Morrison, Ciarán and Rooney, Laura (2017) Digital Skills for the UK Economy. [Report] ,

This version is available at https://strathprints.strath.ac.uk/64301/

Digital Skills for the UK economy

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Document reference number	DHI+DDMMYY+doctype+000X *DHI270117S0006*
	o E = exploratory report o L = lab report o F = factory report o S = summary document o LR = literature review o RR = research report o MR = market research o MAP = mapping o V=video o O= other

Publication date	1/27/2017
Revision date	
Revision number	

Purpose of document	Summary of digital skills related document
Other detail (delete row if appropriate)	

Related projects	Names and doc reference numbers
Keywords	digital skills; skills gaps; future requirements; digital technology; up-skilling

Digital Skills for the UK economy
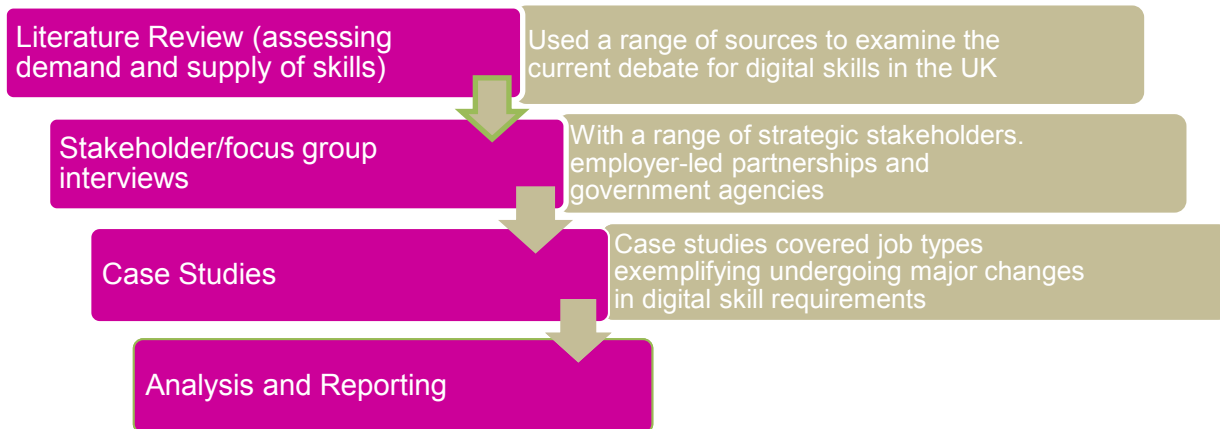
A report by ECORYS UK

January 2016

The UK's digital economy is growing, 2013 saw 53% more companies form compared to 2010. It was estimated that the digital economy's gross added value was 6% of the total UK economy. The increasing rate of technological innovations requires the UK's workforce to be able to continually improve their skills to prepare them for emerging roles in their individual fields. The increasing demand for digitally skilled employees and the "move to 'Digital by Default' online government services implies directly that citizens should have, by 'default', a set of digital skills to enable them to access these services" (page 12). However, it is important to remember that the digital skills of 'innovators' need to be improved, and not just those of the 'user'.

The digital skills for the UK economy report was commissioned by the Digital Economy Unit, in the Department for Culture, Media and Sport, to help improve the understanding of the current and future demand for digital skills in the UK economy. The objectives of the report were to:

- Understand current and future demand for digital skills in the UK economy
- Understand the routes used to meet the digital skills needs of individuals and employers in the UK, and the current barriers and market failures faced by businesses in accessing digital skills
- Identify the risks and opportunities in add opportunities in addressing digital skills needs in the UK

Methodology

Literature Review (assessing demand and supply of skills)	Used a range of sources to examine the current debate for digital skills in the UK
Stakeholder/focus group interviews	With a range of strategic stakeholders. employer-led partnerships and government agencies
Case Studies	Case studies covered job types exemplifying undergoing major changes in digital skill requirements
Analysis and Reporting	

Digital Skills: definitions and frameworks

As is seen in most terminology regarding 'digital' the definition of digital skills has expanded from its beginnings in ICT literacy which focused on technical and operational knowledge about computer use, while later definitions cover cognitive, attitudinal, social and emotional skills. Digital literacy is the broadest 'digital' concept, and encapsulates the features of more modern digital skills definitions.

There is a vast number of different definitions for digital skills, and the varying terms that relate to it i.e. Digital literacy, these definitions highlight that digital skills involve several inter-related skill concepts. Most definitions reviewed tend to make no clear distinctions between the skills needed by different groups. Others are too broad and therefore ostracise potential citizens, learners, or users in developing their defined competencies.

However, the definitions and frameworks reviewed in the report cover the following broad categories:

1. Basic digital literacy skills (empowering individuals): Required by every citizen to become 'digitally literate'. Needed to carry out basic functions such as using digital applications to communicate and perform internet searches. Cyber security falls within this category.

2. Digital skills for the general workforce (Upskilling for the Digital Economy): Includes category 1, plus skills needed in a workplace and generally linked to using applications developed by IT specialists. While digital skills needed by the workforce are likely to differ sector to sector, there will be some minimum requirements linked to processing information that is applicable across all sectors.

3. Digital skills for ICT professions (digitally innovative and creative individuals, organisations and businesses): Includes category 1 & 2, plus skills required in the divers IT sector. These include digital skills linked with the development of new digital technologies, products and services. Such Skills are needed if the UK is to compare favourably with other nations.

Using these categories of digital skills allows for us to more easily discuss the extent to which the supply of skills meets the demand for skills within the economy. The way we define digital skills needs to be rethought, for now, these three definitions allow us to discuss the needs of different user groups that fall within each category.

Digital skills requirements

It has become increasingly more difficult to quantify the current number of roles requiring digital skills as said skills have become increasingly needed across all sectors and service areas. Most industries and sectors recognise that as they become increasingly digitised there will be greater demand for staff in general to have varying degrees of digital skills. The UK forum for Computing Education expects that in a sort amount of time m2st of the UK workforce will require 'digital citizenship skills', estimating that "approximately 16.5 million people will need the appropriate skills to become 'digital workers' and 'digital makers'" (page 25). Despite these requirements, the report estimates that 23% of UK adults do not have the basic online skills to meet the needs of the digitisation od UK business, figure 1 below shows how interviewed stakeholders felt about the current skillset of potential recruits.

Figure 1. Graph showing stakeholders views on which skills are most lacking in potential employees.
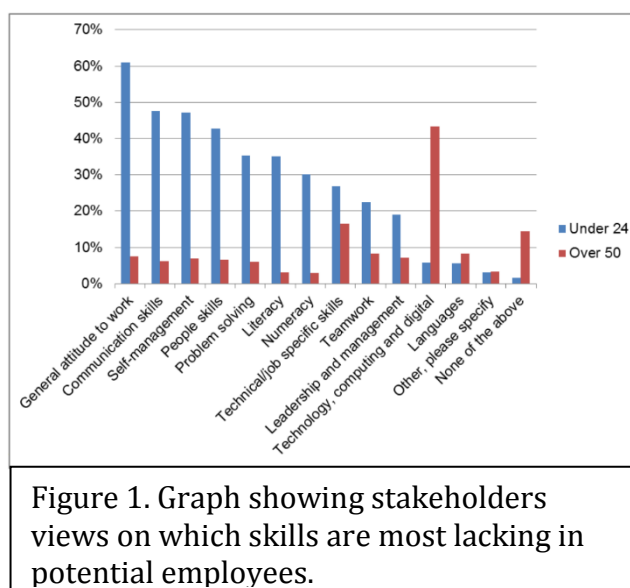
Digital skills gap

The report used the construction industry as an example were digital skills gaps had been noted by employers, 34% of whom highlighted improving the IT skills of their workforce as a priority. This was mirrored in the business sector where a report by the confederation of British Industry stated that 61% of surveyed businesses reported that their employees had weaknesses in IT skills competencies. Weaknesses in literacy and numeracy skills competencies, 54% and 53% respectively, was much lower showing that IT skills have become a key area for business. The IT skills gaps are predominantly found in the construction and manufacturing sectors, with 72% and 62% respectively reporting weaknesses in the IT skills of their workforce.

Shortages

Skill shortages threaten to undermine the potential for the increase in productivity that is expected when using digital technologies. Employers in the UK's digital and creative sectors are struggling to find workers with digital skills, and concerns are growing over graduate leaving "university without up-to-date technical skills, or the softer skills required to be effective in the workplace" (page 34).

The report states that a lack of technical specialist's skills is responsible for digital skills shortage in the tech sector, with data driven businesses struggling to find any new employees. Whilst OFCOM state the young adult population offers a valuable skills pool for employers, other studies question whether this skills pool meets the requirements of potential employers. This is supported by a trend in the IT and Telecoms sector, where the proportion of 16-29 year olds declined from 32% in 2001 to 19% in 2011, in the same timeframe the proportion of over 40's in the sector rose from 32% to 47%. This trend suggests that digital skills required for the sector are acquired by working in the sector and aren't being acquired through education. If this is true, then the supply of new graduates is unlikely to fill the digital skills shortages within the UK economy. Figure 2 below describes the current digital skills demand.

Current digital skills requirements	Digital skills shortages	Digital skills gaps
Baseline digital skills: being able to browse websites, search content, use the keyboard/mouse, understand the IT jargon, social networking/media and using the basic word packages. Examples cited by stakeholders include: • Cyber security (awareness) • Office skills and business processing skills • Working with office software and databases	The main gaps stakeholders believe are in the higher level skills. There was a perception that not enough people were coming through the education system with the skills necessary to keep up with the changing technological landscape.	Mainly in occupational areas linked to specialist IT skills such as: • Data analysts • Computer scientists • Healthcare IT • Product managers • Cybersecurity specialists
Sector specific skills: Digital skills requirements are likely to be in sectors that have either traditionally been non-digital, or in occupational areas that have been automated as a result of new technologies. Examples include: • Automated milking on farms • 3D printing • CAD • Computer design in glass manufacturing • Graphic design • Building Information Modelling (BIM) • Digital marketing in retail • Agriculture – programming precision planting machines/Extracting biological information from your herd • Digital publishing and content production. • Publishing – E-readers replacing books. **Digital roles**: Specialist technical IT skills linked to sectors and businesses in which the demand tends to arise quicker than what the training and education systems can respond to. Examples cited here include: • Analytics (Big Data) • Cyber security specialists • Web developers • Innovators • Programmers	Examples cited here include: • Data analytics • STEM professions • Big data • Computer scientists • Cloud storage • Innovators	• Senior programme developers • Data scientists • Artificial intelligence

Figure 2. Table showing the current demands for digital skills.

Future requirements

As the UK's digital economy grows, new roles in the field of 'big data' analysis are expected to emerge, with a predicted increase of 160% in demand of big data specialists, representing approximately an additional 346,000 big data jobs. The IT/Comms sector is expected to employ around 1.4 million people by 2020, around a 19% increase in the sectors workforce. This trend of digitalisation is also expected in the advanced manufacturing sector, where industry leaders believe that certain roles skill requirements will need to change.

The report states that the digital and creative sectors will need 1.2 million new workers between 2012-2022 to support the sectors growth and to replace the outgoing work force, and again raises concerns over the education sectors ability to supply the quality and quantity of workers needed for these digital roles. Workers specialised in cyber security, mobile and cloud computing, big data, and social media will be required going forward, as well as workers with expertise in anticipating markets and consumer responses to new business models, and legal expertise to navigate the new rules concerning data protection and IP. To respond to future requirements interviewed stakeholders felt that is was crucial to upskill the existing workforce to help them to currently adapt to current and new technologies that are likely to emerge across their work sector.

Healthcare Case Study

How has digital transformation change the sector

Digital technologies have started to change the sector in several key ways, the way in which evidence is gathered in clinical trials has begun to change, and there is a growing emphasis on recording and sharing information on people's wellbeing in digital form. In the future technology, may help shape the health sector in both provision and treatment.

The healthcare system has benefited from digital transformation, specifically in facilitating healthcare professionals to support their patients and promoting self-management. This has led to culture shift in the UK's healthcare system, such as the concept of a system facilitated by online or digital devices, while also requiring largescale transformation of the practitioner patient relationship.

What digital technologies have been introduced

The most basic change in the UK system has been the introduction of the digital clinical record system, occurring in 96% of all GP practices, beginning in 1990. Since then, healthcare providers have worked with the commercial sector to introduce 'telehealth' and 'telecare' systems. Recently a large range of health and wellbeing applications have been developed to help people manage and monitor their own health. Technology firms are also trying to tap into the healthcare industry creating digital technologies, products and services to help improve the overall healthcare system.

Impact on the sector

The impact of digital technology on the sector is growing, the pharma and health technology sector has grown from 7% in 2010 to 11% in 2014, suggesting more resources have been put towards developing the sector. There is a noticeable failure in the implementation of digital health ideas, services and technologies, despite the UKs perceived reputation as being a frontrunner in developing said ideas, services and technologies. This partly due to the shortage of technical and managerial skills in the healthcare system, combined with patients lacking the basic digital skills needed to access and use digital technologies.

Research suggests that despite the significant operational impact the digitisation of clinical health records has had on the sector, the data being collected is not being used in an effective manner, this is also coupled with concerns over privacy, security, and patients being unable to access their own health information.

Initiatives have been set up to help people utilise digital resources to manage their own health, and for greater uptake and development of digital services and technologies in the healthcare system. While these initiatives work to improve patient and healthcare professional access to digital health technologies, there is a growing concern over the culture of the NHS that is blocking the extent to which health care professionals implement digital technologies in to the system.

The overall impact of digital technology within the healthcare system is difficult to measure mainly due to the lack of uptake in the sector. As the NHS, doesn't really support the implementation of digital solutions or the upskilling of their workforce, data collection, analysis and use is limited. More needs to be done in training and upskilling both the technical and managerial workforce, within and out with the healthcare sector, to help improve the uptake and usage of digital health technologies.

Meeting the UKs skills requirements

To address the shortage in digital skills, industry and sector initiatives have been established alongside initiatives between government and industry. However, these may be operating in silos and nowhere near the scale required to address the skills shortages in the UK. Examples of such initiatives are:

- The national College for Digital Skills will be established to address the skill shortage and provide real opportunities for young people.

- Recommendations have been put forward to NESTA to encourage curricula reform so that data analytics have a greater opportunity to flourish
- Businesses have provided free software to schools and skills training to students and individuals directly

Research for the report suggests that despite the numerous initiatives created they still may not be sufficient when compared to the scale of digital skill shortages. There has yet to be a high-level meta-analysis of studies to show national picture on a consistent basis.

There are behavioural, cultural and/or awareness issues with parts of the population, these are acting as barriers to the development of digital skills, and may be restricting individuals from entering digital skill based professions.

- Some studies have shown that there is a lack of knowledge of digital careers amongst students, parents and teachers.
- There is a gender barrier for women entering IT professions, and a social stigma associated with the IT sector in general.
- There are opportunities to highlight the benefits of accessing relevant IT courses and pursuing It-focused careers.

There is a current misinterpretation of the potential for the integration of IT skills, and the opportunities it presents, this particularly affects SMEs and their ability to identify opportunities for training and development.

Risks and opportunities in addressing the UK's digital skills needs

The main risks associated with the shortage of digital skills concern the employers, the opportunities for stronger investment in up-skilling the workforce are significant. A key risk associated with the shortage realties to the negative impact on business growth, innovation and larger societal development. However, the opportunities associated with investment in strengthening the skills base are great. For example, US multinationals are 8.5% more productive on average that UK domestic firms due to their use of ICT. It has been estimated that the economy could benefit by an excess of £22 billion if everyone on the UK gets online. Along with this it has been estimated that where IT is optimised by businesses, an additional £47 billion in GVA could be added to the UK economy.

25% of SMEs that use mobile services most intensively have revenues that grow up to twice as fast as their peers and create jobs up to 8 time faster. The lack of ICT infrastructure has quite obviously been cited as the primary cause in countries failing to utilise their large pools of IT employees. Data driven companies have been shown to be 10% more productive than those who aren't data driven. Further research is required to shed light on feasible forms of support to benefit more from ICT capabilities within businesses.

Conclusions and recommendations

Risks

The shortage in suitable digital skills for digital jobs continues in the UK labour market, this shortage is linked to a quarter of all job vacancies. This presents a major risk to business growth, innovation and broader societal development. By not effectively linking the supply of digital skills to the overall demand may make the UK a less attractive place to do business and invest.

Opportunities

There is a clear link between market competitiveness and the uptake and application of digital technology in the workplace. This means significant value can be added to the UK economy and society through better investment in digital skills, this relates to both job creation and firm productivity and scaling up markets for companies including SMEs.

Barriers and Market failures

Currently 79% of large companies and 49% of SMEs are suffering tech skill gaps, with a clear is match in the skills offered by the labour market and those demanded. The range of activities and occupation where digital skills are required is growing but supply is again not meeting these demands.

Recommendations

There is a need for central government leadership on the issue, the government has the resource to empower the uptake of digital skills through infrastructure, qualification frameworks, education curricula, business and sector organisation. Government initiatives can support and energise the multi-level digital ecosystems. However, the government should not be the overall provider of digital skills development, instead processes need to be in place where those who need skills can be rapidly provided with

appropriately skilled employees. This requires central government needs to provide economic policy direction, national focus and leadership, while the education sector, local government and employers are responsible for addressing the digital skill gaps and shortages in the UK. The report makes four recommendations, these being:

1. Government should provide leadership, coordination, and key resources in establishing the conditions for digital skills development
2. Employers should take ownership of digital skills development
3. The education sector should develop and adapt their offers to meet the changing needs of the digital economy working within policy and funding frameworks established by the Department for Business Innovation and Skills; Education; and Culture, Media and Sports
4. Local and regional government and agencies should address the digital skills needs of their local areas