

## WORKING PAPER 8

# English approaches to digital skills policy – some reflections on current directions and developments

Ewart Keep, University of Oxford

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### English approaches to digital skills policy – some reflections on current directions and developments

*Ewart Keep*

#### **Abstract**

This paper provides a critical overview of the UK government's strategy for addressing digital skill needs. It locates this issue against a backdrop of multiple policy challenges, including relative economic decline, flatlining productivity growth, the effects of Brexit and the issues thrown up by transition to Net Zero. One of the central themes is the question of governmental capacity and where digital skills sits within a hierarchy of policy 'needs' and priorities. The paper starts with a section that outlines the policy context, beginning with the broader economic and policy backdrop and then moving on to explore the pace and intensity of digitalisation. Attention is drawn to the absence of a policy focus on the workplace and the productive process that take place therein, which raises questions about the context for thinking about digital skills. The changing nature of the national 'industrial strategy', the digital strategy, and the work of the relevant government departments on estimating the scale of the skill needs created by digitalisation and current policy ambitions is surveyed. Next, the various digital skills policies and the institutional arrangements that have been put in place to deliver them are reviewed. The paper moves on to some of the challenges that digital skills policy faces, including policy coherence and coordination, funding skills delivery and the role of employers in this, the timeliness and quality of labour market information, and the responsiveness of the education and training (E&T) system to emerging demands. The paper concludes with some thoughts on how policy is developing and some lessons that other countries might take from the UK's efforts.

Keywords: UK | Skills policy | Digital skills | Governmental capacity | Policy lessons

#### **INTRODUCTION**

This paper is concerned with the ability of skills policy and the education and training (E&T) system to respond to the challenges posed by digital technologies and the skill needs they generate. The UK government has a digital strategy, which covers England, and this encompasses skills. The governments of Scotland, Wales and Northern Ireland have produced their own digital strategies, and as education and training (E&T) is a devolved area of policy, they are developing and delivering their own approaches to encouraging the uptake of digital technologies and responding to the resultant changes in demand for skills and knowledge. The paper that follows focuses on England and the UK government.

It also follows the argument outlined in an earlier paper for this project (Keep, 2021) that thinking about digitalisation and skills needs to be framed within and related to wider economic and skills policy challenges, rather than simply becoming narrowly focusing on the supply of digital skills as a discrete (semi-) technical problem. The reason for this is that policies and activities aimed at addressing digital skill needs cannot easily be divorced from the broader policy context, which in the UK case includes major structural problems with stalled productivity and wage growth, a looming recession which over the next two years will deliver the largest fall in living standards since records began (Office for Budget Responsibility, 2022),

a fiscal crisis impacting on the public finances, the effects of the UK's departure from the EU ('Brexit') not least in terms of changes in the labour supply, low business investment (including in ICT), a massive and potentially unsustainable trade deficit, and significant difficulties that are being experienced with cross-government policy coordination and with the design and delivery of existing education and training (E&T) policies. At a very basic level, these major policy challenges means that decisions about the amount of attention and political capital that can be focused on digitalisation are liable to be framed relative to the level of attention needed to be devoted to other issues – in other words a zero-sum game choice. The UK government has only so much 'bandwidth' and, as will be explored below, governmental capacity is sometimes constrained.

Against this somewhat challenging backdrop, the changes that are and will in future be wrought by digitalisation, in terms of altered patterns of employment, shifts in the profiles and skill needs of different occupations and altered career structures and progression routes have major short, medium and long-term implications for the design and operation of E&T policy. For example, re- or upskilling the adult workforce in the UK (i.e. England, Wales, Scotland and Northern Ireland) is a major task, as in total this comprises about 32.6 million workers (employed and self-employed) (NAO, 2022). Given the likelihood that over time digitalisation will become a widespread phenomenon within UK workplaces, albeit taking place to varying degrees of intensity and at a varying pace, there is a need for the E&T system to gear itself up to address this. This paper explores some of the major issues that confront policy makers and practitioners in attempting to meet the new circumstances created by digitalisation and to extract lessons about policy design and process that can be applied in other jurisdictions.

Before proceeding further it is also important to offer one major caveat. In seeking to provide an overview of current developments, the author is faced with a fundamental difficulty – many of the programmes, initiatives and institutional arrangements that have been put in place by the government and other actors are relatively new, their impacts are often uncertain, a lot of activity has not been evaluated and what evaluations do exist are tentative and cover only the early stages of delivery. This makes it extremely difficult at this point to arrive at firm and definitive judgements about the efficacy of policy design and delivery.

## **The structure of what follows**

The paper opens with a section that outlines the policy context, starting with the broader economic and policy backdrop and then moving on to explore the pace and intensity of digitalisation, and the absence of a broader policy context concerning the workplace and the productive process that takes place therein. Attention then turns to the specific policy context, including the changing nature of the national 'industrial strategy', the digital strategy, and the work of the relevant government departments on estimating the scale of the skill needs created by digitalisation and current policy ambitions. Next, the various digital skills policies and the institutional arrangements that have been put in place to deliver them are reviewed. The paper moves on to some of the challenges that policy faces, including policy coherence and coordination, funding skills delivery and the role of employers in this, the timeliness and quality of labour market information, and the responsiveness of the education and training (E&T) system to emerging demands. The paper concludes with some final thoughts on how policy is developing and some lessons that other countries might take from the UK's efforts.

## **THE POLICY CONTEXT**

### **The broader economic and policy backdrop**

The focus of this paper is on the response of the UK Government's skills policies to digitalisation. However, as noted above the spread of digital technologies is by no means the only factor disrupting established policy stances on skills and the labour market, and these

other challenges need to be borne in mind as they form the backdrop to the formulation and delivery of digital skills policies and interventions. They include:

- Reduced government spending on adult skills and training (which will be examined in more detail below)
- Falling employer investment on workforce skills (ditto)
- An ageing workforce – in the early 1990s about 20 per cent of UK workers were aged over 50. Today the figure has risen to about one third. This matters because, as the National Audit Office (NAO) observe: “research suggests that employers are less likely to train older workers than younger employees” (2022: 7)
- The medium-term impacts of Brexit and the loss of free movement of labour from the EU. This is of importance in sectors that were previously heavily dependent upon EU labour, such as health and social care, hospitality, catering, food manufacture, construction, and transport and storage (NAO, 2022; ReWAGE/The Migration Observatory, 2022).
- The challenge of achieving ‘net zero’ by 2050 and the associated need to address skills demand around electrical vehicle construction and maintenance, building and maintaining renewable energy generation facilities, power distribution, green construction and heating, home insulation and so on (see James Relly and Robson, 2022). Some estimates (NAO, 2022: 7) suggest as many as 20 per cent (6.3 million) jobs will be directly affected the changing skill needs thrown up by the transition to net zero.

It is against this turbulent policy backdrop that the Digital Strategy has been developed and has to be delivered.

*Relative economic decline.* Lying behind all of the above is a further and more fundamental set of issues – economic stagnation, stalled productivity growth, very low or no wage growth for the majority of workers and an overall picture of relative economic decline (Resolution Foundation/CEP, 2022). A major inquiry into the future of the UK economy and labour market being funded by the Nuffield Foundation and delivered by the Resolution Foundation and the Centre for Economic Performance at the London School of Economics (LSE) has recently laid bare some of the dimensions of the UK’s persistent under-performance, and argued that a series of immediate economic crisis has served to mask the deeper, long-term downward trend in our relative performance with other developed countries (RF/CEP, 2022).

The findings included:

On the eve of the financial crisis, GDP per capita in the UK was just 6 per cent lower than in Germany, but this gap had risen to 11 per cent by 2019....

This reflects a productivity slowdown far surpassing those seen in similar economies. Labour productivity grew by just 0.4 per cent a year in the UK in the 12 years following the financial crisis, half the rate of the 25 richest OECD countries (0.9 per cent). Having almost caught up with the economies of France and Germany from the 1990s to the mid-2000s, the UK’s productivity gap with them has almost tripled since 2008 from 6 per cent to 16 per cent – equivalent to an extra £3,700 in lost output per person.

(RF/CEP, 2022: 8)

Weak productivity growth has fed directly into flatlining wages and sluggish income growth: real wages grew by an average of 33 per cent a decade from 1970 to 2007, but this fell to below zero in the 2010s. The result is that by 2018, typical household incomes were 16 per cent lower in the UK than in Germany and 9 per cent lower than in France, having been higher in 2007 (RF/CEP, 2022: 8).

8 million younger Brits have never worked in an economy that has sustained rising average wages (RF/CEP, 2022: 13).

As will be discussed at various points below, these trends have significant impacts on a range of digitalisation and skills issues, the first of which we now turn to.

### **The pace and intensity of digitalisation**

The economic woes outlined above come with implications for the pace and depth of digitalisation across the UK economy and labour market. As the UK Digital Strategy (DCMS, 2022) makes clear, the UK does well in attracting investment into digital sectors like Fintech, gaming, and business services with levels of investment running well ahead of those in Germany and France. In 2021 more private capital was injected into the tech sector in the UK than in any other European country (£27.4 billion), double the level achieved by second-placed Germany, and more than three times that achieved by third-placed France (DCMS, 2022: 3).

However, when we turn to the broader economy and non-digital sectors, there are reasons for suspecting that the adoption of digital technologies may now and in the future be patchy and slow because at an economy-wide level the UK's record on investment is extremely weak. The Resolution Foundation/Centre for Economic Performance report puts it thus:

...when it comes to low business investment, the UK is in a league of its own.

This low level of investment may have made sense when the UK was the most advanced economy in the world with a huge capital stock advantage over its competitors, but that was a century ago: the current state of affairs is a recipe for relative decline. In the 40 years to 2019, total fixed investment in the UK averaged 19 per cent of GDP, the lowest in the G7 and some 4 percentage points below G7 average of 23 per cent. Persistent low investment means that virtually all of the productivity gap with France is explained by French workers having more capital to work with. It should be obvious that UK policy debates should focus on the danger of too little automation rather than too much.

(RF/CEP, 2022: 116)

Within total fixed investment, the proportion accounted for by private rather than state investment is particularly worrying, with business investment representing only 10 per cent of GDP in 2019, significantly behind an average of 13 per cent in France, Germany and the USA (RF/CEP, 2022: 16). These figures have obvious implications for the pace and intensity of digitalisation in sectors and areas of the economy outside of 'tech' firms. Research by the Trades Union Congress (TUC) showed that in terms of investment in ICT equipment, the UK

ranked 19<sup>th</sup> out of 24 OECD nations (Tily, 2018). As the Resolution Foundation/CEP analysis notes, “...the policy-making community spent much of the past decade worrying about robots taking all of our jobs, even as business investment – a precondition to getting some technological advancement – flatlined”(RF/CEP, 2022: 101).

What comparative evidence is available tends to support the view that the UK's uptake of some forms of digital technology, such as industrial robots, has been slow compared to that seen in other countries. For example, between 1993 and 2017 UK installation of robots followed a lower trajectory than in France, Germany, Switzerland, Italy or the USA, to the extent that by 2017 whereas Germany had 5 industrial robots per 1,000 workers, the UK had just 0.5 (for details, see Di Giacomo and Lerch, 2022).

There is thus the potential danger that the gap between leading edge digital adopters and trailing edge non-adopters will be wide and long-lived in many parts of the economy, and that as a result, changes in working practices and accompanying demands for digital skills will be patchy. This will make life more complex for E&T providers and for those who have to try and plan E&T provision, both sectorally and in relation to geographical localities.

The Institute for the Future of Work suggests that:

To date, evidence suggests that the returns of technology adoption are being less evenly distributed and shared with workers, compared to previous technological transformations. In particular, while the more highly skilled workers may find their roles enhanced, ‘low’ skilled workers become particularly vulnerable. Capital-intensive technologies tend to be more concentrated in particular geographic areas and less integrated into local economies.

To date, there appears to be less ‘trickle down’ of the benefits and opportunities of technology than in past industrial revolutions, partly because automation technologies tend to be more concentrated in particular geographic areas as we discuss below

(2022: 10)

And go on to argue that:

Technological adoption is concentrated in geographic hubs with adoption accelerated unevenly across communities, especially during times of economic decline. Many supply chains have been hollowed out and are being rebalanced out of necessity or to reduce risk and dependencies in the future. Capital-intensive automation technologies, which are not designed at home or in response to local challenges are less likely to be well integrated into local economies.

(Institute for the Future of Work, 2022: 14)

### **An absence**

Before sketching in the specific over-arching policy context for digitalisation, it is important to observe an absence – this relates to a focus on what happens in the workplace within UK government policy on employment, employee relations, productivity and skills (Keep, 2021; Keep, Lloyd and Payne, 2010). Before the arrival of the Thatcher government in 1979 there

had been a long tradition of policy makers being interested in workplace employment relations and how the management of the workplace impacted upon productivity. This changed, as the industrial relations 'problem' was 'solved' by government intervention and the weakening of trade union power (Keep, Lloyd and Payne, 2010). Policy makers tended thereafter to treat the workplace as a 'black box'. As long as a set of minimum legal rights for workers have been abided by, the state has evinced little interest in how employers organise work or deploy skills (Keep, 2013; Keep and Mayhew, 2014; Keep, 2016) and there has been an implicit cross-party consensus since the mid-1980s, though weakening somewhat of late, that state interest or intervention in the workplace lacks a strong legitimacy and probably needs to be minimised.

The absence of policy that has resulted from this state of affairs has had and will continue to have profound implications for policies concerning digitalisation. First, there is no clear locus within central government for ownership of workplace change issues. The UK is unusual within the OECD as being a country that lacks a government department or ministry whose central focus is work and employment. It is also doubtful if the Department for Digital, Culture, Media and Sport (DCMS), as the lead department on digitalisation has the mandate, expertise or research contacts and capacity to pursue these topics as they relate to digitalisation, even if it wanted to. Second, there is no over-arching strategy or set of objectives about workplace organisation and innovation, or skills utilisation to provide a context for policy formation on digitalisation. Finally, as a result of the 'hands off' approach adopted by government over the last 30 years or more, there is a lack of experience of and knowledge about the kinds of workplace-focused policy interventions that might be possible and how government might go about implementing them (Keep, 2016).

As previously noted (Keep, 2021), this situation means that the UK government starts in a very different place from countries such as Germany that possess a long-standing tradition of policy interest in workplace relations and innovation, and which have constructed a nested set of policies on Industry 4.0, Work 4.0 and Skills 4.0. In the UK, the work element is missing and liable to remain so for the foreseeable future. Thus, for example, Germany's plans for Work 4.0 come with an explicit goal of seeking to ensure that digitalisation does not worsen income disparities within the labour market or disrupt codetermination processes. The UK government has no such goals.

### **Industrial strategies, digital strategies and policies**

The UK government formulated a Digital Strategy in 2017 and this was updated in July 2022 (DCMS, 2022). The strategy encompasses digital infrastructure, ideas and intellectual property, skills, finance for digital start-ups and for their expansion, spreading digitalisation and the digital industries across the whole of the UK, and promoting inward investment.

This strategy was formulated by the Department for Digital, Culture, Media and Sport (DCMS) and as originally conceived was designed to act in concert with the government's broader, economy-wide Industrial Strategy (BEIS, 2017). The Department for Business, Energy and Industrial Strategy (BEIS) constructed this over-arching Industrial Strategy around five 'foundations of productivity':

1. Ideas
2. People
3. Infrastructure
4. Business environment
5. Places

And four 'grand challenges' (artificial intelligence and data, clean growth, the future of mobility/transport, and an ageing society).

The government subsequently decided to abandon the Industrial Strategy in 2021 and replace it with a much looser and less interventionist strategy entitled *Plan for Growth - Build Back Better* (HM Treasury, 2021), which in part represented a move by the Treasury (the finance ministry) to wrest control of post-Covid economic recovery policies from BEIS. The *Plan for Growth* revolved around three ‘core pillars of growth’ (infrastructure, skills and innovation) that it is assumed will deliver three ‘people’s priorities’ (levelling up less productive and prosperous localities, net zero and ‘global Britain’ – whatever the last priority might be taken to mean).

*Plan for Growth - Build Back Better* (HMT, 2021) was recently supplemented by an update – *The Growth Plan 2022* (HMT, 2022). This marked the change from the administration led by Mr Johnston to the one headed by Ms Truss, and it announced that the new government’s “central economic mission” (HMT, 2022: 5) was to achieve trend growth in economic activity of 2.5 per cent per annum. The key policies to deliver this objective were:

To drive higher growth, the government will help expand the supply side of the economy. The Growth Plan sets out action to unlock private investment across the whole of the UK, cut red tape to make it quicker to deliver the UK’s critical infrastructure, make work pay, and support people to get onto the property ladder. New Investment Zones will provide time-limited tax reliefs, and planning liberalisation to support employment, investment, and home ownership.

(HMT, 2022: 5)

For a glimpse of the thinking that underlay this strategy, see Kwarteng et al, 2012. Given the subsequent early demise of Ms Truss’s premiership it must be assumed that at some point a revised *Growth Plan* will be issued by the new Chancellor of the Exchequer (Mr Hunt).

Besides the Digital Strategy’s relationship with these shifting over-arching economic strategies, DCMS’s policies exists alongside a range of other strands or foci for economic policy, including:

- An integrated review of security, defence, development aid and foreign policy, one of which’s aims is to strengthen the UK’s position as a global science and tech ‘superpower’ (H M Government, 2021a)
- An Innovation Strategy (BEIS, 2021a) – digital is one of the seven technology ‘families’ identified in the strategy
- A national AI strategy (DCMS, 2021)
- The Kalifa Review of UK Fintech (HMT, 2021)
- A Net Zero Strategy (BEIS, 2021b)
- An Export Strategy (Department for International Trade, 2021)
- A ‘levelling up’ white paper on regional policy (Department for Levelling Up, Housing and Communities, 2022)

Plainly, this array of complementary policies requires a degree of coordination across different parts of central government and between the different actors and agencies that are intended to deliver the policies. This is a topic we will return to.

Having set out the broader context for the Digital Strategy attention now turns the work of DCMS and DfE on digital skills. We start with looking at what is known about the scale and nature of digital skill needs.

## **THE SCALE OF DIGITAL SKILL NEEDS**



## Some words of caution

The task of forecasting the future skill needs that may result from the digitalisation of work is by no means easy (Keep, 2021), particularly in economies and labour markets where the subjects and courses studied often do not determine in what sectors and occupations people end up working. There are many issues, but three are worth highlighting here. First, early patterns of technology adoption and the skill needs they generate may be very different from those that emerge as the technology and its usage matures.

As a result, current developments may not prove to be a good guide to what subsequently emerges as the technology and people management, recruitment and training responses evolve and mature. Consequent upon this, a major difficulty is that within such a rapidly evolving field, skill needs will change at a pace that the providers of education and training will often struggle to apprehend and match (Keep, 2021: 6).

Second, skill needs cannot be simply 'read off' from whatever technology is deployed, as how and to what ends it is used in individual workplaces will vary very considerably (OECD, 2019; Keep, 2021). We will return to this issue later.

Third, employers' estimates of skill shortages in the labour market, and skills gaps within their own existing workforces, need to be treated with a degree of caution. There are two main reasons. First, most firms tend to live hand-to-mouth in relation to skills, and few engage in any form of systemic workforce planning or skills forecasting. Second, firms have come to realise, particularly within the skills policy context set by the UK government, that the means to secure resources (potential students/trainees, funding and the expansion of E&T provision relevant to their needs) is to cry 'skill shortage' (Keep, 2006a & b). This has been intensified by the perception by different sectors and occupations that they are in a zero-sum game for a finite pool of talent in the shape of more able students and potential employees (Keep, 2012 & 2018). Therefore, to some extent at least, UK employers estimates of skill shortages should be treated as 'bids' rather than necessarily being highly accurate audits or forecasts.

## What we know

With these caveats in mind, we can now turn to a very brief survey of what is known about digital skill needs. Current estimates of the size of the digital sector's workforce are that in 2020 there were 1.7 million jobs, a more than 31 per cent increase since 2011 (DCMS, 2022), although many who work in the sector are not necessarily highly skilled in digital technologies – for example, accountants, HR staff, and marketing experts to name but three groups.

The Digital Strategy identifies a skills shortage in more advanced digital skills (DCMS, 2022: 74), but does little to drill down and specify the dimension of this in any detail. However, others have tried to fill this gap – see Industrial Strategy Council, 2019; DCMS/Burning Glass, 2019; CBI/Tata, 2019; Microsoft, 2020a & b; Tech Nation, 2022, and Skills UK/LWI/Engenuity, 2022. There are also more narrowly focused attempts to gauge specific aspects of digital skills shortages, for example, see H M Government's (2021b) exploration of the UK data skills gap; and the Gatsby Foundation-funded investigation of digitalisation in the automotive sector (Lanham, Shakspeare and Goodliffe, 2020).

The latest large-scale offerings are Tech Nation's annual report *People and Skills* (2022) which provides a useful snapshot of skill needs in the tech sector and for jobs that are directly related to the use of digital technologies (like software engineer or coder). It uses web-scraping and Office for National Statistics (ONS) data to provide an overview of the relative growth of different tech occupations over time, explore career patterns, and to indicate the skills in

demand at a fairly detailed level. There is also a recent report produced by a consortium of Worldskills UK, the Learning and Work Institute (LWI) and Enginuity that provides a useful overview of demand across the whole economy and labour market based on a synthesis of existing research, a survey of company HR staff, a survey of young people, and a focus group for employers (Worldskills UK/LWI/Enginuity, 2022).

Key findings from this and earlier work are:

The foundational levels of digital skills vary across the adult population, with a relatively significant number having very limited or no skills. This is a topic, labelled by government as essential digital skills (EDS), which DCMS has been concerned about. EDS represent a basic level of knowledge required for people to make use of basic digital functions for work and for everyday life (access the internet, download apps, shop online, etc). In 2018 the Tech Partnership, Lloyds Bank and the DfE undertook extensive consultations to set a baseline for EDS across the UK. Subsequently, Lloyds Bank has funded a survey using a representative sample of the UK population (originally those aged 15+, but in 2021 those aged 18+). The results are reported in Lloyds Bank, 2021, and the headline figures are that about 21 per cent of the population (11 million people) do not have all the EDS required for day-to-day work and life, and 10 million lack foundation level skills and are unable to, for example, access the internet. The bulk of the 10 million fall into three categories:

1. Those aged over 65
2. People with disabilities and sensory impairments
3. Those with no formal qualifications

In terms of handling digital technologies in the workplace, the survey suggested that 64 per cent of the workforce now have the essential digital skills needed for work, and the trend is that skills are deepening across the workforce and more people are reporting being able to undertake tasks independently and without help. In this regard, the pandemic and of extensive shifts to digital modes of operation in many businesses has had a major impact. However, 11.8 million workers (36 per cent of the workforce) still do not possess the basic digital skills needed, and 8 per cent do not possess the knowledge to be able to even connect to the internet. This excluded section of the national workforce tends to be made up of:

- those aged 55+;
- part-time workers;
- those working in the service sector;
- those without formal qualifications;
- and female workers.

Basic digital skills are now widely demanded by employers in every sector, required in 82 per cent of job roles advertised online (DCMS and Burning Glass, 2019) and demand for advanced digital skills (defined as a good knowledge across a range of digital skills as well as in-depth knowledge in an area like computer-aided design, or coding) was also growing, with one in four employers saying that most of their workers required advanced digital skills (WorldSkills UK/LWI/Enginuity, 2022), confirming a trend identified by the Confederation of British Industry (CBI and Tata, 2019).

Employers report digital skill gaps in their existing workforce, and that they are also struggling to find sufficient recruits with the skill levels they need. 23 per cent of businesses in the WorldSkills UK/LWI/Enginuity survey claimed to be facing basic digital skill gaps among their current employees, and 37 per cent made the same claim in relation to advanced digital skills (2022: 17). Within this overall national picture there are significant regional and local variations in skill demand and in some instances in the scale of disjuncture between demand and supply (Royal Society, 2022).

## **DIGITAL SKILL POLICIES AND INITIATIVES**

### ***The overall challenges***

Given the scale and nature of the skill needs outlined above, it can be argued that there are three over-arching challenges that the skills component of the Digital Strategy needs to address:

1. Identifying changing skill requirements at sectoral and occupational levels
2. Ensuring that the qualifications and curriculum 'offer' at all levels of education changes to reflect emerging needs
3. Ensuring that the right mix and scale of provision for both initial and adult learners can be funded and delivered – a task that involves the state, employers and individuals

None of these requirements is new or unique to the impacts of digitalisation. These are widespread and long-standing challenges for any national skills system. The problem is that in the recent past English E&T policy and practice has sometimes struggled to fully address these requirements in ways that have worked, and as will be explored below there are reasons for thinking that the skill needs thrown up by digitalisation will not be easy to satisfy without the adoption of new approaches.

In thinking about how to segment digitalisation's impact on skills, it can be argued that there are three categories that need to be borne in mind (see Keep, 2019 and 2021):

1. the creation of new skill needs and jobs directly related to the digital sector and digital technology;
2. the need for digital skills in jobs not primarily focused on this technology or located in the digital industries;
3. and the broader impact of digital innovation on skills needed in all forms of employment.

With respect to the first group, the number of jobs (and hence demand for skills) involved may be relatively small compared to the broader skill needs generated by the second and third types of impact. As will be discussed below, at present much of the focus on skills forecasting around the impacts of digitalisation has focused on 1, with relatively limited and patchy attention being paid to 2 and 3.

### **Institutions to deliver digital skills**

*Digital Skills Council (DSC)*. The DSC has very recently been created by DCMS to act as a focal point for cooperation between government and industry and will:

- Promote digital careers
- Increase awareness of resources that enable pathways into digital and digitally enabled jobs for workers in non-digital roles
- Promote mechanisms to increase diversity in digital and digitally enabled jobs

The Council is made up of employers, academics, and representatives of the various government departments with an interest in this area (besides DCMS, it will also include representatives from the Department for Education [DfE], the Department for Work and Pensions [DWP] and BEIS). It is jointly chaired by an industrialist and a minister from DCMS.

Its creation is important because the English skills system now operates with relatively few intermediary bodies between national government (ministers and civil servants) and the institutions, public and private that actually deliver the E&T activity (Richmond and Regan,

2022). Those that do exist are primarily market regulators or government inspectorates. Skills funding, except for some limited elements of adult E&T that are devolved to those localities that have a Mayoral Combined Authority (MCA), are very largely managed directly by the DfE. The DfE has mechanisms for meeting national level business representation organisations, such as the Confederation of British Industry (CBI), British Chambers of Commerce (BCC), and the Institute of Directors (IoD), but decision-making bodies that are led or dominated by employers are limited and contact with industrial sectors is also smaller than it used to be (see below). The Institute for Apprenticeships and Technical Education (IfATE), which is responsible for establishing the standards that govern apprenticeships and the new T level technical qualifications (see below) is designated by government as 'employer-led', but its senior staff are largely drawn from seconded DfE civil servants and besides specifying the learning goals of apprenticeships and technical qualifications and setting the funding bands for different apprenticeships, its decision-making powers are limited.

*Local Skills Improvement Partnerships.* The other set of general employer-led bodies are the new Local Skills Improvement Partnerships (LSIPs) which are discussed below. The LSIPs embody the government's enthusiasm for a local focus on skills rather than a sectoral one, and this was reflected in the government's decision in 2016/17 to cease to fund support for sectoral employer skills bodies (Sector Skills Councils – SSCs) and to abolish the UK Commission for Employment and Skills (UKCES) which brought together employers and trade unionists to coordinate activity on skills, largely at sectoral level. As a result, there are now no bodies that encompass social partnership, trade unions have come to be excluded from the formal machinery of policy formation, and the unions' network of workplace learning representatives was de-funded by government a few years ago.

*Local Digital Skills Partnerships (LDSPs).* DCMS have also experimented with a set of local bodies focused on digital skills. LDSPs were created to boost digital skills capabilities within localities; bring together public, private and third sector actors to work on upskilling; and to raise general awareness of the importance of digital skills. The first LDSPs was launched in April 2018, and six were in operation by the end of 2019. In addition, two other localities subsequently decided to set up their own LDSPs without financial support from DCMS.

The overall resources committed by government were relatively modest, with DCMS allocating £1.3 million in direct financial support to the first six LDSPs, with a further £300,000 worth of in-kind support (largely civil servants' staff time). The bulk of the money was expended on funding to each LDSP to employ a Regional Coordinator.

The evaluation commissioned by DCMS (AMION Consulting, 2021) found that the LDSPs had been successful in bringing together a range of local partners and in raising awareness of digital skills among the population, through online job fairs and careers work, offering work experience opportunities, piloting the first skills bootcamps, and providing support to those at risk of digital exclusion. The LDSPs had also been able to boost local businesses' awareness of the importance of digitalisation and the digital skills needed to deliver effective results. Despite these achievements and the modest costs entailed, there appear to be no plans by DCMS to extend the coverage of LDSPs across England, and the latest version of the Digital Strategy (DCMS, 2022) makes very little mention of LDSPs.

Having reviewed the institutional infrastructure that is available to oversee the digital skills element of the Digital Strategy, we can now turn to looking at the programmes, initiatives and qualifications that are being assembled and marshalled to deliver its intended outcomes.

## **Initial education**

DCMS has a dual approach – efforts to embed digital skills in the education offer for all, and efforts to create higher level specialist digital skills. The importance of initial education in laying the foundations for subsequent lifelong learning (LLL) cannot be overstated. Unless initial schooling (up to upper secondary level) imparts basic skills such as literacy, numeracy and

digital literacy, as well as an appetite for further learning, adult learning strategies and the re- and upskilling of the workforce will be founded on shifting sands. The UK does not have a good record in this regard. As PIAAC (OECD, 2013) and other surveys and testing exercises (Green, Green and Pensiero, 2014; Learning and Work Institute, 2021) have demonstrated, there is a wide dispersion of attainment levels in literacy and numeracy, far too high a proportion of students leave schooling with very weak skills and limited levels of qualifications and attempts to subsequently remediate these deficiencies have had limited effects.

There is considerable debate about the ideal curriculum offer and assessment regime in the lower secondary phase of state schooling in England, and within this debate there is a strand concerned with how the teaching of digital skills should best be framed, upon what it should focus and what qualifications should be used to assess this learning. There is not space to go into these arguments here, but those with an interest should explore Royal Society, 2017; Sentance, 2021; Pearson, 2021; OECD, 2021; HM Government, 2022.

The DfE white paper *Skills for Jobs* (DfE, 2021) concentrated attention on post-16 (upper secondary) technical education and training, and one strand in the policy was a strong emphasis on English, maths and digital skills as a core offer in all provision. At present the main thrust of government policy is focused on developing and rolling out a set of new, more demanding technical qualifications at level 3 (upper secondary), called T levels. These include T levels covering digital technologies (digital business services; digital production, design and development; and digital support services), and "...all T level programmes include digital skills that are relevant to the occupations in question, giving employers the confidence that T level graduates will have the proficiency needed for employment" (DCMS, 2022: 30).

The government has sought to try to boost the proportion of students in higher education that are following a broad range of Science, Technology, Engineering and Maths (STEM) courses and this has been attended by a measure of success, although major shifts in the balance between these courses and the humanities and social sciences take a long time to accomplish (DCMS, 2022). It is also worth noting that today computer science is the third largest subject choice (after biological science and business studies) for undergraduate study in the UK. Moreover, DCMS has sponsored a pilot programme to test out effective ways to teach foundational data skills to all HE students. The pilots commenced in 2021 and are running in seven universities. It is unknown when an evaluation of this exercise will be publicly available.

From 2019 the government has funded universities to create AI and data science conversion courses for those who want to retrain but lack prior experience and qualifications, and there are scholarships to encourage diversity within this programme (see DCMS, 2022: 32). The government has also funded 1,000 doctoral places in AI, and an additional 1,000 places were recently announced.

Policy has also acknowledged the importance of ensuring that there is high quality careers information, advice and guidance (CIAG) available to students at all levels in the education system to help them to see where particular qualifications and courses can lead and to enable them to chart a course through the education system that will allow them to realise their career goals. Thus, the Institute for Technical Education and Apprenticeships (IfATE) has created occupational maps to show learners and employers how particular vocational qualifications and apprenticeships can lead to specific jobs. For young people the Careers and Enterprise Company (which is the lead agency for CIAG for young people), and the National Careers Service which caters for adults have both taken steps to ensure that there is high quality information available on courses and qualifications that lead to digital jobs.

### **Adult re- and upskilling**

In order to understand where digital skills provision fits within the overall picture of adult E&T provision a brief overview of the complex web of funding streams, schemes, programmes and entitlements is provided below.

*Adult Education Budget (AEB).* The AEB provides the funds that the government disburses to support general adult E&T. In areas of the country where there is a devolution deal, the money is allocated to the relevant Mayoral Combined Authority (MCA), who then have their own system for allocating funds against local priorities to public and private E&T providers. For the rest of the country, the government allocates the AEB on the basis of a bidding competition from providers using a complex and shifting set of criteria.

The AEB (both devolved and undeveloped) funds a set of 'universal' learning entitlements:

1. English and maths up to and including level 2 (lower secondary equivalent) for those who do not already possess a higher-grade GCSE pass.
2. A first level 2 or 3 qualification for those aged 19-23 who do not already possess one.
3. Essential digital skills qualifications, up to and including level 1 (a level significantly below that expected of lower secondary schooling attainment) for individuals aged 19+ who have digital skills assessed at below level 1.

As outlined above, there is strong evidence that there are many adults who need help with acquiring elementary digital skills. The Essential Digital Skills (EDS) entitlement represents the government's assessment of the most basic level of skills required for adults to function as digital citizens, consumers and workers. DCMS, in partnership with DfE, have specified two Essential Digital Skills Qualifications, which are designed to provide adults with low or no digital skills with a foundation of basic skills and knowledge. These cover using devices and handling information; creating and editing; communicating; transacting; and being safe and responsible online. DfE has added these qualifications to the adult learning entitlement, and they are available free of tuition costs for some adults.

*Digital Functional Skills Qualifications.* These are aimed at filling the gap between the foundational level of essential digital skills and more advanced course offerings and are being designed with recognition and use by employers in mind. These will be on offer from August 2023.

*Training leave.* There is an established legal right, created under the New Labour government, for employees to request training leave from work to undertake E&T. This right is available to those who are classed as employees, have worked for the organisation for at least 26 weeks, in firms with 250 or more employees, and the activity they wish to undertake can be shown to help staff do their job better. The numbers requesting and taking training leave are small and the leave is usually unpaid.

*Advanced Learner Loans (ALLs).* ALLs allow individuals aged 24+ to apply for a loan to cover the costs of a course at levels 3 (upper secondary equivalent) to level 6 (degree equivalent) at an FE college or training provider. In 2020/21, 82,000 students were studying using ALL funding.

*Lifetime Loan Entitlement (LLE).* LLE extends the model of ALL to allow adults to access the main student loan system (the one that funds higher education study in England), with each adult being allocated up to four years of full-time equivalent learning over their lifetime. It will be possible to use the LLE to fund modules and short courses as well as full qualifications (at levels 4-6 sub-degree and degree), which is a major break with established practice in England. The LLE will commence operation in 2025.

*National Skills Fund (NSF).* Launched in 2021 the NSF aims to fund the delivery the adult skills that employers need, with an initial funding allocation of £1.6 billion spread over three years (i.e. just over half a billion pounds per annum). One of the main programmes within the NSF are Skills Bootcamps.

*Skills Bootcamps.* The aim of bootcamps is to help individuals adjust to the changing economy through training to upskill or reskill so to enable transition from work in declining sectors and occupations into new career directions. Thus, the aim is to develop the skills that are demand

by local employers that will allow individuals to get a better job and higher pay. Outcome measures set by the Department for Education (DfE) concern entry into work or a different job and whether this represented any form of progression. The bootcamps – which also involved a small number of technical skills courses – comprise intensive, short training programmes (around two to three months) designed to meet employers' skills needs. There is an additional focus on equality, diversity and inclusion (EDI) given that the digital and technical workforces are currently white, and male dominated (Williams et al, 2021: 8).

Bootcamps are free to employed, self-employed, or unemployed participants (who are aged 19+) and the courses are mainly pitched at levels 3 to 5 (upper secondary equivalent to sub-degree), though a few were at degree or master's levels (levels 6 and 7). Employers can use the Bootcamps to upskill their existing employees, and if they do, they only need cover 30 per cent of the cost of the training. Courses offered by Bootcamps include a range of digital skills (including digital marketing, women in software, cloud services, computer aided design, coding and cyber security), construction and other forms of technical training, and heavy goods vehicle driving.

Initial evaluation of the Bootcamps (Williams et al, 2021), which are still in their early days, found that the largest age group attending was 26-35, with those aged 36-45 making up the next largest group. Two thirds of those attending were employed or self-employed, and one third already possessed a Level 6 qualification (degree), while 16 per cent had a Level 2 or below qualification attainment level. High levels of satisfaction from both students and employers were recorded. A more recent evaluation undertaken by the government's Office for Standards in Education, Children's Services and Skills (Ofsted) indicated some causes for concern, including variability in the success rates in recruiting students to the courses, patchy levels of employer engagement, and wide variations in the quality of instruction – particularly in programmes that were being taught exclusively online (Ofsted, 2022).

It needs to be borne in mind that in their earlier stages the Bootcamps were rolled out during the difficult circumstances of the Covid pandemic. In their first year (2020/21) Bootcamps were allocated £43 million of public funding, and another £60 million from the National Skills Fund has now been pledged.

*Lifetime Skills Guarantee (LSG)*. The LSG is another NSF offering and provides access to a free level 3 course (from a list of 400 approved qualifications) to all adults who currently do not possess a level 3 qualification, or those who earn less than the National Living Wage, or who are unemployed. In 2020/21, 19,720 adults availed themselves of these free courses. This entitlement supplements those funded via the AEB.

*UK Shared Prosperity Fund (UKSPF)*. This replaces funding that came to the UK under the EU's European Social Fund (ESF). Resources from UKSPF, which will cover all four UK nations, will start to flow in 2024/25, and the skills component of this will be spearheaded by the new Multiply numeracy programme (which starts with other temporary funding in autumn 2022/23). This aims to increase the level of functional numeracy across the UK's adult population.

The DfE are currently consulting over the simplification of the skills funding landscape, with the ultimate ambition of rolling as much non-student loans funding into the NSF as is possible, including the AEB, and reducing the number of separate pots of money that are available.

## **Overview**

The sections above have outlined the broad backdrop to the Digital Strategy and the skills component thereof and have sketched in the main lines of policy development to date. As the foregoing indicates, there is no shortage of activity and plans that support the delivery of digital skills. The key question is what are the prospects of them delivering what is required?

Therefore, the next section turns to some of the challenges that confront the government's efforts.

## CHALLENGES

### Policy coherence and coordination

As already noted, the integration of policy around the digital strategy and digital skills with many other strands of economic and education and training policy is important. There has been consistent criticism in recent times of the UK government's approach to policy formation with commentators arguing that while the government is often good at establishing very ambitious high-level goals, often related to our becoming the 'best place in the world for x', 'world-leading' and a 'superpower', the means of achieving these goals is sketchily specified, and the steps required for the practical implementation of policy and milestones to measure progress are either absent or lacking in detail (see Burnett and Priestly, 2022; and House of Lords Science and Technology Committee, 2022 on these problems in relation to science and innovation policy). As what follows will reveal, similar problems have been identified with economic growth strategies and with the subordinate strategies for digital technologies and for skills.

In the policy analysis literature there has been considerable dismay at the scale and endemic nature of strategic policy 'churn' in the UK (Burnett and Priestly, 2022), with, for example, four short-lived growth strategies between 2015 and 2021 (*2015 Long Term Economic Plan*, *2017 Industrial Strategy*, *2021 Build Back Better*, and *2021 Innovation Strategy*). For a commentary on this policy landscape and on the replacement of the *Industrial Strategy* by the *Plan for Growth*, see the House of Commons Treasury Committee (2022). The main criticisms are that the tendency by government to change strategies and the delivery mechanisms and institutions that support them at frequent intervals is self-defeating and that a longer-term focus is required; and that there is a danger that the different strands of policy do not mesh together. For example, the Committee notes that:

The levelling-up White Paper *Levelling Up the United Kingdom*, includes no mention of the *Plan for Growth*, and the *Export and Net Zero Strategies* include only one mention each. In his 2022 *Mais Lecture*, the Chancellor evaluated the drivers of growth and where the UK had struggled, coming to the view the Government had three priorities -capital, people ideas. Although these could be seen as overlapping to an extent with the three 'pillars' of the *Plan for Growth* – infrastructure, skills and innovation – he made no reference to it in his lecture....The Government as a whole is spending a large amount of money and time on devising growth strategies and policies. It is important to have a robust, overarching strategy that drives co-ordination across departments.... However, it is unclear to what extent the *Plan for Growth* is an active strategy driving the Treasury's activities as the co-ordinating economics ministry. As a result, there is a risk that growth strategy and policy are fragmenting across departments.

(House of Commons Treasury Committee, 2022: 18-19)

In relation to local economic strategy and the government's ability to deliver on its spatial re-balancing and 'levelling up' agenda, research suggests that the UK government finds this kind of 'join up' across different policy areas and silos difficult to achieve (Pabast, 2021; Richards



et al, 2022), with Richards et al arguing that the UK possesses “an incoherent state” (2022: 2), ill-equipped to confront the challenges of the 21<sup>st</sup> century and characterised by ad hoc policy and structures, high levels of instability, and poor linkages between policy design and policy delivery.

This backdrop is important because it is certainly the case that the Digital Strategy touches upon the remits of a number of central government departments:

- Department for Digital, Culture, Media and Sport (DCMS)
- Department for Work and Pensions (DWP) (in essence, the ministry for social security and the unemployed)
- Department for Education (DfE)
- The Department for Business, Energy and Industrial Strategy (BEIS)
- Department for Levelling Up, Housing and Communities (DLUHC)
- Her Majesty’s Treasury (HMT) (the finance ministry)
- Department for International Trade (DIT)

Unfortunately, the criticisms of lack of strategic coherence and of institutional and policy churn noted above in relation to industrial and growth strategies are mirrored in much of the research and policy literature on UK government skills policies (Keep, 2006a & 2009b; Norris and Adam, 2017; Slater, 2022). The DfE currently lacks an overall skills strategy, having chosen to gradually abandon previous attempts at creating an over-arching policy narrative and associated set of goals, and to instead rely on a much narrower policy framing. The absence of an over-arching strategy for education and training, or for skills makes it hard to discern what level of relative priority is being afforded to different areas of activity and policy goals, not least to digital skills. It is also difficult to escape the impression that different strands of E&T policy and associated provision occur within silos, often with limited communication between them.

The DfE’s approach has either meant a focus on individual sectors/stages of skills delivery (for example, further education – see the White Paper *Skills for Jobs*, 2021), or on individual initiatives and schemes which are implicitly expected to address broad policy challenges. For example, DfE has no strategy on adult or lifelong learning, but instead points to a number of schemes and interventions – the trialling of the new T level qualification for adults, Skills Bootcamps, the loans-based Lifetime Learning Guarantee, which taken together are assumed to add up to an implicit strategy.

This assumption is open to doubt. Some components of this implicit strategy have yet to be tested (T levels for adults), and others will not become effective until 2025 at the earliest (the Lifetime Learning Guarantee, which aims to extend the income-contingent student loans system currently available to HE students to adults wanting to take intermediate and above level vocational qualifications in further education or with private training providers [ITPs]). Even when they come into operation, their success is by no means guaranteed. T levels are two-year courses designed to complement academic A levels at upper secondary level, originally designed for 16-19 year-olds and it is unclear how attractive they will be to adults, not least as they mean long, and therefore expensive courses that only deliver an intermediate (sub-tertiary) qualification.

The success of the extension of the student loans systems to a much wider range of courses and students is, as will be discussed below, also moot. Previous attempts to remove government funding for adult learners and substitute this with loans that the students must repay resulted in large reductions in learner volumes (House of Lords Economic Affairs Committee, 2018), see below for further details.

The lack of a broader and coherent skills strategy is problematic for DCMS’s work, as it means that its efforts cannot be framed within some broader over-arching context of what is expected

or wanted. Thus, DCMS now finds its Digital Strategy, and the skills component thereof, operating in isolation from any kind of master plan, both at a level above digital (general industrial strategy) and at a level above digital skills (a broader skills strategy).

### **Funding E&T, including the role of employers**

The funding of educational provision is another major and intractable challenge for policy. As will be explained below, both public and private investment in skills has been constrained and there are serious doubts that the overall level of expenditure is commensurate with the scale of need.

*Public spending.* Adult learning in England has been caught in a pincer movement of contracting spending by both government and employers, the scale of which is often not fully appreciated within England. In terms of public investment, in 2010 the incoming Coalition government (made up of Conservatives, with Liberal Democrats as the junior partner) opted to introduce a policy of austerity, with major reductions in public spending, not least on education. The schools' budget was given a measure of protection from the cuts, but adult learning was not and suffered major reductions. Thus, in 2010/11 about 3.2 million adults were in government-funded further education and training. By 2020/21 this figure had halved to 1.6 million (NAO, 2022). The number of adults pursuing level 2 and below (lower secondary equivalent and below) qualifications has fallen by 50 per cent since 2020, and the volume of adult learners pursuing a level 3 (upper secondary equivalent) qualification by 33 per cent (Staufenberg, 2022).

The reasons for this massive decline are not hard to find when we look at the trajectory for public funding. In terms of the trends in UK government spending on adult skills, the following statement from the Institute of Fiscal Studies (IFS) provides a succinct overview:

Total day-to-day spending on adult education and skills amounted to £3.5 billion at the latest count in 2019–20. This includes about £1.5 billion for classroom- or community-based adult education, a large element of which is devolved to city regions. Total spending on apprenticeships (across all ages) stood at about £2 billion. Overall spending across adult education, apprenticeships and work-based learning fell by 35% or by £1.9 billion in real terms between 2009–10 and 2019–20. Total spending on classroom-based adult education (i.e. excluding apprenticeships and work-based learning) was at a high point of about £4.4 billion in 2003–04. It then fell by about one-third between 2003–04 and 2009–10 and by a further 50% or £1.5 billion between 2009–10 and 2019–20. Taken together, this represents an overall fall of two-thirds since 2003–04. This has partly been made up for by a 50% or nearly £700 million increase in spending on apprenticeships since 2009–10 (which here includes young people as well as adults). Therefore, there have been large falls in spending on adult education over time, which remain even after accounting for a shift towards spending on apprenticeships. The current government has repeatedly stated the need to improve adult skills provision. With this in mind, it allocated a range of additional funding streams in the 2021:

An extra £550 million for adult education in 2024–25 as compared with 2019–20.

£170 million in increased apprenticeship funding by 2024–25.

About £190 million per year for a new programme called ‘Multiply’ to improve numeracy skills across the UK.

Together this amounts to about £900 million in extra day-to-day spending on adult education and apprenticeships in 2024–25 as compared with 2019–20. In addition to this future spending, it is worth noting that the government has indicated that it will shortly reform how learners access funding for post-16 education as part of the new Lifelong Loan Entitlement. ....spending on adult education and apprenticeships is projected to rise by 30% between 2019–20 and 2024–25. However, this only reverses a fraction of past cuts; combined spending on adult education and apprenticeships will still be 15% below 2009–10 levels. Spending on adult education on its own (i.e. excluding growing levels of spending on apprenticeships) will still be one-third below 2009–10 levels even with the additional funding announced in the 2021 Spending Review. (IFS, 2022)

*Employer investment.* Given the decline in public funding outlined above, for more than a decade government policy has been predicated, albeit with declining levels of conviction, on the convenient assumption that:

They [employers] are willing to invest – invest far more than they do at present in the skills of their workforces if they can be sure that the training they buy will be of high quality and geared to their needs. We need a new approach . . . Our aim is to shift profoundly the balance between the state, businesses and individuals.

(Department of Business and Innovation and Skills, 2010, 12–14)

In other words, the official expectation has been that a retreat from adult learning investment by the state would be compensated for by rising employer and individual investment. The government have not been alone in expecting employers to step up to the skills challenge – young people also anticipate employer support. As Worldskills UK, LWI and Enginuity (2022) observe, drawing on data from their survey of young people:

Young people have high expectations around employer investment in their skills. Seven in ten (70%) young people say that they expect their employer to invest in their digital skills....However, as our employer survey found, only half of employers say they provide digital skills training”

(2022: 24)

These findings illustrate a tension at the heart of policy, as more general evidence suggests that at aggregate level employers are, in contradistinction to official expectations, locked into a long-term, structural retreat from providing training to the employed workforce.

Using evidence from several official surveys, Green and Henseke (2019) estimate that between 1997 and 2017 the annual volume of employer-provided training hours fell by about

60 per cent. This despite the fact that over this period the government was exhorting employers to do more and, in some instances, providing various forms of subsidy to incentivise greater activity (Keep, 2018 and 2019). Far from stepping up the plate, employers have been doing less and less. Between 2011 and 2019 the real term fall in employers' spending on workforce training per employee was 11 per cent (NAO, 2022) – from £1,710 in 2011 to £1,530 in 2019, and the average number of days an employee spends in training each year fell by 18 per cent (from 7.8 days to 6.4 days) between 2011 and 2017 (Li, Valero, and Ventura, 2020). According to figures provided by Evans (2022):

Employers invested £42 billion (including the wage costs of those on training) in skills in 2019, roughly the same in real terms as in 2005. However, there are 3.5 million more people in work. This means training investment per employee fell 28%, from £2,139 to £1,530.

(Evans, 2022: 7)

To put this in context the EU average of investment in training per employee is now about double that of the UK (Evans, 2022: 7). Finally, in 2019 the government's Employers Skill Survey (ESS) found that 39 per cent of employers had provided no training whatsoever to any of their employees in the preceding 12 months.

This picture is confirmed by research undertaken by Emsi and the City and Guilds Group (City and Guilds is a major UK vocational qualification awarding body). The research was based on a poll of 5,000 working-age people across the UK, which aimed to gather data on attitudes to work and re-skilling, and to map the formal education and workplace training that the individuals had received. The results were alarming. Just under a third (33 per cent) of people stated they had received workplace training in the last 6 months. However, 8 per cent of respondents reported that they had not received any training in at least five years, 11 per cent had not received any training for over a decade and 15 per cent of people stated that they had never received any workplace training during their working lives (2020; 39). The chief executive of the City and Guilds Group noted that:

Our research found that almost half of respondents (47%) had not taken part in any workplace training in the last three years, whilst over a quarter (26%) had not had any training for at least a decade. We found that part-time workers, those aged 55 and over, and those from lower socio-economic groups were disproportionately affected by this lack of training investment. We also saw a clear London versus the rest of the UK divide in terms of levels of training and job opportunities available, with those living in the capital much better placed to meet the demands of the future workplace.

(Emsi/City and Guilds Group, 2020: 5)

A second and related problem centres on the fact that the rights, roles and responsibilities of employers in relation to skill formation have remained unclear since the early 1980s (Gleeson and Keep 2004; Keep, 2009a; Keep 2012 & 2020). There have been attempts to try to define employers' responsibilities, for example, the Dearing Review of higher education (National Committee of Inquiry into Higher Education, 1997) proposed the development of a compact between government, students and employers to pay for HE (which was quietly ditched by government), while the government-sponsored National Skills Task Force (2000) and the Leitch Review of Skills (2006) both set out proposed definitions of employers broader responsibilities for funding and providing training, but these were swiftly abandoned by government when employers declined to follow them (Keep 2006a & 2012). As a result, in England it remains the case that it is not possible to find any answer to the fundamental

question – what elements or aspects of initial or adult training are employers expected to contribute to, in what manner, and via what mechanisms?

Moreover, at present the government has no general policies that seek to engage with or exert leverage upon employer investment in skills, except for the apprenticeship levy. The main thrust of the government's approach to employers is to make the E&T system more 'employer-led', but all that this means is that the publicly funded system is meant to become more responsive to employer's demands for different types, levels and volumes of skills rather than employers investing more or conducting more training themselves. As the National Audit Office argue:

The Department for Education's (DfE's) overarching philosophy is to put employers at the heart of the skills system, specifically by giving them a central role in identifying local and national skills needs, and in developing and designing qualifications and training.

(NAO, 2022: 42)

The most visible elements of this approach are the new Local Skills Improvement Partnerships (LSIPs), which are being granted statutory status and being rolled out across England. The LSIP are local rather than sectorally-based organisations and offer local employer representative bodies (usually a chamber of commerce) two things. The first is a modest amount of government funding to conduct local skill need assessments. The second is the power to present to and then discuss with local Further Education colleges and Universities the 'skill demands' indicated by the assessments. Colleges will have a legal duty to try to respond to these demands insofar as they are able, and government funding, performance management and inspection regimes will seek to put pressure on colleges to deliver what employers have requested.

Thus, notions of 'employer-led' and 'employer leadership' are about enhancing the power of employers as external consumers of the outputs of the E&T system, rather than boosting their role as producers or co-producers of skill within that system. As the NAO's commentary on current policy puts it: "Government knows that employers' spending on workforce training has fallen...but has not made clear to what extent it is seeking to influence employers to invest more in developing the skills of their own workforces" (NAO, 2022: 47)

The NAO's overall judgement of approaches to employer engagement as they currently stand is that:

DfE is staking its success on a more employer-led system but, from the evidence we have seen, it is unclear whether the conditions are in place for this to be implemented successfully, in particular whether employers are ready to engage to the extent that will be needed to achieve a step-change in performance. As a result, there is a risk that, despite government's greater activity and good intent, its approach may be no more successful than previous interventions in supporting workforce skills development

NAO, 2022: 14

Elsewhere within the government, the Treasury is aware that all is not well with the contribution that employers are making to skills investment (NAO, 2022) and the then-Chancellor of the Exchequer in his 2022 'Spring Statement' announced that the government would be reviewing incentives that might help boost employer spending (Sunak, 2022). Whether this review will proceed, and what form any new incentives might take under the new government remains to be seen.

Given this backdrop, it will be interesting to see how and to what extent the new Digital Skills Council is able to mobilise employer action and investment. One of its stated objectives is to encourage employers to: “invest in employer-led digital upskilling of the existing workforce. The Government will support industry partners to explore incentive and recognition schemes, to promote employer-led training” (DCMS, 2022: 38).

*Individual investment rides to the rescue?* As the volume of both public and employer investment available to fund adult E&T have been constrained, the state has been forced to seek to shift more and more responsibility onto individuals, for example through an increasing reliance on funding adult re- and upskilling via student loans. The prime example is the Lifetime Loan Entitlement, which, as has been explained above is due to start operation in 2025.

The assumption by government is that individuals will be keen to avail themselves of these loans, but the evidence from the existing Advanced Learner Loans which were introduced to pay for previously free or heavily subsidised level 3 (upper-secondary equivalent) vocational courses for adults, is that their introduction witnessed a substantial and sustained fall in the number of learners pursuing courses (IFF Research, 2018). Government-commissioned evaluation showed that following the introduction of loans student numbers fell sharply – from 142,000 in 2012/13 to 94,000 in 2014/15. More recent figures continue to show a decline, although the disruption to learning caused by the Covid pandemic means that the figures that follow should be treated with caution. According to Student Loan Company (SLC) statistics:

Year 2019/20 the number of ALL learners starting a course was 57,500

Year 2020/21 the number of ALL learners starting a course was 51,000

Year 2021/22 the number of ALL learners starting courses was 40,500

SOURCE: SLC, 2022

More broadly, given the lack of real terms wage rises for many employees since 2008, and the fall in real earnings for some (RS/CEP, 2022) that is now being exacerbated by massive leaps in the cost of energy and a squeeze on household budgets, the expectation that individuals will be willing or able to foot the costs of re- or upskilling, either directly or through loans, may prove to be misplaced. The available research evidence indicates that individuals with constrained financial resources are often loath to borrow (see Keep, 2009b for an overview of this issue). There is thus reason to doubt that individual investment will prove to be the panacea that some in government currently hope.

*Implications for digital skills.* In terms of points at which constraints on public and private investment in skills may hinder attempts to tackle digital skill needs, the Digital Strategy identifies major challenges that need, at least in part, to be addressed by employer investment and action. For example, as Lloyds Bank (2021) underlines, there are more than 11 million adults who are capable of going online but lack the essential basic digital skills for work. DCMS term this the ‘hidden middle’ (between the digitally excluded and those with advanced digital skills), and observe that “upskilling the ‘hidden middle’ requires a significant commitment from employers, individuals, third sector organisations and the Government” (DCMS, 2022: 36).

Leaving aside the adequacy of current government plans and spending allocations to this task, as has already been noted the willingness and ability of employers to step up to the plate is likely to prove to be a major stumbling block to progress. At aggregate level the UK government already knows that it faces a major challenge in relation to employers’ investment in the skills of the adult workforce (Clayton and Evans, 2021; Evans, 2022). Within this overall trend, different kinds of worker are exposed to greater risk of not being trained – mainly older workers, those who are less well-qualified, and those from some ethnic minorities (Clayton and Evans, 2021). We also know that those working in certain sectors (such as retail and wholesale) and for certain types of employers – smaller firms and less profitable ones - are

less likely to receive any training from their employer (see Clayton and Evans, 2021; and Evans, 2022).

In relation to digitalisation, the danger is that in sectors where low pay and/or low qualification levels are prevalent in the workforce, and also for older workers more generally re- and upskilling to meet changing patterns of work and the new skill requirements established by the deployment of digital technologies will be patchy and often inadequate. The Industrial Strategy Council predicted that by 2030:

The most widespread under-skilling is likely to be in basic digital skills; which are likely to look increasingly advanced, compared to what we might consider 'basic' to look like at present. In total, 5 million workers could become acutely under-skilled in basic digital skills by 2030, with up to two-thirds of the workforce facing some level of under-skilling.

(ISC, 2019: 4)

The Industrial Strategy Council went on to conclude that:

Participation in training has remained flat at best, part of the reason is low levels of both government and employer investment in adult training. There are a number of policies targeting areas where a skills mismatch could occur, but existing commitments do not look to be sufficient in scale to address the skills gaps predicted.....The scale and type of skills shortfall anticipated, cannot be addressed through formal education outside of the workplace alone. An urgent shift to a new norm of lifelong learning in the UK workforce is required. Employers, government and individuals will all have a role to play in reskilling and upskilling the existing workforce.(ISC, 2019: 4)

In the medium to long-term this situation poses an existential threat to UK Government's skills policies, both in general and specifically in relation to digital skills. Employers are doing less and less and expecting the state to do more – what could arguably be seen as a form of 'welfare dependency' on the part of firms (Keep, 2006 & 2020). For the foreseeable future public spending is liable to be highly constrained and it is also unlikely that individuals can (or indeed should) fill the gap left by employer retreat, particularly as challenges such as the move to Net Zero and the impacts of digitalisation spread across the economy and the labour market.

### **Labour Market Intelligence**

As previously noted, ascertaining the scale and nature of the digital skills challenge at a level of spatial, sectoral and occupational granularity that will enable effective responses by the E&T system and the individual providers within it is important. For the E&T system to function effectively a number of different, but related sets of labour market information/intelligence (LMI) are required. To simplify, there are two key types of information that will be needed.

The first set relates to the nature, intensity and level of new skill needs. In some cases, this means new skills to undertake entirely new job roles. In others it means that the shape of existing occupations will shift and that some old skill requirements may vanish and be replaced by new ones that relate to the usage of digital technologies. Those designing qualifications, curricula, and pedagogies to deliver these skills need to know a considerable amount about what specific skills and knowledge will be needed, and at what level (from basic to doctoral).

The second set of information requirements relate to the scale/volume of demand for these skills in terms of where (across the UK and different sectors and occupations in the labour force), and when the requirements will emerge. Without a reasonable level of accuracy on these points, the planning of provision is rendered highly problematic. Unfortunately, at present the ability of the UK government to monitor the pace and shape of the uptake and usage of digital technologies is very weak. As the Institute for the Future of Work observes: “Currently, there are no nationwide statistics on technology adoption available, and there is very little data on how automation technologies are changing access to, and the nature and conditions of, work across the UK” (Institute for the Future of Work, 2022: 7).

The DfE’s response to the need for more and better LMI has been the announcement of the creation of a Unit for Future Skills (UFS). The Unit for Future Skills (UFS) looks likely to combine very traditional techniques – economic modelling of occupational change, and use of large-scale survey data from government-commissioned surveys – with some newer approaches such as the use of combined sources of administrative data (for example the Longitudinal Educational Outcomes [LEO] data which combines income tax records with learner/student numbers to provide very detailed information on the wage premia attached to obtaining particular types and levels of qualification). The UFS has also indicated that it will investigate the utility of greater use of data obtained from web-scraping job advertisements, and that it is investing considerable store in the development of a UK-specific skills taxonomy of the type offered by O’NET in the USA.

There are two observations that can be made about the UFS’s plans. The first is that they place limited emphasis upon information from employers about future skill need, in part because the vast bulk of UK employers have a long track record of failing to undertake workforce planning or skills forecasting. This is a significant weakness particularly as new skill needs pertain to the effects of changing workplace practices.

The second point on the UFS’s plans is that they do not seem likely to encompass the kind of observational workplace studies overseen in Germany by the Federal Institute for Vocational Education and Training (BiBB). BiBB has undertaken a set of 16 sectoral/occupational case studies, looking in detail at the impact of digitalisation on work, skills and qualification requirements (see Conein and Shad-Dankwart, 2019; and Bretschneider, 2019). In the medium term this absence represents a major problem. Knowing what is happening in the tech sector and in tech-focused jobs is important, but so too is detailed information on how digitalisation is changing the structure of work, jobs and skills that are not predominantly tech-focused. As has been previously noted, how extensively and to what ends digital technologies are introduced into and deployed within different workplaces is not predetermined by the technology itself, and very different models of digitalisation are possible with correspondingly divergent implications for skill requirements. This reality makes it essential that a detailed picture of the rollout of digital technologies across different sectors and sizes of workplace is available. Without reasonably granular knowledge of the changes in job content and skill requirements that are occurring across the broader labour market, the E&T system will not be able to update and re-focus qualifications and curricula for non-tech jobs in ways that reflect changing need.

It will be interesting to see how the UFS develops, and what its focus on digital skills will be. It will also be important to see in what ways and how far its battery of LMI research techniques and sources of data evolve to meet demands for more granular information.

### **The responsiveness of E&T curricula and qualifications**

As noted above, faced with significant technological change and its impacts on occupational structures and workplace practices, an essential component of any E&T response to digitalisation is the ability of those who design and set the curriculum and assessment system



to adjust their offerings to take account of these changes in a timely manner. Three sets of problems are apparent.

*Setting new qualification standards.* The first relates to setting of qualification standards and specifications, including the course of study, topics to be covered and the broader curriculum offer required in order to respond to the evolving effects of digitalisation. As noted earlier, to date the overall pace, and the scale and shape of the workplace implications of digital adoption vary considerably across sectors and within sectors and occupations. This is likely to make the design of qualifications tricky, as there will be a need to achieve an acceptable compromise between the needs and ambitions of leading and trailing edge employers, especially in sectors that have large numbers of smaller and less-profitable firms, such as retail, catering, leisure, and social care. This long-standing problem might be termed the ‘Shadbolt dilemma’ (after the 2016 UK government-commissioned report on computer science degrees, headed by Professor Nigel Shadbolt) which noted that some employers wanted computer science graduates who were fully conversant with the latest coding languages, were job ready and would ‘hit the ground running’ when recruited into the workplace, whereas others were much less concerned with these requirements, and wanted well-rounded individuals who could see the wider potential of digital technologies and communicate with non-technical specialists. Accommodating both demands within degree programmes was seen as problematic (Shadbolt Review, 2016; see also Keep, 2018 for a fuller discussion of this point).

At a broader level, as James Relly et al (2022) note in relation to net zero’s implications for skills, the overwhelming preponderance of discussion on green skill needs tends to centre on initial E&T and on a fairly narrow focus upon technical skills rather than on any wider changes in the nature of the work tasks and the structure of the occupation and its practices as a result of change (2022: 17). This approach reflects a long tradition in UK vocational E&T of qualifications that tend to be built on narrow models of skills, knowledge and their application in workplace settings – often far narrower than those found elsewhere in Europe (Brockmann, Clarke and Winch, 2011). There is a danger that the same issues will emerge in relation to digitalisation, and that rather than a polyvalent, broadly skilled workforce we will get one that is trained to execute today’s tasks with limited capacity to support subsequent change, adaption and growth.

These considerations often surface when a new qualification is being designed, but it is important to recognise that they are also liable to be present when existing qualification and assessment specifications are revisited and revised. This brings us to the next area for concern.

*Adjusting and updating qualifications.* There are questions about the ability of the qualifications system to update its offerings with sufficient speed. Digital technologies are fast-moving, and this has implications for keeping qualifications up to date, both for awards aimed squarely at digital occupations, and also for the digitally-related components of offerings for jobs that are not specifically labelled as digital. As one training provider observed:

There seems to be a miss-match...you look at some of the qualifications, they haven’t been updated for eight years and the tech’s moving on rapidly, rapidly. We’ve already got employers with the original cyber apprenticeships that are telling us they’re out of date because the technology has moved on in three years.

(Worldskills UK/LWI/Enginuity, 2022: 33)

The mechanisms to respond to this challenge are varied and differ with the level/type of qualification involved. In the main, the existing feedback loops can be argued to work reasonably well in universities, where vocational and science and technology departments usually have a good understanding of changing practice in the sector/industry/occupation that

they work with. One good example is legal education. Different law schools are doing different things but there is a clear response to AI which is often tailored to meet the varied needs of different segments/tiers of the legal labour market (Janecek, Williams and Keep, 2021; Williams, Keep and Janecek, 2021; Thanaraj and Gledhill, 2022).

It is much less clear how further education colleges and other vocational E&T providers respond as they are usually not able to set its own curriculum and assessment standards – these are determined by IfATE and the qualification Awarding Organisations (AOs), and the capacity of either to capture and then respond to technologically-induced change is open to question. At present there are about 140 AOs, although not all of these make vocational awards. The problem is that while the larger AOs and those that specialise in particular vocational routes (e.g. childcare) have the resources and employer contacts to keep abreast of technologically-driven change, it is open to doubt if some of the smaller AOs will have the capacity to cope.

When it comes to IfATE, how well it will encourage and support the Trailblazer groups of employers to update T level and apprenticeship standards, and how well the AOs that use these standards to create T levels and apprenticeship awards and to devise other vocational qualifications, remains to be seen. In some countries that have high quality apprenticeship systems, the institutional mechanisms to accomplish forge feedback loops between evolving leading edge workplace practice and the regular updating of vocational curricula are already in place and operating effectively (see, for the case of Switzerland, Rupiotta and Bakes-Gellner, 2019). This is relatively rare in England.

*Changing labour market, changing E&T offer?* A third set of issues arises in relation to the degree to which qualifications design and the shape and scale of E&T provision are capable of responding to the medium to longer-term impacts of digitalisation on levels of employment in particular occupations, and the changing nature of entry-level positions in those occupations and sectors. As previously noted, the UK government is currently expending considerable sums of money and a great deal of public policy energy on superintending the construction and rollout of a set of new level 3 (upper secondary) technical qualifications – T levels – which will replace existing initial vocational qualifications for a significant number, though not all, occupations. The original intention, now somewhat modified, was that T levels were to lead into work rather than higher education.

The T level standards that are used by awarding bodies to set the detailed course content and assessment regimes, have been constructed by self-nominating consortia of employers (Trailblazer Groups), supervised by IfATE. Some of the T level standards and occupational pathways within them look liable to run into structural occupational change caused by digitalisation, as well as competition for entry level job opportunities with those completing university degrees. The potential for such problems appear particularly acute in areas such as business administration and marketing, and paralegal studies, where the likelihood of digitalisation reducing the number of intermediate-skilled routine job openings looks relatively strong, and where such job openings do continue to exist they may both be different from what is currently the norm (in terms of roles, tasks and skills) and hotly contested for by graduates from lower tier business and law schools.

## **FINAL THOUGHTS AND LESSONS**

The preceding section has explored a number of challenges that face official plans. Looking across digital policy a number of problems are clear. The first is that digitalisation as a policy issue has remained a relatively low key one in the UK and without attention the willingness and ability of policy makers to invest political capital in confronting the skills issues it throws up has been muted at best. In this regard, it is problematic that the lead government department (DCMS) is relatively small and possesses a limited budget.

Furthermore, in the UK policy sphere, in overall terms vocational skill is not an area of particularly high priority at present, not least because the various economic problems outlined above tend to create pressures for attention to be directed at debates about the short-term amelioration of their effects on different sections of the economy and society. Insofar as educational and skills issues do grab political attention, it tends to be around the school system and higher education (particularly access to degree education, the size of the student population and how best to fund provision).

It is also the case that in UK media coverage of skills issues is much smaller scale than can be found in some other developed countries. A research project by Ng (2022) for Singapore's Skills Future agency used big data analysis of 'skills narratives' in a range of media across 20 developed countries, including Singapore, New Zealand, Australia, Ireland, the UK, India, Japan, the USA and Canada, to investigate the scale and nature of media attention to skills issues. Top in terms of volume of coverage were Ireland and New Zealand, with Singapore not far behind. Trailing near the bottom of the rankings was the UK, with a very much lower volume of 'conversation'. In the author's experience, within this limited volume of coverage, the bulk tends to focus on access to various forms of academic education (particularly university), the cost of the student loans system to the state and individuals, concerns about the quality of schooling, arguments about what should be taught within the curriculum, concerns about the fairness of the public examinations system, and the impacts of social class and economic deprivation on the achievements of some sections of the population. Coverage of vocational education outside of higher education is very limited in the mass media (national newspapers, radio and television) and little attention is focused on the linkages between the economy (current and future), the labour market and skills except for perennial cries from employers about actual, perceived and prospective 'skill shortages'.

There has also been limited public debate or policy enquiries about digitalisation and the vast bulk of what has occurred has been focused rather unprofitably on the 'will robots eat our jobs?' question – in other words, its potential impacts on future levels of employment. Thinking about and coverage of the wider skills implications of digitalisation has been surprisingly small in volume, and to some extent has existed in the shadow of a slightly greater policy focus on the skill demands thrown up by moves towards Net Zero. In part, this reflects the dictum that in the UK government targets concentrate political and administrative attention (Keep, 2006a), and given the demanding nature of the Net Zero transition targets this has meant that there has been a concerted effort to try to start to gauge the scale and nature of the skill needs that will be associated with the shift to low/no carbon technologies and energy supplies, at national, industry sector and local levels particularly in localities, such as Teesside, which are aiming to become green energy 'hubs', and in sectors like construction where the need to change what is being delivered are obvious and immediate. By contrast, there are far fewer time-linked/critical government targets relating to digitalisation and digital adoption, and fewer still that relate to digital skills.

A second problem is the nature of the UK policy process about skills more generally. As the author has argued previously (Keep, 2006a & 2009a) policy debates and policy responses thereunto have remained heavily 'imprinted' and focused upon a set of cycles of concern and associated waves of reform that are by now embedded in the assumptive universe and traditions of the policy community. In other words, a great deal of attention and effort is expended on making yet another attempt at resolving persistent long-standing weaknesses and failures. Two examples are offered here. First, there is the fact that despite repeated reforms over the last 30 years or more, there has been little success in closing the educational attainment gaps between those from more and less advantaged backgrounds, and also very little if any improvement in literacy skills across the generations (see Farquharson, McNally and Tahir, 2022 for details).

The second example of repeated policy failure is rather closer to the focus of this paper and concerns the role of employers. Trying to get employers to become more engaged with the skills system has been a long-standing policy goal and governments have tried a variety of

means to achieve this (Keep, 2018 & 2020), but as has been outlined above the desired goal remains as elusive as ever. This is important because, unless and until the rights, roles and responsibilities of employers in relation to training and developing the workforce are agreed between employers and government and between different groups of employers, it is extremely hard to forge plans to address skill shortages and potential bottlenecks that go beyond the action and spending power of the state alone. In this regard, the absence of a long-established and powerful set of bodies to represent employers at sectoral level on skills issues and to coordinate and concert collective action on the skills agenda is a contributory weakness.

The inability to nail down what contribution employers can be expected to make to funding skill creation has several knock-on effects. First, it means that when the government launches new initiatives, particularly in relation to adult training, there is no certainty as to the degree of employer buy-in and contribution to the plans. Student loans fill gaps left by constrained state finances and employer retreat, but they may not achieve the level of take-up that is intended and they may not be sustainable if income-contingent loan repayment by students falls short of the desired target levels.

On top of this needs to be added problems that relate to policy churn and institutional instability. Most UK government skills policy and many of the programmes and institutional arrangements that are meant to deliver policy, are transitory in nature, as indeed are wider economic policies. What is here today will probably be gone tomorrow. As numerous commentators have observed, this militates against a long-term focus and policy programmes that require time and stability to deliver results (Keep, 2006a & 2009a; Norris and Adam, 2017; Slater, 2022).

Finally, there is the issue of governmental capacity (Keep, 2021). One of the themes that runs through this paper is that the UK government faces multiple challenges and its capacity to address those being thrown up by digitalisation is constrained – by competing demands from other policy areas; fragmented structures; underlying ideological assumptions that limit policy choices; short time horizons; and by the legacy of a set of unresolved issues to do with the design, operation, management and funding of the E&T system at large. Thus, the overarching lesson to be gleaned from the case of England is that systemic policy capacity really matters and countries that try to confront digitalisation, alongside the myriad of other contemporary E&T problems, are more likely to succeed if they have already built up such capacity. This is because digitalisation generates a set of impacts and challenges across the whole economy and a broad range of policy areas, and this means that a digital skills strategy needs to be broadly focused, and its interactions and interfaces with other policy areas (such as economic development and industrial strategies) need to be thought through and coordinated. Countries where policy making takes place in relatively tightly-constrained and compartmentalised ways, with limited interaction between different strands of government activity, will struggle to design and deliver what is required. Capacity in this context means, for example:

- the ability to mobilise and concert action by a range of actors, and mediate between competing interests and demands for resources;
- the ability to secure legitimacy for decisions taken;
- the ability to organise and deliver appropriately focused E&T activities and outcomes;
- the ability to commission and utilise research and evaluation of all kinds;
- the ability to maintain feedback loops between those who actually deliver E&T and those who superintend policy formation;
- and to be adaptive and respond to change and renew itself to meet current circumstances, rather than follow lines of path dependency.

*Other lessons.* In terms of other lessons to be gleaned from England, the following are apparent:

1. The potential ubiquity of digital technologies, the variety of ends to which they can be put, and the lack of a simple ability to read across from their introduction to an inevitable and predictable impact on workforce skills means that a considerable amount of effort and resource needs to be invested in tracking developments and assessing their implications for different parts of the skills system. Moreover, as digital technologies change and mature, the ways that it is deployed in the workplace may shift, modifying skill requirements as a result. This evolutionary process will need to be carefully monitored.
2. In an economy that encompasses both frontier firms and a long tail of low investing, low performing companies the pace and nature of digital adoption will vary very considerably and may be protracted. This sets up challenges for framing policy responses that will command widespread support and target different kinds and levels of need.
3. In economies that lack a well-developed and effective system of social partnership, particularly in terms of effective employer representative bodies, the capacity to mobilise collective action is likely to be limited and this may well constrain skills responses to digitalisation, especially those focused on workplace training and development.
4. Countries that have extensive forms of inter-firm networking (local and sectoral) and which also possess extensive social partnership arrangements with a tradition of interest in skills and workplace training have a substantial advantage over less well-networked nations. Thus, in dealing with the impacts of digitalisation, Germany possesses resources and opportunities that the UK government does not.

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