA OCCUPATIONS	*112,500*	*67,400*	*179,800*
Advertising	1134	Advertising & Public Relations Managers	9,400	31,700	41,100
	3433	Public Relations Officers	1,000	32,100	32,900
	3543	Marketing Associate professionals	10,500	104,200	114,700
Music	3415	Musicians	800	29,700	30,500
Design	3421	Graphic Designers	39,900	51,000	91,000
		SUB-TOTAL: ADVERTISING. MUSIC & DESIGN OCCUPATIONS	*61,600*	*248,700*	*310,200*
		TOTAL CONTENT INDUSTRIES	**174,100**	**316,000**	**490,000**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding).

LABOUR POOL FOR THE CONTENT SECTOR		Total
EMPLOYED		
Content industries	**Creative Media**	417,750
	Advertising, Music & Design	204,100
Content occupations in other industries	**Creative Media**	67,400
	Advertising, Music & Design	248,700
	Sub total employed	**937,850**
AVAILABLE FOR WORK BUT NOT CONTRACTED		
Freelancers available but not contracted**/***	**Creative Media****	**50,000
	Advertising, Music & Design**	***49,000
	Sub total additional available for work	**99,000**
	TOTAL CONTENT SECTOR LABOUR POOL (employed plus available for work)	**1,036,850**

Source: ONS Labour Force Survey (LFS) April-June 2009 (figures may not sum due to rounding) except for those marked ** which are from Skillset's Employment Census 2009 and Creative Media Workforce Survey 2008, and those marked *** which are from Creative & Cultural Skills' Impact and Footprint Reports 2008 (see Annex D3).

ONS LFS data for the employed workforce is based on April – June 2009, in employment, of working age.

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[114] i.e. those within Creative Media occupations within the Creative Media industries and those within Advertising, Music and Design occupations within the Advertising, Music and Design industries

D3   Content industries: SIC / SOC limitations

D3.1 SIC / SOC limitations and SSC primary research

Both Skillset and Creative & Cultural Skills undertake extensive labour market research, which includes addressing limitations of SIC and SOC codes in terms of the Content industries. These limitations arise from elements of the Content industries sitting within other, broad classifications (affecting, for example, interactive media, facilities (excluding post production), and parts of advertising, music and design). In addition, there are, in the Content sectors, significant numbers of freelancers who are available for work but not contracted at the point of ONS surveys; this is an important part of the total labour pool.

These information gaps are filled by the relevant Sector Skills Councils' industry-backed primary research programmes. Skillset's research programme was established by the Audio Visual Industries Training Group a decade ago and has since been steered since by the same organisations[115]. Similarly, for Advertising, Music and Design, gaps have been filled by Creative & Cultural Skills biennial round of research, which focuses on the demographic and economic impact and the skills issues facing the industry.

D3.2 Differences compared to standard sources

There are three key differences between the SSC primary research and the standard sources as relevant to this Report:

1. Macro-level employment data (section 2.2, Annex D): Employment data from Skillset and Creative & Cultural Skills has been used to supplement the employment data available via the Office of National Statistics Annual Business Inquiry. As set out in section 2.2 and Annex D2, compared to the ONS source, this has resulted in an additional 34,250 people being shown in employment in 'interactive media' and 35,600 in 'facilities (excluding post production)', and an additional 99,000 freelancers in the labour pool who are not contracted but available for work.

2. GVA data (section 2.3): Standard ONS sources, with the limitations cited above, have been used for GVA data for the Creative Media industries. However, the source for the GVA data for Advertising, Music and Design is from the methodology used by Creative & Cultural Skills.

3. Sub-sector level employment data (Annex D2): There are some differences between ONS research and SSC research in terms of the number of people within the different sub-sectors of the Content industries. These do not make a difference to the overall employment numbers except as accommodated in point 1 above. However, it should be noted that the outputs from the SSCs' employer research is undertaken using these SSC definitions. Details of the mapping of SSC sub-sector definitions and employment numbers to ONS definitions and employment numbers are available from Skillset and Creative & Cultural Skills.

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[115] http://www.skillset.org/research/committee/

Annex E: Summary of reference sources

This section provides information about the main research publications used in this report.

E1   Sector Skills Council research

E1.1   e-skills UK research publications

- <u>IT & Telecoms Insights 2010:</u> new research for the Sector Skills Assessment (IT & Telecoms Insights 2010) sets out the current reality, forecasts the future based on the best available intelligence, and assesses the implications for the IT & Telecoms sector. These reports build on existing knowledge, with new primary research amongst 2,300 employers (<u>e-skills UK 2009 Employer Survey</u>), updated forecasts in light of the recession and a detailed analysis of the workforce profile and current skills provision.

- <u>IT & Telecoms Insights 2008</u>: a suite of national and regional reports based on primary research amongst more than 4,000 employers; an analysis of technology-related trends and their implications for the future (in partnership with Gartner Executive Programs); employment forecasting (in partnership with Experian); an analysis of the impact of Information and Communications Technologies on productivity (in partnership with Adroit Economics and Regeneris Consulting); detailed assessments of staff training and current skills provision.

E1.2   Skillet research publications

- A Skills Review for the TV & Radio Sector, 2009 (internal report).
- Balancing Children and Work in the Audio Visual Industries, 2006.
- Creative Media LMI Digests, 2009.
- Creative Media Workforce Survey, 2008 (in press).
- Employment Census, 2009 (in press), 2006, 2004, 2003, 2002, 2001, 2000.
- Employer Survey, 2006 (internal report).
- Feature Film Production Workforce Survey, Skillset/UK Film Council, 2008.
- Film Sector Employers: Skills and Training Needs in Production, Distribution & Exhibition, Skillset 2009 (in press).
- Final Summary Report from the M.TEST Project and Recommendations, Skillset/IABM, February 2009 (internal report).
- From Recession to Recovery, 2009 (internal report).
- Photo Imaging Workforce Survey, 2007 (internal report).
- Sector Qualifications Strategy, 2008.
- Survey of the Audio Visual Industries' Workforce, 2005.

E1.3 Creative & Cultural Skills research publications

- Creative & Cultural Industries Impact and Footprint 2008, 2006

- Creative Blueprint: The Sector Skills Agreement for the Creative and Cultural Industries 2008

- Creative and Cultural Industries Workforce Survey, 2009

- Creative Blueprint Research Paper 1: Creative and Cultural Industries in the Economic Downturn, 2009

- Research Strategy, 2008

- Design Blueprint, 2008 (with the Design Council)

E2   Third party research

- 'Building Britain's Future: Jobs of the Future', HM Government September 2009.

- 'Building Britain's Future: New Industry, New Jobs', Department of Business, Enterprise and Regulatory Reform April 2009.

- 'Business Innovation Survey', DBIS, August 2009.

- 'Resilience amid turmoil – benchmarking IT industry competitiveness 2009', Economist Intelligence Unit, October 2009.

- 'IT spending 2010', Gartner October 2009.

- '2009 Business Pulse', Vanson Bourne / BT, October 2009.

- 'Aid to Recovery: the economic impact of IT, software and the Microsoft ecosystem on the global economy', IDC October 2009.

- 'Digital Competitiveness Report', European Commission, August 2009.

- 'Digital Britain Final Report', DCMS June 2009.

- 'The UK's Digital Road to Recovery', London School for Economics and Political Science (LSE) and the Information Technology and Innovation Foundation (ITIF) April 2009.

- 'State of the UK Video Game Development Sector', Tiga January 2009.

- 'Creative Industries Technology Strategy 2009-2012', Technology Strategy Board 2009.

- 'Creative Industries Economic Estimates Statistical Bulletin', DCMS January 2009.

- Annual Report, Ofcom 2009.

- 'Demanding Growth', Nesta, 2009.

- 'Media Predictions, TMT Trends 2009, Deloitte, 2009.

- 'Information and Communication Technology Strategy 2008-2011', Technology Strategy Board 2008.

- 'Working Futures 2007-2017', Warwick Institute for Employment Research (IER) and Cambridge Econometrics, December 2008.

- Global Entertainment and Media Market Outlook, PWC, 2008.

- 'Creative Britain – New Talents for the New Economy', DCMS February 2008.

- 'Raise the Game', Nesta, 2008.

- 'Statistical Yearbook', UK Film Council, 2008.

- 'The Advertising Forecast', Advertising Association statistics published by www.WARC.com. Nielsen Media Research, World Advertising Research Centre.

- 'The New Inventors: how users are changing the rules of innovation', NESTA, 2008.

- 'User Generated Content, Social Media and Advertising', IPA, April 2008.

- Understanding the Impact of Online Trading on the Occupations and Skills within the UK's consumer facing business sectors, IFF Research on behalf of Skillset, e-skills UK, Skillsmart Retail, People 1st, GoSkills and Financial Services, 2008.

Annex F: The Framework for Labour Market Intelligence

The following table shows the alignment of this Strategic Skills Assessment for the Digital Economy to the Framework for Labour Market Intelligence set out by the UK Commission for Employment and Skills (UKCES):

Strategic Skills Assessment for the Digital Economy	UKCES Framework for Labour Market Intelligence
1. Introduction	
2. The Digital Economy	
3. Skills drivers	What drives skills demand
4. Current skills environment	Current skills needs
5. Future skills needs	Anticipating what lies ahead
6. Geography	Geography
7. Global ambition	

Annex G: Glossary

ABI	Annual Business Inquiry (ONS)
BIS	Department for Business, Innovation and Skills
CD	Compact Disk
DCMS	Department for Culture, Media and Sport
GCSE	General Certificate of Secondary Education
GVA	Gross Value Added
ICT	Information and Communications Technology
IDBR	Inter-Departmental Business Register (ONS)
IP	Intellectual Property or Internet Protocol
IPR	Intellectual Property Rights
IT	Information Technology
LFS	Labour Force Survey (ONS)
LMI	Labour Market Intelligence
MMOG	Massively Multiplayer Online Game
NESTA	National Endowment for Science, Technology and the Arts
ONS	Office of National Statistics
PC	Personal Computer
RFID	Radio Frequency Identification Device
RES	Regional Economic Strategy
SIC	Standard Industrial Classification codes
SOC	Standard Occupational Classification codes
SSC	Sector Skills Council
SME	Small and Medium Enterprises
STEM	Science, Technology, Engineering and Mathematics
UKCES	UK Commission for Employment and Skills
VFX	Visual Effects
WiMax	Wordwide Interoperability for Microwave Access

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