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Unlocking the UK's Digital Ambitions

How cloud computing can support
growth in the UK's digital economy



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PUBLICFIRST 

Public First is a global strategic consultancy that works to help organisations better understand public opinion, analyse economic trends, and craft new policy proposals. While Amazon Web Services (AWS) commissioned this report from Public First, all economic estimates are derived from official, third-party and proprietary information.

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- Digital technology is one of the most important drivers of economic growth, higher living standards, and increased sustainability. Since the 1980s, Information and Communication Technology (ICT) has been responsible for around 40% of the UK's growth.¹
- **In total, we estimate that digital technology could create over £413 billion in additional value for the UK economy by 2030.**² That is the equivalent of around 19% of the entire UK economy – or bigger than the entire regional economy of the South East of England.
- The Government's Digital Strategy 2022 recognises this, asserting that the "UK's economic future, jobs, wage levels, prosperity, national security, cost of living, productivity, ability to compete globally, and our geo-political standing in the world" are all reliant on "continued and growing success in digital technology."³
- However, to unlock the full potential of digital technology, our research reveals that we will need to focus on three areas: (i) encouraging greater adoption of digital tools; (ii) strengthening digital skills; and (iii) continuing to invest in digital infrastructure.

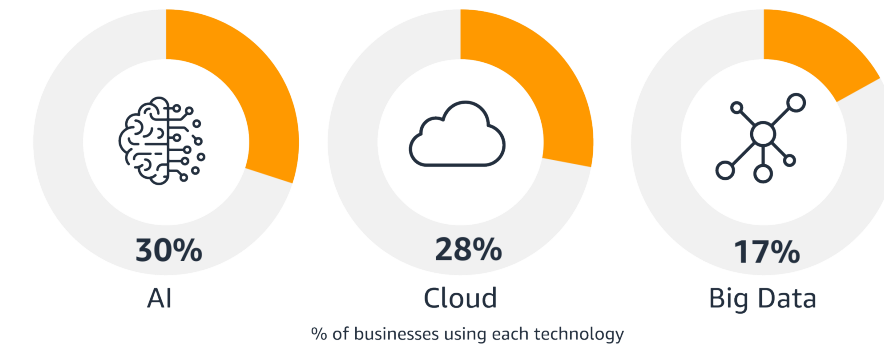
Digital technology could create over
£413 billion
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That is the equivalent of around
19%
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Adoption

There is still a long tail of UK businesses who are yet to capitalise on digital technologies



- Businesses of all sizes benefit from digital services and tools such as cloud computing. However, there is still a long tail of UK businesses who are yet to capitalise on these technologies, and who – with the right support – would gain from increased digital adoption.
- Over half of UK businesses (54%) agree that digital technology has become increasingly important over the last five years. This rises even higher when talking to large companies with over 250 employees – of which 86% believe that technology is more important now than it was five years ago.
- Highly digitally intensive businesses are confident about the importance of technology; nearly two thirds (59%) agree that technology could make a difference to their operations over the next five years.⁴
- Companies that use business organisational tools such as Customer Relationship Management (CRM), Enterprise Resource Planning (ERP) or Supply Chain Management (SCM) see a productivity boost of around 25% - and are more likely to have experienced growth than the business population as a whole.⁵
- Running these tools on the cloud further increases productivity. In the UK, Amazon Web Services' (AWS) cloud solutions are increasingly helping new business organisational tools scale in order to serve the global market – indirectly supporting the productivity of millions of small businesses who use accounting, web hosting or CRM software that run on AWS.
- Nevertheless, lack of awareness of the role that technology can play in advancing a business' productivity was a key reason for low digital adoption. Over a third of the least digitally intensive businesses (40%) said that they did not know what difference greater use of digital technology would make to their operations.

¹ Public First estimate, based on Conference Board data on average Gross Domestic Product (GDP) impact of Information and Communications Technology (ICT) capital and Organisation for economic Co-operation and Development (OECD) data on proportion of Total Factor Productivity (TFP) that is attributable to Information Technology (IT).

² Measured in Gross Value Added (GVA), which is equivalent to the value created by the private sector.

³ <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>

⁴ We gave each business a score of 1-12 for digital intensity, based on the European Union's 2020 digital intensity index. Businesses are given 1 point for each of the following: more than 50% of persons employed having access to the internet for business purposes, employment of ICT specialists; fast broadband (30 Mbps or above); providing more than 20% of persons employed with a portable device allowing mobile internet connections; having a website; a website has sophisticated functionalities (at least one of: description of goods or services, price lists; possibility for visitors to customise or design online goods or services; tracking or status of orders placed; personalised content in the website for regular/ recurrent visitors); use of 3D printing; buying medium-high cloud computing services; sending invoices suitable for automated processing; use of industrial or service robots; having ecommerce sales accounting for at least 1% of total turnover; analysing big data internally from any data source or externally.

⁵ <https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/informationandcommunicationtechnologyintensityandproductivity/2018-10-05>

Skills

Digital skills were seen as important or essential by 82% of businesses, rising to 97% for digitally intensive businesses



97%

- Increasing the availability of advanced digital skills (such as programming and coding) in the UK will allow businesses to take greater advantage of digital technologies. This can be achieved by boosting the number of specialists, as well as improving the digital skills of the average worker.
- Digital skills were seen as important or essential by 82% of businesses, rising to 97% for digitally intensive businesses. In fact, digital skills are increasingly more desirable than other formal qualifications. 46% of businesses deem intermediate digital skills (such as creating a website) as important; but only 28% of businesses say the same for university degrees.
- Almost two thirds (57%) of the most digitally intensive businesses have found it difficult to find staff with good digital skills. At the same time, those businesses said that a shortage of digital skills had slowed growth (62%) and increased costs (63%).
- However, most individuals have not received formal digital training and are instead self-taught. 52% of respondents had developed their skills through trial and error, closely followed by 44% who have learnt through their own research.
- A third of employees (32%) spend over 15 minutes a day trying to understand how to do something on their computer. By one estimate, over 40% of workers who use office software daily do not have sufficient skills to use it effectively. ⁶

Infrastructure



92% of cloud users feel confident that their data is secure in the cloud

- Digital infrastructure such as high-speed connectivity and cloud computing continue to be fundamental to supporting wider digital transformation. Over the next decade, low latency and edge technologies will become increasingly important to enable new workflows for advanced manufacturing, smart networks, and autonomous transport.
- Cloud users see clear benefits from the technology. 80% of businesses using cloud computing agreed that it has made it easier for their business to compete with bigger enterprises, and 67% agreed that the costs of starting a business had reduced substantially because of cloud computing.
- Cloud computing also offers secure and reliable digital infrastructure. 92% of cloud users feel confident that their data is secure in the cloud. A further 45% of respondents said they would find it difficult to store data securely without cloud services.
- In the next decade, virtualised infrastructure and low latency applications – optimised to process a very high volume of data with minimal delay – will require edge computing nodes to complement the cloud, bringing computing power closer to the end user.



Foreword

Foreword

This year, the UK Government published its Digital Strategy 2022. At the heart of this strategy is a mission to strengthen the country's position as a "Global Science and Tech Superpower", and to encourage investment and innovation so that the UK can further compete on a global stage.

There are signs of progress. The UK has more unicorns, and more start-up and scale-up investment, than France and Germany combined, and it is recognised as a world leader in emerging technologies like artificial intelligence (AI), advanced semiconductor design, and quantum computing.⁷

Since 2014, the UK has invested over £2.3 billion into AI technology and it is home to over a third of Europe's AI companies.⁸ The UK has also established a thriving community of quantum start-ups, with over 40 based in the country which have raised over £135 million in venture capital investment so far.⁹ In recent years, the tech sector has grown by around 7% a year and is now estimated to support around three million jobs.¹⁰ It's undeniable that digital technology has transformed businesses and changed our lives, and will only continue to do so.

At AWS, we share this vision, and we commissioned independent consultancy, Public First, to undertake a new study to understand the role that digital technologies – including cloud computing – can play in unlocking UK organisations' digital ambitions.

According to Public First's research, digital technology could create over £413 billion in additional value for the UK economy by 2030. That is the equivalent of around 19% of the entire UK economy – or bigger than the entire regional economy of the South East of England.

The research also revealed that citizens and businesses see digital technology as one of the biggest areas for growth for the country after health, with cloud computing playing an integral role in underpinning the technology stack that will enable the UK's digital future.

However, to unlock the full potential of digital technology in the UK, the research revealed that we need to focus on three key areas:

- **Encouraging greater adoption of digital tools.**
- **Strengthening digital skills.**
- **Continuing to invest in digital infrastructure.**

Since launching the UK AWS Region in December 2016, we have worked consistently with organisations of all sizes, with the aim of democratising access to technology and putting the power of the cloud into the hands of everyone.

We have committed to investing in the UK to create the conditions for organisations in all industries to become global leaders in their use of technology. Earlier this year, we announced that we expect to spend more than £1.8 billion in the next two years building and operating data centres in the UK to meet the growing needs of our customers and to strengthen the UK's digital infrastructure. We will continue to create jobs, skills, and training opportunities across the country, and we will help our customers to do the same.

We know that the UK is full of opportunity, and we are excited by the potential to continue supporting our customers, partners, and citizens across the UK over the years to come. We will continue to push the boundaries of how digital technologies can help our customers and partners to innovate, scale, and grow, and help them to unlock the many opportunities afforded by this digital decade.

Darren Hardman

VP & General Manager, AWS UK & Ireland

⁷ <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>

⁸ <https://www.gov.uk/government/news/new-ten-year-plan-to-make-britain-a-global-ai-superpower>

⁹ <https://www.techuk.org/resource/the-uk-envisioned-as-a-global-leader-in-quantum-post-brex-it-in-new-policy-document.html>

¹⁰ <https://technation.io/report2021>



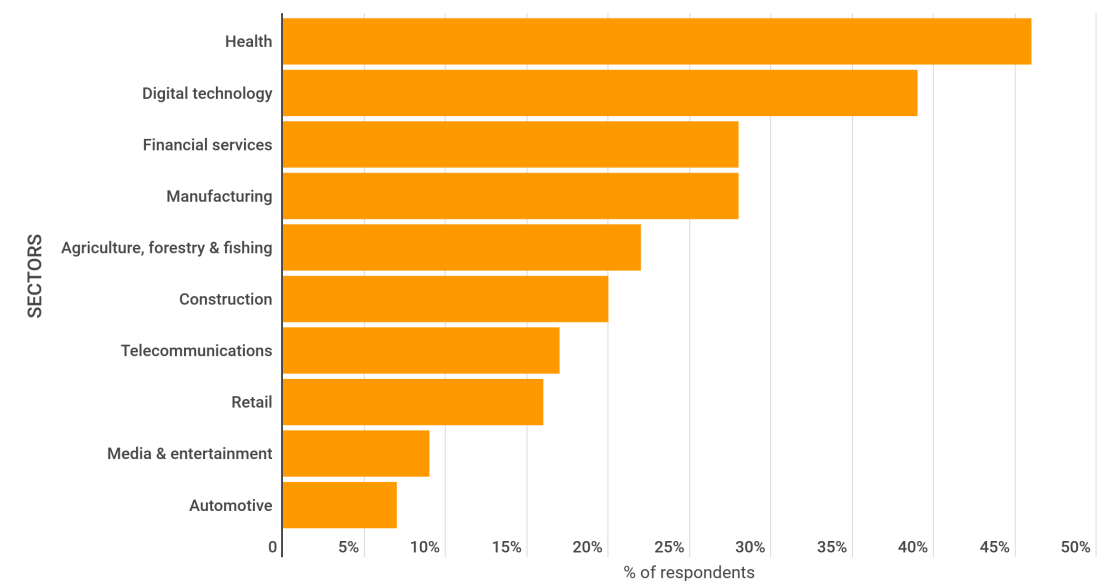
Introduction

Digital technology is one of the most important drivers of economic growth, higher living standards, and increased sustainability. **Since the 1980s, Information and Communication Technology (ICT) has been responsible for around 40% of the UK's growth.**¹¹ Successive technologies such as personal computers, the internet, smartphones, and cloud computing have helped transform the way we live, work, and communicate.

The 2020s look likely to see significant digital progress. While internet prevalence is near universal in advanced economies, there is still potential to deepen and expand the use of digital tools such as ecommerce, social media, and cloud computing. In parallel, technologies that have emerged more recently such as AI, machine learning (ML), and blockchain are likely to become increasingly economically important, and blur the division between virtual and physical worlds.

The UK Government's Digital Strategy 2022 recognises this, asserting that the "UK's economic future, jobs, wage levels, prosperity, national security, cost of living, productivity, ability to compete globally, and our geo-political standing in the world" are all reliant on "continued and growing success in digital technology."¹² Our research shows that the UK public agrees – digital technology was seen as one of the most important sectors for the UK's economy in the next decade, second only to health.

Which, if any, of the following sectors do you think is most likely to be important to your country's economy in the next decade?



11 Public First calculation based on the Total Economy Database, The Conference Board.
12 <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>

AWS commissioned independent consultancy Public First to explore the role cloud computing can play in unlocking the UK's digital ambitions. **In total, we estimate that digital technology could create over £413 billion in additional value for the UK economy by 2030.**¹³ That is the equivalent of around 19% of the entire UK economy – or bigger than the entire regional economy of the South East of England.

However, to unlock the full potential of digital technology, the research revealed that the UK will need to focus on three areas:

- **Encouraging greater adoption of digital tools.** While the UK's tech sector is world-leading, there is opportunity for some organisations to take greater advantage of digital technology, particularly cloud computing.
- **Strengthening digital skills.** The UK will need significantly more people with advanced digital skills to invent, deploy, and support new technologies. However, it is equally important to boost intermediate digital skills across the whole workforce, increasing productivity in day-to-day work.
- **Continuing to invest in digital infrastructure.** Over the next decade, new low latency technologies will become increasingly important to enable new workflows for advanced manufacturing, smart networks or autonomous transport.

13 Measured in Gross Value Added (GVA), which is equivalent to the value created by the private sector.

Sources of data

An umbrella report by Public First, *Unlocking Europe's Digital Potential*,¹⁴ uses the EU's Digital Decade targets for 2030 as a benchmark, and has provided the opportunity to build out a series of deep dives into several European countries.¹⁵

In this UK-focused paper, we used a range of different methods to quantify the economic potential of digital adoption in the UK, and the role of cloud computing within that:

- We ran a new, nationally representative consumer poll reaching 1,009 UK adults, seeking their opinion on a range of issues related to digital technology and skills.
- We ran a new, economically representative business poll, reaching 993 senior decision makers in the UK with an additional dedicated sample of 400 business cloud users who use both infrastructure-as-a-service and platform-as-a-service.
- We ran new literature reviews on the impact of digital technology, skills, cloud computing, and AI on economic growth.
- Based on the data from our polling and the results from our literature reviews, we produced new modelling to separately estimate the impact of increasing the level of basic digital skills, business digital tool adoption, cloud computing, and the use of AI and big data.

To learn more about our modelling approach, please see the [Appendix 1: Methodology](#).

Public First is a member of the Market Research Society. The full tables for all the data used in this report are available to download from our website.¹⁶

While AWS commissioned this report from Public First, all economic estimates are our own.

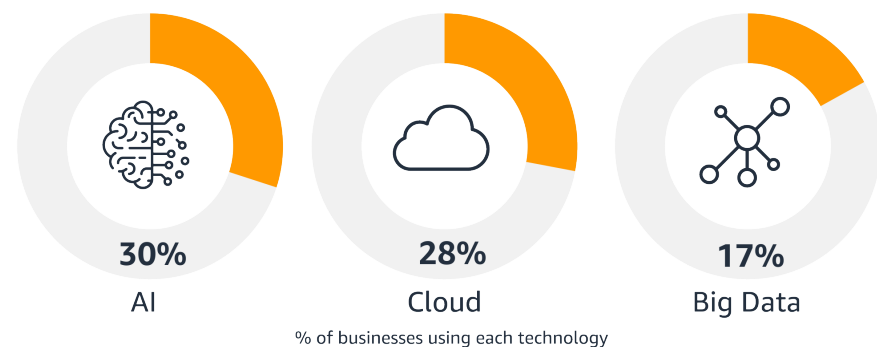
14 <https://awsdigitaldecade.publicfirst.co.uk/>
15 https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
16 <http://awsdigitaldecade.publicfirst.co/wp-content/uploads/Public%20First%20Poll%20for%20AWS%20UK%20%28Business%20Count%29%20Final%20.xlsx> and <http://awsdigitaldecade.publicfirst.co/wp-content/uploads/Public%20First%20Poll%20for%20AWS%20EU%20%28UK%20Consumer%29%20.xlsx>

Adoption



Businesses of all sizes benefit from digital services and tools such as cloud computing. However, there is still a long tail of UK businesses who – with the right support – would gain from increased digital adoption.

There is still a long tail of UK businesses who are yet to capitalise on digital technologies



The importance of digital technology for businesses

The UK is Europe’s largest data market,¹⁷ with more unicorns, and more start-up and scale-up investment, than France and Germany combined.¹⁸ In recent years, the tech sector has grown by around 7% a year and the sector is estimated to support around 3 million jobs.¹⁹

Even more important than the success of the tech sector itself is the potential of digital technology to boost the productivity and growth of the wider UK economy.

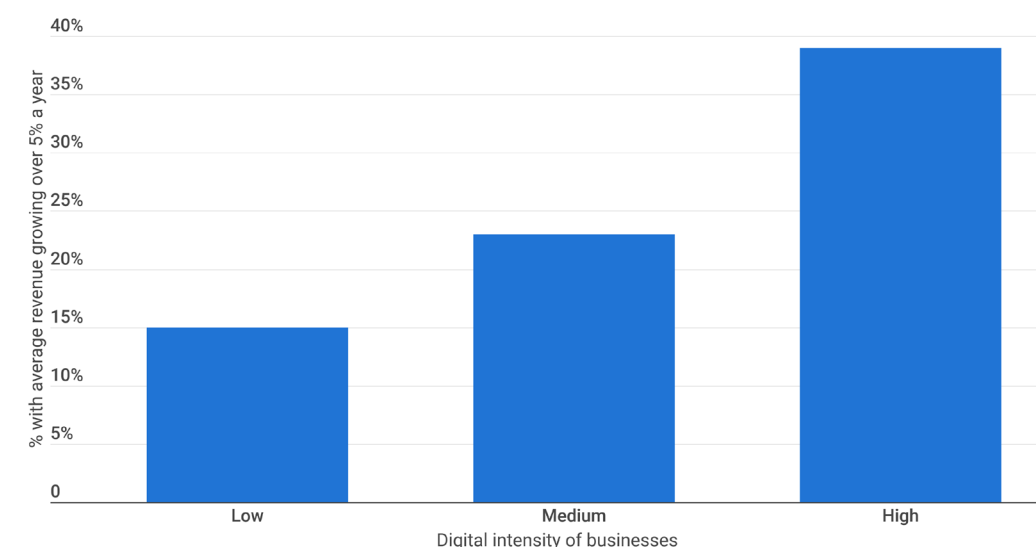
In our business polling, over half of UK businesses (53%) agreed that digital technology has become increasingly important over the last five years. This rises even higher when talking to large companies with over 250 employees – of which 89% believe that technology is more important now than it was five years ago.

The Office for National Statistics (ONS) has estimated that companies that use business organisation tools such as CRM, ERP or SCM see a productivity boost of around 25%.²⁰

Running these tools on the cloud further increases productivity. In the UK, AWS’s cloud solutions are increasingly helping new business organisational tools scale in order to serve the global market – indirectly supporting the productivity of millions of small businesses who use the accounting, web hosting or CRM software than runs on AWS. **AWS customers have reported enjoying an average return on investment (ROI) of £2 in higher revenue or reduced costs, for every £1 spent on AWS cloud services.²¹**

The largest part of our estimate of the economic opportunity comes from the potential of new technologies such as AI or ML, alongside rolling out existing technologies such as CRM or ERP. In our data, we saw that **businesses that used digital tools such as cloud computing, online accounting, ERP, CRM or AI were more likely to have grown revenues by over 5% a year than the business population as a whole (see graph below).**

The percentage of businesses with revenue growing over 5% a year relative to the digital intensity of their operations.



In order to further explore levels of digital adoption across businesses, we gave each business a score of 1-12 for digital intensity based on the number of digital tools they used, and used this to classify their level of overall digital intensity. We classified businesses with a score of lower than 3 as having a low digital intensity; 4-6 as having a medium digital intensity, and above 7 as having a high intensity. Again, we found a clear relationship between the overall level of digital intensity of a business, and recent revenue growth.

17 <https://datalandscape.eu/study-reports/final-study-report-european-data-market-monitoring-tool-key-facts-figures-first-policy>
 18 <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>
 19 <https://technation.io/report2021>
 20 <https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/articles/informationandcommunicationtechnologyintensityandproductivity/2018-10-05>

21 <https://awsimpactreport.publicfirst.co.uk/>

SECTOR DEEP DIVE: FINANCE & INSURANCE

- 45% of respondents from the financial and insurance sector reported their business had grown in 2021.
- Respondents from the financial and insurance sector were more than twice as likely as the average business to employ ICT specialists (42% vs 16%).
- Businesses in the financial and insurance sector were twice as likely to make use of big data analysis compared to the average business (42% vs 17%).

Starling Bank: Breaking the Banking Mould

Starling Bank is an award-winning UK-based digital bank that was born on the cloud.²² Founded in 2014, Starling Bank saw a gap in the market for a business that could combine the convenience of a mobile-first user experience, with the functionality of a fully licensed bank. It was granted a banking licence by the Bank of England in July 2016, and in May 2017, the company launched its first mobile personal current account, followed by the launch of the UK's first digital business bank account in March 2018.

AWS was a natural choice for Starling Bank because it was already accredited by 18 global regulatory bodies, so it was clear to the UK and EU industry regulators that all of the technology used would be secure and compliant as standard. AWS's pay-as-you-use model meant that Starling Bank avoided the heavy capex of an on-premises IT infrastructure, and could scale up or down seamlessly, and the architecture did not need to be created from scratch. The flexibility of the cloud also enabled the company to build a fast, scalable, compliant infrastructure and to release new features for customers every day.

Today, Starling Bank manages £10 billion in deposits. The bank has helped customers to apply for accounts in just minutes, make payments faster, track their spending, and more, all with ease from their mobile devices. The business continues to innovate quickly using the cloud and in response to the COVID-19 pandemic, it supported self-isolating customers by launching mobile cheque deposits and a Connected Card feature that enables customers to let someone they trust make payments on their behalf.

Increasing awareness of digital technology

There remains significant potential to further increase the adoption rates of basic technologies. In our polling we found that:

41%

of businesses **don't use digital tools to track orders or inventory.**

31%

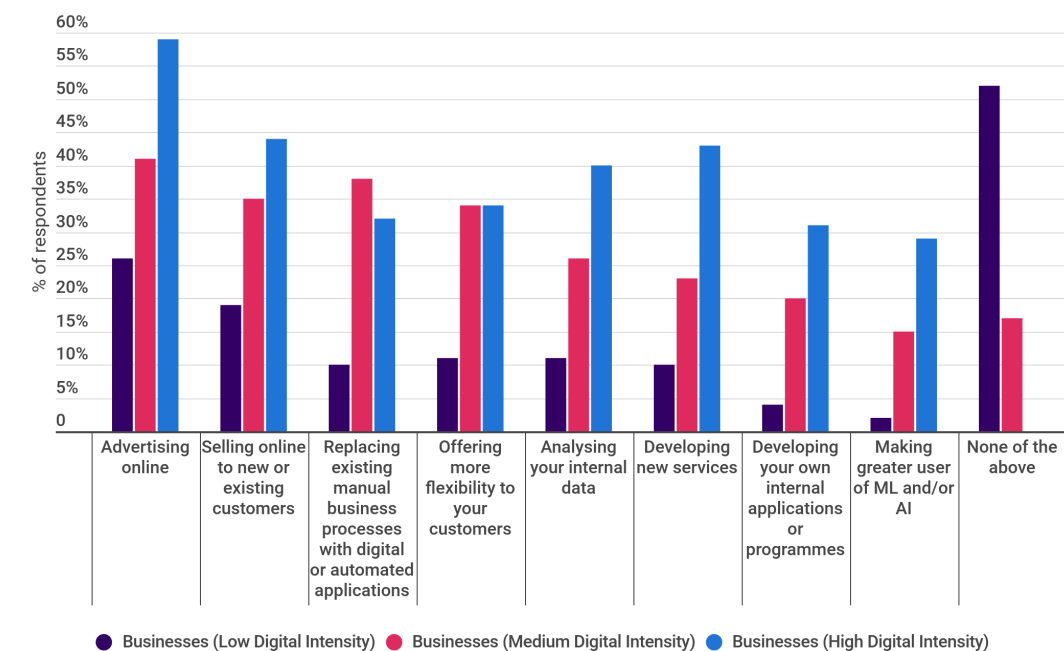
of businesses **don't yet advertise online.**

38%

of businesses **are not using social media.**

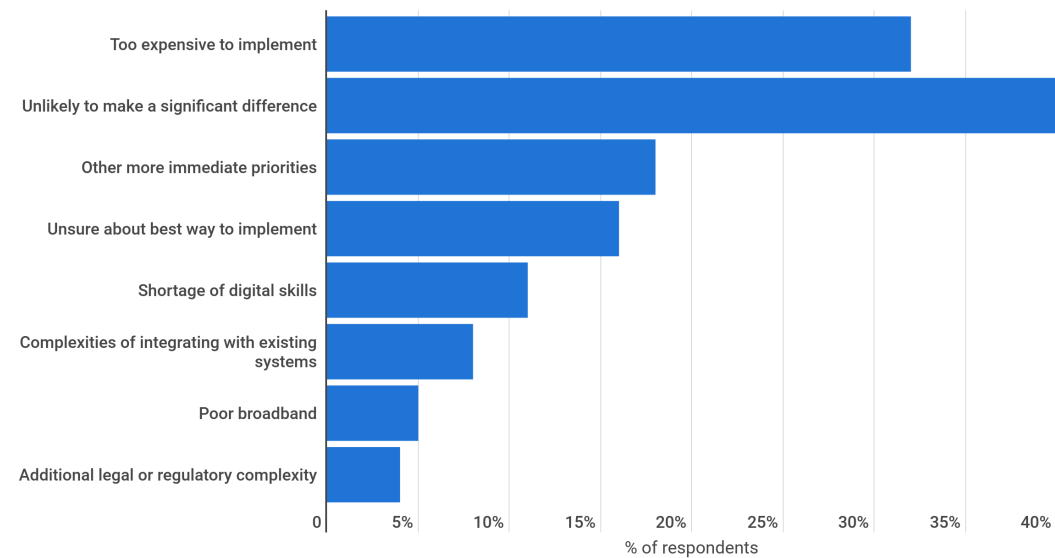
Similarly, we found that only digitally intense businesses were taking advantage of more advanced workflows such as analysing internal data or running their own custom applications.

Where do you think digital technology could have more impact in your business than it does now?



While highly intensive digital businesses are confident about the importance of technology – with nearly two thirds (59%) agreeing that technology could make a difference to their operations over the next five years – just 16% of low intensity digital businesses feel the same way.

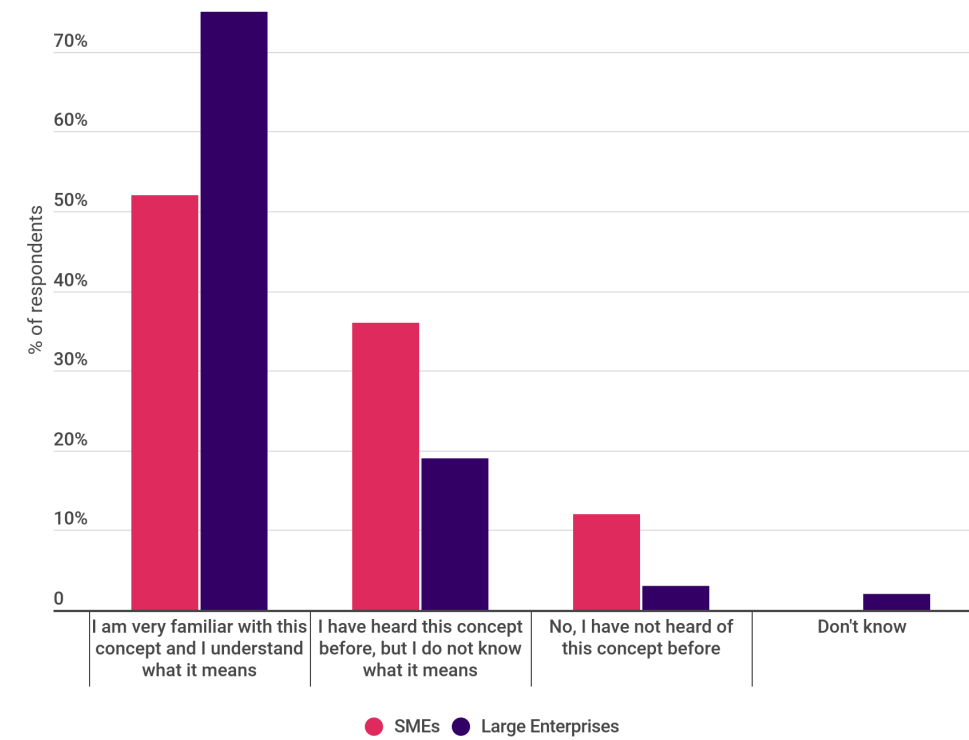
What is preventing low digital intensity businesses from using more digital technology?



Lack of awareness of the role that technology can play in advancing business productivity was a key reason for low digital adoption. Over a third of the least digitally intensive businesses (40%) said that they did not know what difference greater use of digital technology would make. The next biggest perceived barrier was cost, with 32% of low-intensity digital businesses suggesting it was too expensive to implement more digital technology.

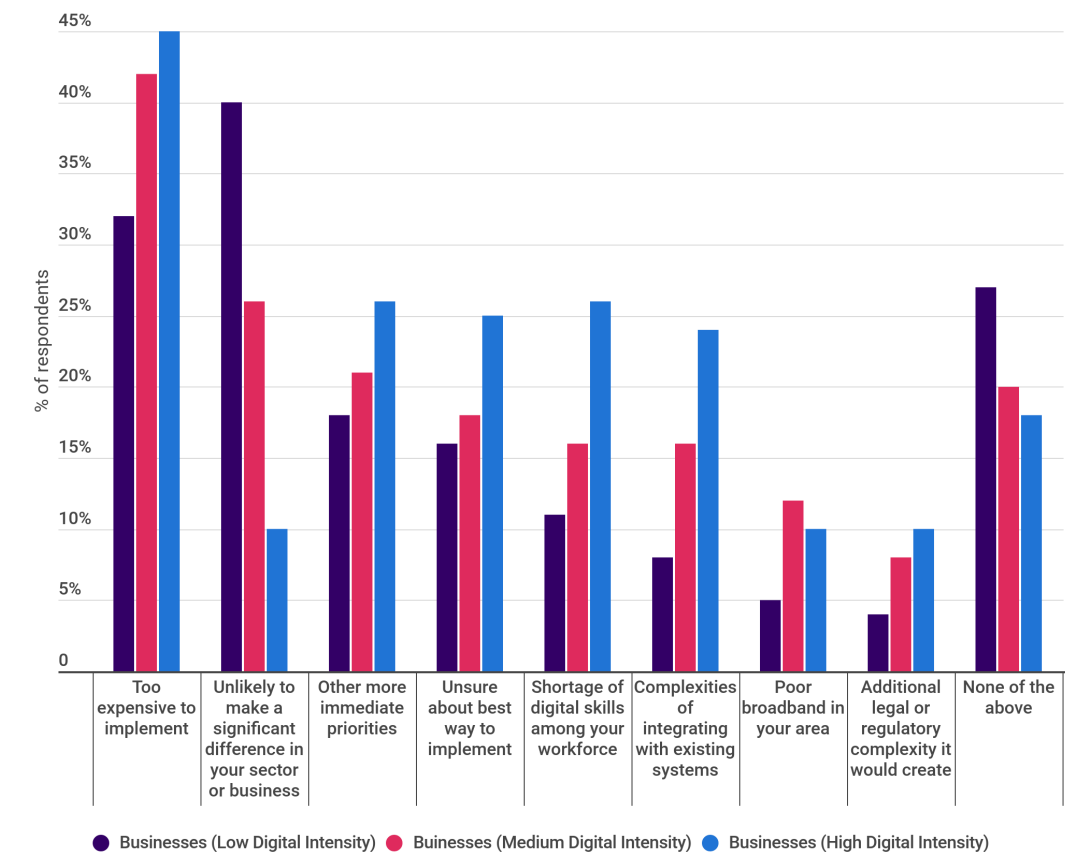
Similarly, almost half (48%) of business leaders had not heard of cloud computing or did not know what the term “cloud computing” meant. This was particularly true of small businesses, who were twice as likely to be unfamiliar with cloud technology compared to large enterprises (48% vs 24%).

Before taking this survey, were you familiar with the concept of cloud computing?



In contrast, the most digitally intense businesses pointed to more tangible, practical barriers, such as the complexities of integrating digital technology with existing systems (32%) or the shortage of digital skills (57%, to be revisited later in this report).

Which of the following are important barriers as to why your company doesn't use more digital technology?



Policy context and recommendations

The UK Government's Digital Strategy 2022 acknowledges that "one of the greatest barriers to the adoption of technology by small and medium enterprises (SMEs) is understanding what product to choose. 44% of SMEs think that "there is too much confusing information" about established technology solutions."²³

In response to this challenge, the UK Government's Help to Grow: Digital scheme provides SMEs with free and impartial information to help them choose, buy, and integrate new digital technologies. Eligible businesses can also access a discount of up to 50% towards the costs of buying approved software, worth up to £5,000. This includes CRM, digital accounting, and ecommerce software. The UK Government expects to reach 100,000 SMEs through the scheme.²⁴

With business costs rising, it is vital that this financial support is complemented with the right guidance. The UK Government's proposed one-to-one advice pilots are welcome, but businesses benefit from hearing from peers about their own journeys as well.²⁵

Growth hubs and peer networks, which provide concrete local touchpoints for businesses, should continue to be a key component of Local Enterprise Partnerships (LEPs) as they undergo integration plans.

²³ <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>

²⁴ <https://helptogrow.campaign.gov.uk/>

²⁵ <https://www.gov.uk/guidance/help-to-grow-digital-apply-to-take-part-in-the-one-to-one-advice-pilot>





Skills

Increasing the availability of advanced digital skills in the UK will allow businesses to take greater advantage of digital technologies. This can be achieved by boosting the number of specialists, as well as improving the digital skills of the average worker.

The UK's digital skills gap

UK Government estimates indicate that there were 31.5% more individuals working in the digital sector in 2020 compared with 2011.²⁶ Turnover and employment in the digital sector are currently increasing at more than double the rate of the economy as a whole, requiring a significant expansion of the UK's current digital workforce.²⁷ With 80% of the 2030 workforce already in work today, reskilling the existing workforce is likely to be crucial.²⁸ By one estimate, the digital skills gap is currently costing the UK £63 billion a year.²⁹

Digital skills were seen as important or essential by 82% of businesses, rising to 97% for digitally intensive businesses



97%

Indeed, our research shows digital skills are increasingly more desirable than other formal qualifications. 46% of businesses deem intermediate digital skills (such as creating a website) as important; but only 28% of businesses say the same for university degrees. The workforce appears to recognise this. 39% of respondents to our consumer poll perceived their lack of digital skills as a barrier to getting a better paid job – more so than a lack of formal degree (33%).

We asked employers what digital skills they consider to be important for the average worker:

71%

said an average worker should be able to share documents.

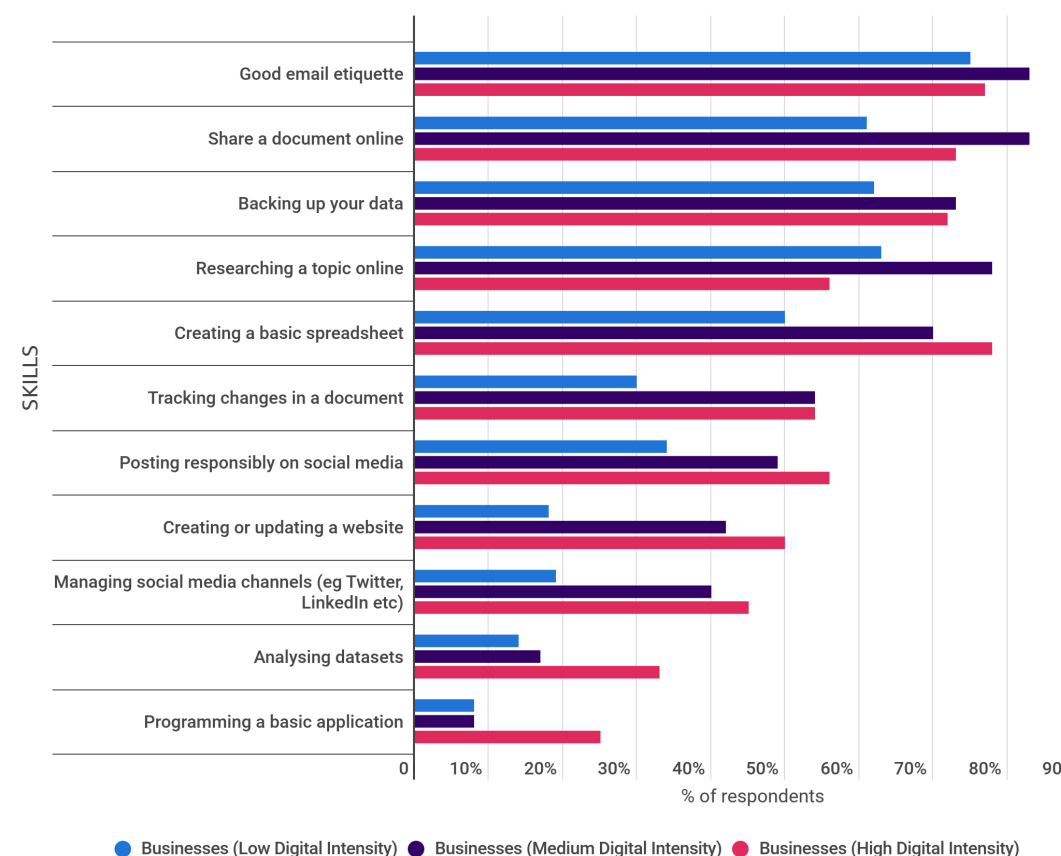
68%

said an average worker should be able to back up data.

63%

said an average worker should be able to create spreadsheets.

Which digital skills do you think it is important for an average worker to be able to do today?



Advanced digital skills are especially important for more technologically advanced businesses. This can be illustrated by the difference between all businesses and those businesses that use cloud technologies.

Advanced digital skills are especially important for more technologically advanced businesses. This can be illustrated by the difference between all businesses and those businesses that use cloud technologies. **Only 11%** of all businesses employ programmers and/or developers – compared to 74% of businesses using cloud services. **Only 5%** of all businesses employ data scientists and/or analysts – compared to 65% of businesses using cloud services.

Perhaps unsurprisingly, the most digitally intensive businesses were therefore more likely to say that they found it difficult to find staff with good digital skills (57%) compared to the average business (20%).

As a result:

62%

of digitally intensive businesses with a shortage of digital skills said it had slowed growth.

63%

of digitally intensive businesses with a shortage of digital skills said it had increased costs.

26 <https://www.gov.uk/government/statistics/dcms-sector-national-economic-estimates-2011-to-2020>
 27 <https://technation.io/wp-content/uploads/2018/05/Tech-Nation-Report-2018-WEB-180514.pdf>
 28 <https://industrialstrategycouncil.org/uk-skills-mismatch-2030-research-paper>
 29 <https://www.gov.uk/government/publications/uks-digital-strategy>

SECTOR DEEP DIVE: RETAIL

- Respondents from the retail sector were four times as likely to rate basic digital skills as “very important” compared to a university degree when recruiting new employees (59% vs 14%).
- 52% of respondents from the retail sector rated experience of managing social media channels as “very important” when hiring new employees.
- 61% of respondents from the retail sector say that ecommerce skills are “important” or “very important” to their business.
- 59% of respondents from the retail sector agree that they feel like they personally need to have better digital skills for their job.

Sainsbury’s Cloud Academy: Inclusive Cloud Learning Opportunities with AWS Skills Guild

Sainsbury’s³⁰ is one of the largest grocery retailers in the UK, and operates over 1,400 supermarkets and convenience stores, including its contactless SmartShop Pick & Go store³¹. Customers are increasingly seeking more convenient and intuitive ways to shop, so Sainsbury’s is focused on strengthening its in-house technical skills to deliver great customer experiences online and offline. To support its digital transformation, together with AWS, the company created Sainsbury’s Cloud Academy, a training framework that focuses on the people and organisational culture that are necessary for cloud transformation.

Sainsbury’s encourages colleagues to use professional curiosity and personal responsibility to create their own learning paths. With AWS Skills Guild, a comprehensive skills enablement programme that builds cloud fluency across organisations, the team created a fit-for-need curriculum and gave colleagues access to everything from virtual classroom training courses to informal learning events like hackathons. This combination of different learning modules created a groundswell of enthusiasm for cloud learning. Further, colleagues are encouraged to spend 10% of their time developing new skills, so Sainsbury’s Cloud Academy quickly became a central training hub.

In the programme’s first 12 months, 440 attendees participated in 30 formal classroom trainings. Sainsbury’s Cloud Academy also unlocked new career aspirations for many colleagues - regardless of background. The initiative, combined with other career development programmes, gives all colleagues, including warehouse teams and other non-corporate colleagues, equal opportunities to learn about cloud technology. For example, a financial manager became a data product manager after taking Sainsbury’s Cloud Academy courses.

Taking greater advantage of digital technology

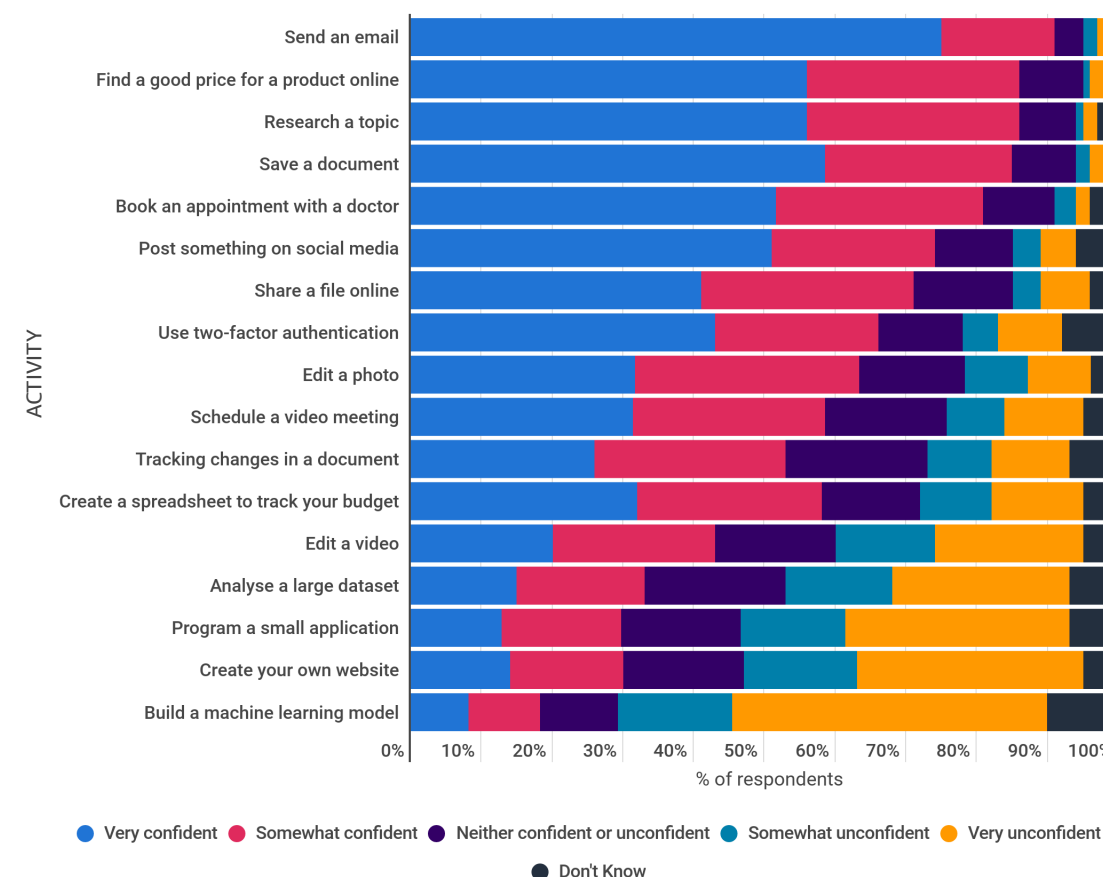
While not everybody needs to be able to write computer code for their job, our research indicates that almost everyone could benefit from strong intermediate digital skills – such as how to collaborate with their colleagues through online tools or do basic data manipulation in a spreadsheet.

A third of working respondents (32%) told us that they spend over 15 minutes a day trying to understand how to do something on their computer. By one estimate, **over 40% of workers who use office software daily do not have sufficient skills to use it effectively.**³²

Our research confirms there is a significant proportion of the workforce who lack confidence in their intermediate digital skills:



How confident or unconfident would you be that you could perform the following digital activities?



We also saw a significant disparity across age groups when it came to intermediate and more advanced digital skills.

43%

of 18–24-year-olds reported feeling confident that they could create a website, compared to just 16% of 55–64-year-olds.

45%

of 18–24-year-olds said they were confident they could programme a small application, compared to just 16% of 55–64-year-olds.

30%

of 18–24-year-olds said they had written computer code in the last 3 months, compared to just 6% of those over 65.

When we asked individuals how they had developed their existing digital skills, most respondents had gained more from teaching themselves than through more formal training. **52% of respondents told us that they had learnt through trial and error, closely followed by 44% who say they had learnt through their own research.** Only 15% had learnt through school IT classes, and 11% via classes paid for by their employer.

Despite this, most respondents (61%) wished they had learnt more about digital technology and computing whilst at school. When reflecting on education today:

76%

said it was important for children to learn **how to programme.**

66%

said it was important for children to learn **how to create their own website.**

57%

said it was important for children to learn **how to build a ML model.**

Beauty Bay: Creating a Talent Pipeline to Support Business Growth

Beauty Bay is an online beauty retailer headquartered in Manchester. Founded in 1999, Beauty Bay sells both private label and other popular third-party beauty brands through its mobile app and website.

Beauty Bay decided to build its business on AWS to ensure it could deliver secure and engaging shopping experiences, scale to meet the demands of its growing worldwide customer base, and have the flexibility to test, iterate and release new features at pace. In order to do this, Beauty Bay employs a digital team of 25 experts who are responsible for driving tech innovation throughout the business.

As a way to grow the talent in its digital team, Beauty Bay turned to AWS and the skills development and training programme, AWS re/Start³³, to help discover a new and diverse pipeline of cloud computing talent. AWS re/Start prepares unemployed and underemployed individuals for cloud careers through classroom-based training. As part of the programme, AWS helps to connect learners with potential employers.

Since joining AWS re/Start, Beauty Bay has hired three employees from the programme into cloud engineering roles, and continues to take part to help inspire new talent. One of the AWS re/Start graduates hired by Beauty Bay has gone on to be promoted in their first 12 months, and is now mentoring the newest cohort of AWS re/Start joiners at the company.

Rob Black, Technology Director, at Beauty Bay said:

"The AWS re/Start programme has been a fantastic way to find fresh technical talent to support our business growth. We are hugely passionate for the ability to lead and inspire the next generation of cloud talent."

Adam Thomason, CloudOps Manager, at Beauty Bay said:

"AWS re/Start is a great catalyst for graduates to begin their careers by providing them with solid, professional training. The skills gained by our own AWS re/Start graduates have allowed them to build and maintain production-grade cloud infrastructure solutions which serve our customers every day."

Policy context and recommendations

The UK Government's Digital Strategy 2022 makes a commitment to ensure "that UK technology businesses have access to the skills and funding they need to innovate, develop and grow".³⁴ As part of this, the UK Government has announced or brought forward multiple initiatives including:

- A new Digital Skills Council and new Digital Skills Partnerships;
- Establishing the National Centre for Computing Education (NCCE) to improve the provision of computing education in England;
- Funding 1,000 PhDs in AI and 1,000 scholarships for master's degree conversion courses in AI and data science;
- Introducing a new Digital Entitlement to allow adults with no or low digital skills to study Essential Digital Skills qualifications (EDSQs) for free;
- Creating new Global Talent, High Potential Individual and scale-up visas.

Similarly, the UK Government's commitment to "Lifelong Learning" recognises that skill sets must continually evolve in the face of new technologies.³⁵

From 2025, the lifelong loan entitlement will provide individuals with a loan entitlement equivalent to four years of post-18 education to use over their lifetime. It will be available for both modular and full-time study at higher technical and degree levels (levels 4 to 6), regardless of whether they are provided in colleges or universities.

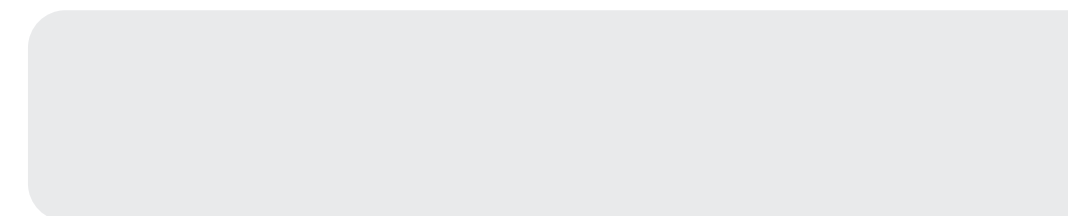
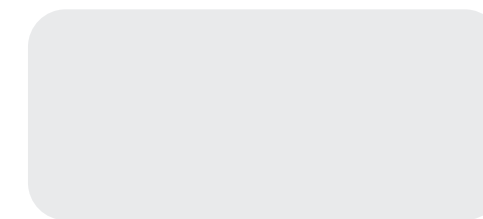
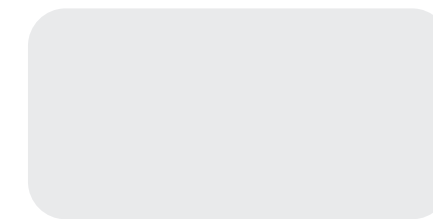
Our research shows digital skills are increasingly more desirable than other formal qualifications. **Extending the lifelong learning loan entitlement to cover industry certifications from a wider range of providers would help the UK Government to meet this demand.** techUK's Fast Forward for Digital Skills³⁶ report outlines how industry can work with the UK Government to close the digital skills gap, and ensure individuals can retrain at a pace and time that works with their lifestyle and other commitments.³⁷

³⁴ <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>

³⁵ <https://www.gov.uk/government/consultations/lifelong-loan-entitlement>

³⁶ <https://www.techuk.org/asset/5A115863-8EFB-4F8C-9B52486240BB100A/>

³⁷ <https://www.techuk.org/shaping-policy/fast-forward-for-digital-jobs-report.html>





Infrastructure

Digital infrastructure such as high-speed connectivity and cloud computing continue to be fundamental to supporting wider digital transformation. Over the next decade, low latency and edge technologies will become increasingly important to enable new workflows for advanced manufacturing, smart networks and autonomous transport.

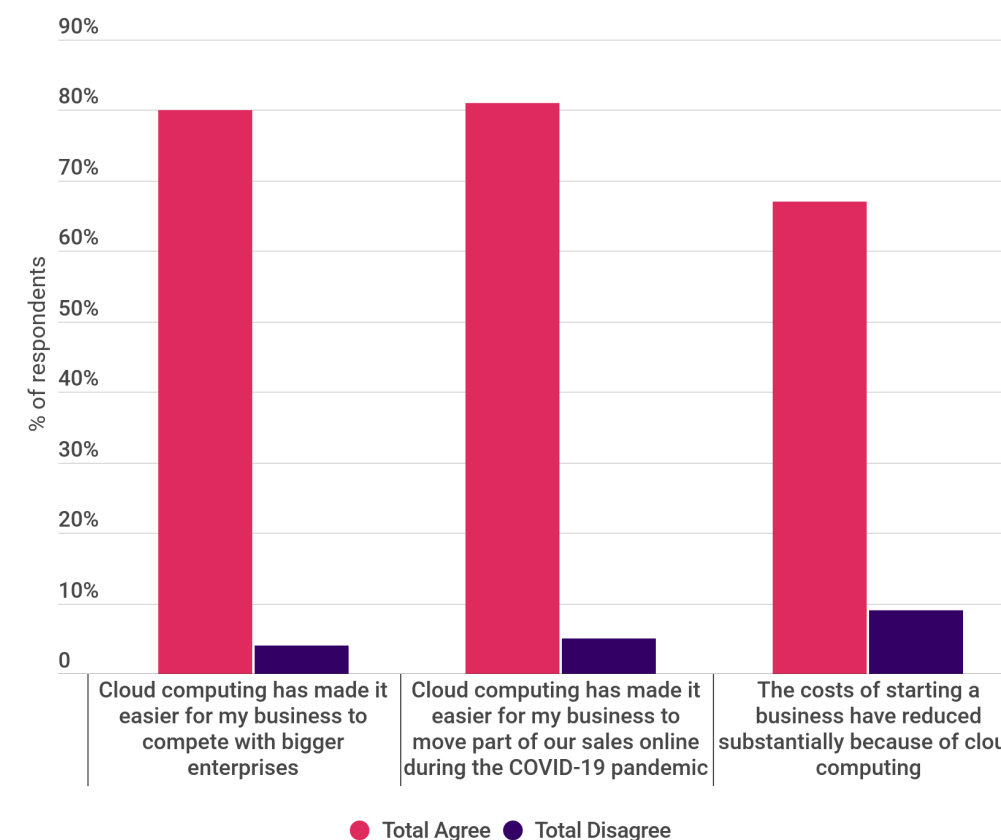
The importance of cloud computing and low latency infrastructure

The cloud sits within the underlying technological stack for most of the leading digital opportunities of the next decade, enabling new technologies such as ML and helping companies to become more agile. In 2020 polling for AWS, UK cloud users told us that the most important benefits for their company were increased reliability (89%), automatic back-ups (88%), higher security (88%), and automatic software updates (84%).³⁸

In the polling for this project:

- **80%** of businesses using cloud services agreed that **cloud computing has made it easier for their business to compete with bigger enterprises.**
- **81%** of businesses using cloud services agreed that **cloud computing made it easier for their business to move part of their sales presence online during the COVID-19 pandemic.**
- **Two thirds (67%)** of businesses using cloud services agreed that **the costs of starting a business have reduced substantially because of cloud computing.**

Do you agree or disagree with the following statements about cloud computing?



The cloud users we talked to were overwhelmingly confident that their data was secure in the cloud, with **92%** stating they felt confident compared to just **2%** feeling unconfident. **45%** of the respondents said that they would find it difficult to store data securely without cloud services.



92% of cloud users feel confident that their data is secure in the cloud

The Benefits of Cloud Computing

Cloud computing is the on-demand delivery of IT resources over the internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centres and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider such as AWS.

Specific advantages include:



Flexibility and cost savings. Using cloud computing, companies only pay for the technology they use. This means that they can scale capacity up and down to meet sudden or seasonal spikes in demand, and can avoid paying for unused computing power. On average, business servers often see utilisation rates of under 20%, while cloud server utilisation can exceed 50%.³⁹ Based on our business polling, **we estimate that UK AWS users saved around 63% of their IT costs from moving their workloads to the cloud.**



Innovation and agility. The cloud allows for the more rapid development, deployment and scaling of new digital tools and services. 56% of AWS-using businesses believe that access to cloud computing cuts the amount of time it takes to develop and deploy new software projects by at least 10%.



Security. By building on top of the cloud, companies can automate manual security tasks, while always maintaining ownership and privacy for their own data. 92% of UK cloud users trust that their company's data is secure in the cloud and 45% said that they would find it difficult to store data securely without cloud services.



Sustainability. Businesses can reduce energy use by nearly 80% when they run their applications on the AWS Cloud instead of operating their own data centres, according to a report by 451 Research. The report also found that migrating computer workloads to AWS could decrease greenhouse gas emissions equal to the footprint of millions of households. In addition, businesses could potentially reduce carbon emissions of an average workload by up to 96% when AWS reaches its goal of purchasing 100% of its energy from renewable sources.⁴⁰

The UK Government's National Data Strategy 2020 cited the importance of virtualised infrastructure, systems and services that process and transfer data with low latency and high reliability.⁴¹ This includes the physical storage of data in data centres, the exchange of data by way of peering and transit infrastructure, and cloud computing which offers remote access to servers, software, and data analytics.

In the next decade, low latency applications – optimised to process a very high volume of data with minimal delay – will require edge computing nodes (i.e. devices, servers or gateways on which edge computing can be performed) to complement the cloud, bringing computing power closer to the end user.

What Is Edge Computing?

Edge computing services deliver data processing, analysis, and storage close to user endpoints. This physical proximity allows users to build high-performance applications that can process and store data close to where it's generated, enabling ultra-low latency, intelligent, and real-time responsiveness. Edge devices can include smartphones, security cameras or even internet-connected household appliances.

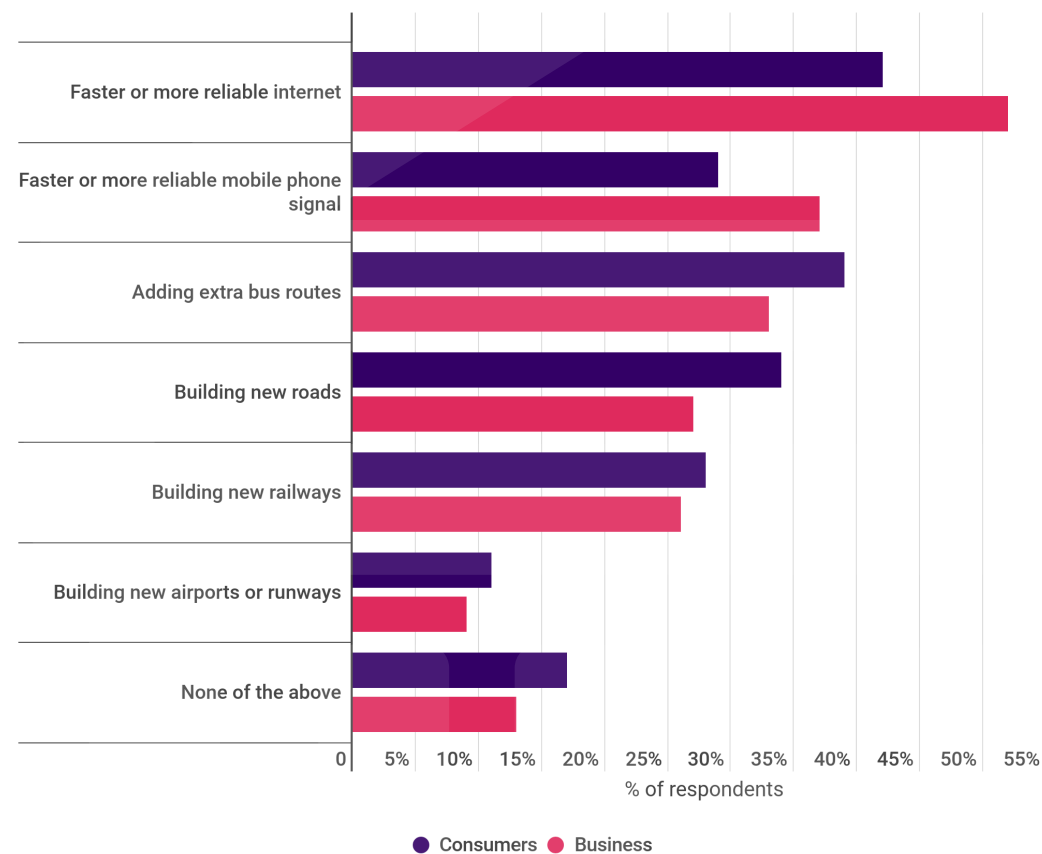
The role of cloud computing in enabling innovation in broader infrastructure

Cloud computing and edge technologies also have an important role to play in enabling innovation in other key infrastructures. These technologies have use-cases across the Internet of Things (IoT), hybrid cloud, and industrial ML, and can easily scale to cover billions of devices across the country. It will help to support smarter energy networks in cities; real-time quality checks in agriculture or manufacturing; and IoT solutions for the safety of workers in hazardous environments.

We asked consumers and businesses what infrastructure investment was most important to them. In our polling, faster internet was a leading priority for local connectivity investment, and faster or more reliable phone signal was also rated highly. Improving local transport infrastructure, such as adding extra bus routes and building new roads were especially important to consumers.

Delivering on all these priorities will require an underlying digital infrastructure. Edge computing will become increasingly important to investment in both communications and transport over time – from roads and railways to runways, as well as the roll-out of 5G.

If you had to choose, which of the following types of infrastructure investment would prefer your Government to prioritise in your local area?



Swindon Borough Council: Improving Response to Illegal Waste Disposal with Artificial Intelligence

Swindon Borough Council, in Wiltshire, England, services a population of around 200,000 people with a yearly budget of over £150 million. The council is tackling illegal waste disposal – known as fly-tipping in the UK – and ensuring clean and safe streets for its residents.⁴²

The council was operating on a manual system, which allowed people to report fly-tipping through the council website, provided they had an account. But it was an unstructured form, which made it difficult for people to provide the right information required. The reports were then printed out and handed to the clear-up team. With more than 300 cases a month, this was a manual and time-consuming drain on resources.

The council worked with AWS and the AWS Consulting Partner Methods to co-produce a new image analysis and reporting system. The new system features a map, so residents can precisely mark where the rubbish is and submit photos of what has been dumped. The system can also automatically analyse the images and allocate the right size of vehicle to collect the waste, and prioritise the collection of waste types such as drug needles. Members of the clear-up team are equipped with tablets to report and resolve cases on-the-go and navigate the most efficient routes for the team to reduce mileage and pollution, which has saved the council £3,000 a year on fuel costs and reduced associated emissions by 1,591,200g of CO2 per year, the equivalent to driving an average car for 7,233 miles.

For the residents of Swindon, the new system means average clear-up times have fallen from over 10 days to just 4. Data analysis can also identify fly-tipping trends and dumping hot spots to help the council tackle the problem in the long term.

Policy context and recommendations

The UK Government's Digital Strategy 2022 states that "every part of the UK needs world-class, secure digital infrastructure that enables people to access the connectivity and services they need - where they live, work or travel." This includes the role-out of 5G to the majority of the population by 2027.⁴³

The impending Wireless Infrastructure Strategy can be a vehicle for raising awareness of the benefits of edge computing, as well as funding trials and testbeds to stimulate further innovation.⁴⁴

⁴³ <https://www.gov.uk/government/publications/uks-digital-strategy/uk-digital-strategy>
⁴⁴ <https://www.gov.uk/government/consultations/wireless-infrastructure-strategy-call-for-evidence/wireless-infrastructure-strategy-call-for-evidence>





Summary of Recommendations

The UK is well placed to take advantage of the next wave of digital advances. However, more can be done to ensure businesses maximise the potential of these technologies.

Encouraging greater adoption of digital tools

The UK Government's recently expanded Help to Grow programme supports businesses investing in productivity-boosting software, and the UK Government should continue to expand it to cover a wider range of software. With business costs rising, it is vital that financial support is also complemented with the right guidance and advice. The UK Government's proposed one-to-one advice pilot is welcome, but businesses benefit from hearing from peers about their own journeys as well. **Growth hubs and peer networks, which provide concrete local touchpoints for businesses, should continue to be a key component of LEPs as they undergo integration plans.**

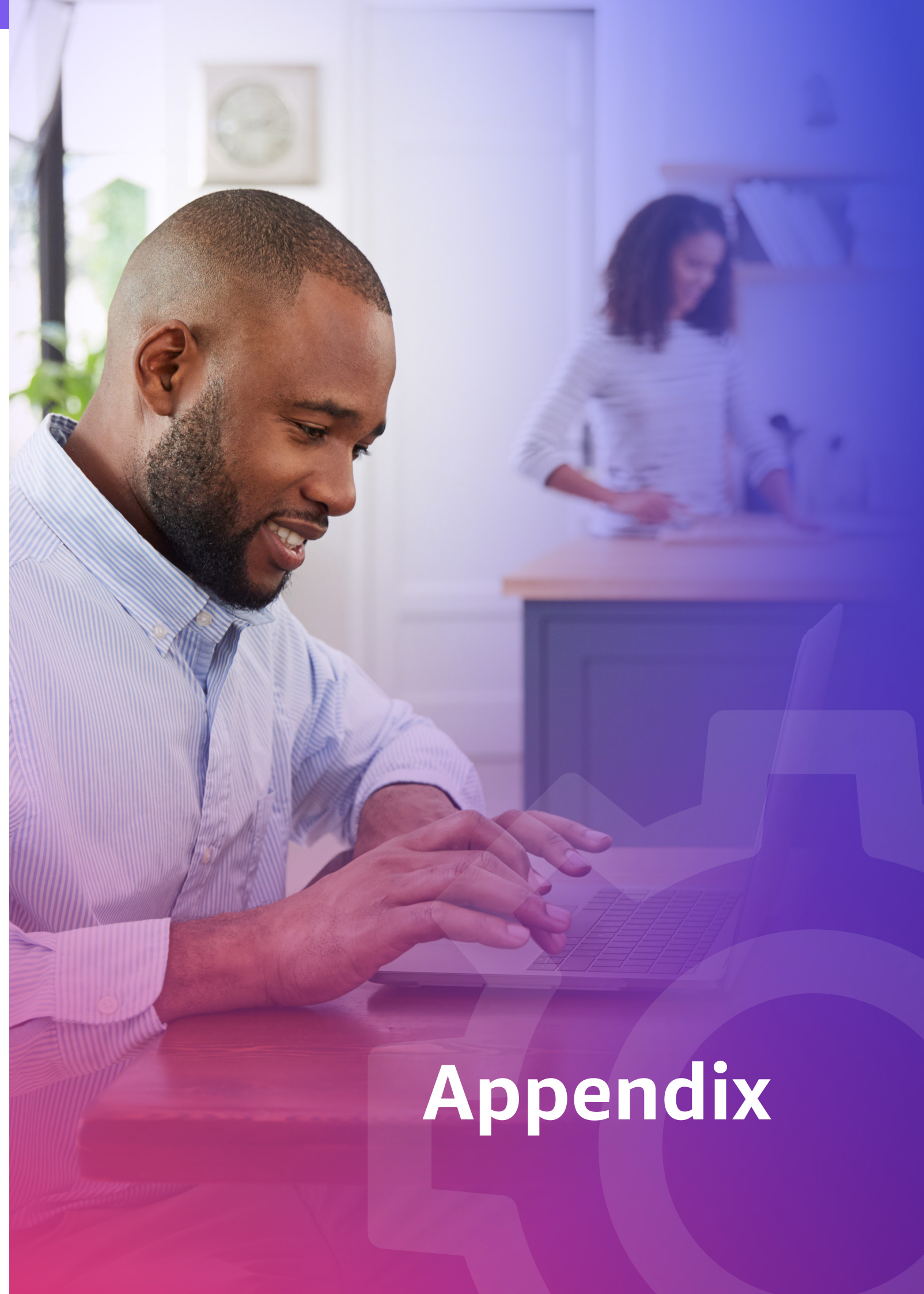
Strengthening digital skills

Our research shows digital skills are increasingly more desirable than other formal qualifications. **Extending the lifelong learning loan entitlement to cover industry certifications from a wider range of providers would help the Government to meet this demand.** techUK's Fast Forward for Digital Skills report outlines how industry can work with the UK Government to close the digital skills gap and ensure individuals can retrain at a pace and time that works with their lifestyle and other commitments.⁴⁵

Continuing to invest in digital infrastructure

Key UK industries such as the manufacturing, retail, and financial sectors stand to benefit from edge computing. However, business leaders lack awareness about what edge computing has to offer. **The impending Wireless Infrastructure Strategy can be a vehicle for raising awareness of the benefits of edge computing, as well as funding trials and testbeds to stimulate further innovation.**

45 <https://www.techuk.org/shaping-policy/fast-forward-for-digital-jobs-report.html>



Appendix

AWS commissioned independent consultancy Public First to explore the role cloud computing can play in unlocking digital ambitions in Europe, and to gain insight from consumers and businesses on the current state of these goals.

The research has included a series of reports focused on different European countries, including Denmark, Finland, France, Germany, Italy, the Netherlands, Poland, Spain, Sweden, and the UK.

Our headline estimates of the potential economic impact of digital technology by 2030 is based on adding together our estimate of the impact of achieving four goals, derived from the EU's Digital Decade ambitions:

- Increasing business cloud computing uptake to 75%.
- Small business adoption of three key digital tools (CRM, ERP, and fast broadband) increases to 90%.
- 80% of UK adults achieving basic digital skills.
- The potential economic impact from AI and big data.

Increasing business cloud computing uptake to 75% by 2030

In order to do this, we combine the following estimates:

- Data from our business poll on current cloud computing uptake per business size per region.
- Data on public cloud spending taken where possible from polling, and calibrated against third party data from IDC and Statista.
- The average ROI for cloud computing, taken as the average of the estimates from our previous impact studies for AWS (Canada, France, UK, US).
- A Type 1 GVA effects multiplier for the UK, derived from ONS data.

Small business adoption of three key digital tools (CRM, ERP, and fast broadband) increases to 90%

In order to estimate this, we:

- Captured existing uptake of each digital tool (CRM, ERP, and fast broadband) from our business polling for small, medium, and large businesses.
- Assumed that uptake for all business sizes across the three types of tool is levelled up to at least 90%.
- Utilised the calculated average impact on productivity of each class of tool from OECD (2019).⁴⁶

⁴⁶ https://www.oecd-ilibrary.org/economics/digitalisation-and-productivity-in-search-of-the-holy-grail-firm-level-empirical-evidence-from-eu-countries_5080f4b6-en

80% of adults achieving basic digital skills

For this estimate, we combined:

- EU DESI data from 2019 on the level of adults with lower than basic digital skills per country, projected forward based on recent time trends to allow for a growth in basic digital skills over the last three years. Given our survey data was completed through an online panel, everyone who completed it had to have at least minimal online skills and therefore we did not attempt to use it to benchmark the prevalence of lower than basic digital skills.
- An estimated average 9% increase in wages for adults achieving basic digital skills in the UK, drawn from average the estimates from DCMS (2019)⁴⁷ and UCL (2007).⁴⁸

Potential increase in economy wide GVA from AI and big data

We extrapolated from McKinsey (2018)'s⁴⁹ estimate of the economic impact of AI by 2030, allocating it to individual countries and modifying it by:

- Using Tortoise's AI Index⁵⁰ as a proxy to calibrate how well prepared individual European countries are to take advantage of AI / big data.
- Deducting impact that should have already taken place since 2018, based on a slow S-curve diffusion path for AI.

⁴⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807830/No_Longer_Optional_Employer_Demand_for_Digital_Skills.pdf

⁴⁸ <https://discovery.ucl.ac.uk/id/eprint/18650/>

⁴⁹ <https://www.mckinsey.com/~media/McKinsey/Featured%20Insights/Artificial%20Intelligence/Notes%20from%20the%20frontier%20Modeling%20the%20impact%20of%20AI%20on%20the%20world%20economy/MGI-Notes-from-the-AI-frontier-Modeling-the-impact-of-AI-on-the-world-economy-September-2018.pdf>

⁵⁰ <https://www.tortoisemedia.com/intelligence/global-ai/>



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