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Realising a cloud-enabled economy in the United Kingdom:

How cloud drives economic and societal impact through micro, small, and medium-sized businesses

2023

By 2030, MSMEs can deliver greater societal value in a cloud-enabled United Kingdom

Across key sectorsⁱ this opportunity is expected to represent:

£6.9 billion combined annual productivity benefits unlocked through cloud-enabled MSMEs in healthcare, education, and agriculture

This represents a 43% increase on current



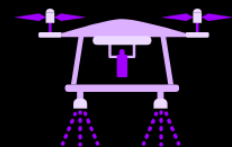
2 million people in the United Kingdom (6% of the workforce) employed by cloud-enabled MSMEs within healthcare, education, and agriculture

58 million telehealth consultations using cloud supported by MSMEs' services



4 million school students engaging in online learning via cloud-enabled MSMEs

1 in 3 farms using cloud-enabled precision agriculture technologies supported by MSMEs



MSMEs is the abbreviation of micro, small, and medium enterprises.

Current values are annual 2022-2023 values based on the latest available data.

i. Key societal sectors are healthcare, education, and agriculture.

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Overview

Micro, small, and medium enterprises (MSMEs, businesses and startups with between 1 and 250 employees) are a major driver of economic performance. In the United Kingdom (the UK), MSMEs collectively account for over 99% of all firms, 61% of jobs, and about 50% of Gross Domestic Product (GDP).^{1,2} MSMEs are also a major source of innovation and disruption in the economy, leveraging both old and new technologies to fill gaps in the current market and bringing new products and services to bear.

By allowing users to procure on-demand, scalable IT products and services over the internet or a private network, cloud technology has driven economic and societal benefits by creating new business models, reducing costs, and supporting new opportunities for entrepreneurs and startups. According to the Organisation of Economic Cooperation and Development (OECD), more than 53% of all businesses across the UK now utilise at least some basic form of cloud technology, although adoption rates of more advanced technologies, such as artificial intelligence (AI) and machine learning (ML) remain low, at approximately 13% of businesses. Cloud technologies have most profoundly impacted smaller businesses and startups by allowing them to start, operate, and scale their organisation more effectively.

The use of cloud computing by businesses is expected to become increasingly ubiquitous, advanced, and mature. With continuous advancements in technology and the decreasing costs of cloud services, businesses will have access to an even wider range of scalable and cost-effective technology solutions across functions, occupations, and industries. We refer to this potential future state as the “cloud-enabled economy,” a future characterised by high levels of overall cloud adoption across businesses in the UK. It is anticipated that under this scenario, 90% of all businesses would adopt at least a basic level of cloud technology.^{3,4} For many businesses, however, this represents only the beginning of their cloud journey. As businesses increase their sophistication and adopt more advanced applications of cloud, such as AI and ML, countries with already high rates of overall adoption can expect to derive even greater benefits.

By 2030, a cloud-enabled UK economy is expected to deliver even greater societal impact by supporting MSMEs to innovative new products and solutions or augment their existing operations. In certain societal sectors, namely health, education, and agriculture, this annual contribution is expected to reach £6.9 billion. Not only that, but by 2030, cloud-enabled MSMEs are expected to support 58 million remote health consultations, four million school students to access online education, and one in three farms access more efficient and sustainable farming practices in the UK. Cloud-enabled MSMEs are also heavily involved with developing solutions to transition the economy towards more a more sustainable future and designing digital finance solutions (through ‘fintechs’) that are helping to support better financial inclusion and wellbeing.

¹ UK Government (2021), Business population estimates for the UK and regions 2021: statistical release.

² Bank of England (2020), Open data for SME finance: What we proposed and what we have learnt.

³ Gartner (2022), The future of cloud computing in 2027: From technology to business innovation.

⁴ Gartner (2021), Gartner says cloud will be the centerpiece of new digital experience.

Although these benefits are substantial, the opportunities of the cloud-enabled economy will not eventuate without action. To unlock this potential, UK businesses and the government will need to collaborate to foster the continued adoption and maturity of cloud usage. Businesses can achieve this by:

- identifying how cloud technology can help them scale and deliver global impact
- investing in embedding cloud technology into their strategy; and
- developing a migration plan and training employees to leverage the benefits of cloud technology.

The UK Government can support businesses in achieving a cloud-enabled economy by:

- prioritising cloud technology education across all levels
- investing in digital infrastructure to ensure innovation can continue unimpeded; and
- and leading by example through promoting cloud adoption across all levels and divisions of government.

1 The cloud-enabled economy

Cloud technology has changed the way many businesses operate, particularly for MSMEs (businesses with between 1 and 250 employees)⁵, by enabling them to scale quickly, reduce costs, reach global markets, and access a range of technology resources that were previously unattainable.

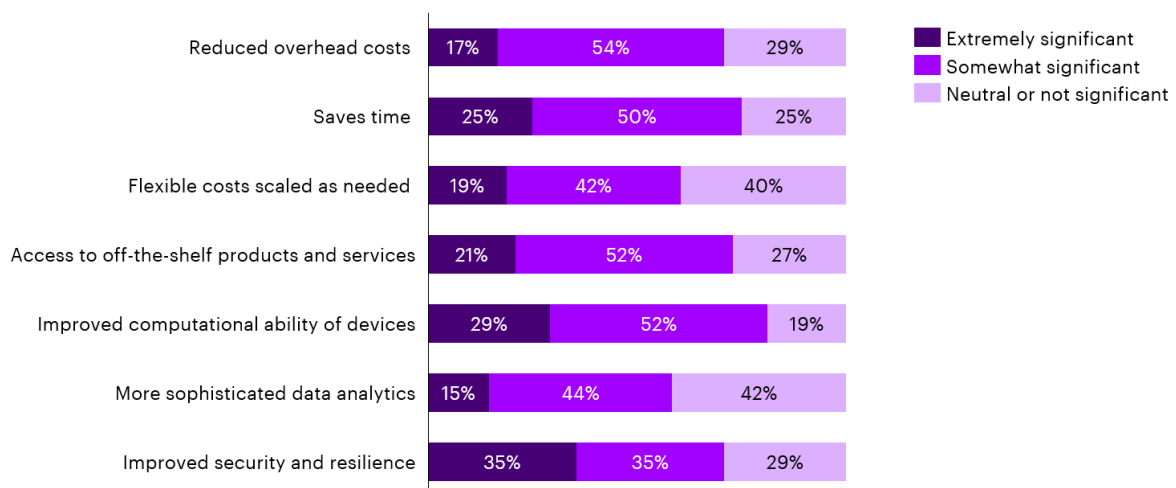
1.1 Cloud technology enables the digital economy

Cloud technology refers to the provision of on-demand IT products and services delivered over the internet or a private network.⁶ This involves housing digital resources from centralised servers owned and operated by cloud service providers, reducing the need for individual businesses to procure and maintain physical hardware. Outsourced technology provides greater flexibility to support MSMEs through the early stages of the business lifecycle by:

- reducing overheads and time to market
- providing greater ability to scale up or down depending on business demands
- offering specialised technology solutions
- increasing computational power of ordinary devices; and
- enhancing security and resilience.⁷

Figure 1: The most significant benefits of cloud technology for MSMEs

Average % of cloud-enabled MSMEs across several industries in the United Kingdom that find cloud somewhat or extremely significant in providing a particular benefit



Source: Accenture societal impact survey (2023), n = 50. 'Neutral or not significant' includes responses of neutral, somewhat insignificant, and not significant at all.

By promoting shared resources, cloud has fundamentally changed the way that individuals and businesses interact with technology, with the number of potential applications of cloud technology far eclipsing simple, remote data storage. Most applications, platforms, and smart products have some functionality facilitated by cloud technology as shown in Figure 2. Having

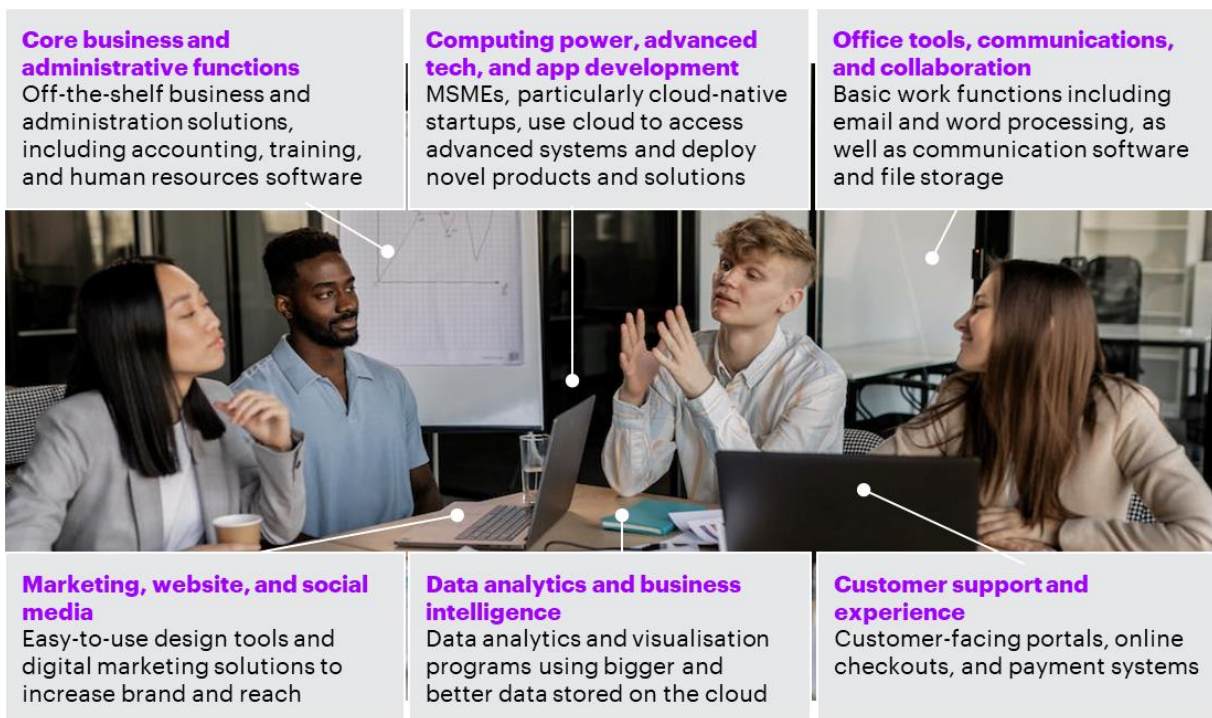
⁵ The definition of MSME used in this report is taken from the OECD (2023) and covers enterprises with businesses between 1-250 employees.

⁶ AWS (2023), What is cloud computing?

⁷ Accenture societal impact survey (2023), n = 562.

access to on-demand functionalities supports MSMEs to start, operate, and scale their business more efficiently and effectively.

Figure 2: End-to-end cloud technology applications for MSMEs

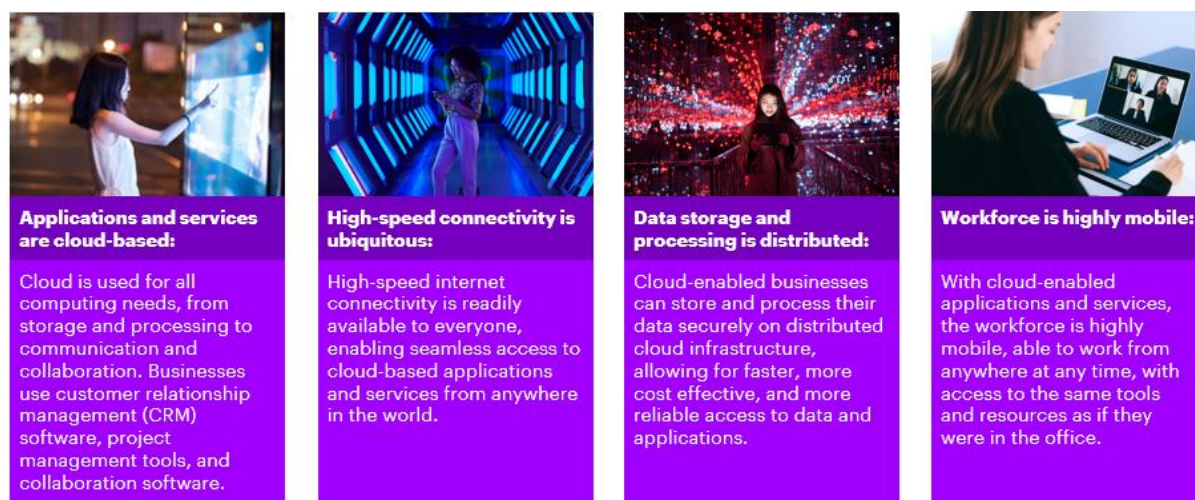


Source: Accenture.

1.2 Achieving a cloud-enabled economy can unlock significant societal and economic potential

With continuous advancements in technology and the decreasing costs of cloud services, economies will continue to experience a wave of digital disruption and productivity as businesses find more ways to produce novel, new products and solutions or augment their existing operations. We refer to this potential future state as the “cloud-enabled economy,” a future characterised by high levels of cloud adoption; based on an assessment of cloud technology industry forecasts, this report expects 90% of all businesses will adopt at least a basic level of cloud technology in a cloud-enabled economy. As cloud technology applications mature, a cloud-enabled economy would increasingly involve digital applications and services being cloud-based, high internet speed and connectivity, cloud-enabled data storage and processing, as well as a mobile workforce (see Figure 3).

Figure 3: Characteristics of a cloud-enabled economy



Source: Accenture

1.2.1 The spectrum of cloud adoption

The definition of cloud technology adoption used in this report is consistent with the Organisation of Economic Cooperation and Development (OECD), and refers to the share of businesses that purchased cloud services⁸ as a proportion of all businesses, across all levels of maturity.⁹ However, cloud technologies have a range of applications across a suite of business functions that mean that the use of cloud technology can be considered on a spectrum of maturity or sophistication as shown by the figure below, which includes:

- **Basic adoption:** user-friendly solutions designed for everyday tasks. These solutions typically do not require specialised technical knowledge to operate and primarily serve to simplify and enhance common digital activities. These include simple cloud-based storage solutions, web-based email services, and collaborative office suites.
- **Intermediate adoption:** applications and platforms that cater to more specialised needs but still largely consist of off-the-shelf products with intuitive interfaces. Such tools include customer relationship management, enterprise resource planning, project management tools, developer platforms, and cloud-based databases.
- **Advanced adoption:** highly specialised cloud applications and cutting-edge technologies tailored for expert tasks. This category encapsulates machine learning and AI platforms, big data analytics tools, internet of things (IoT) platforms, serverless computing, container management systems, and advanced security and compliance tools.

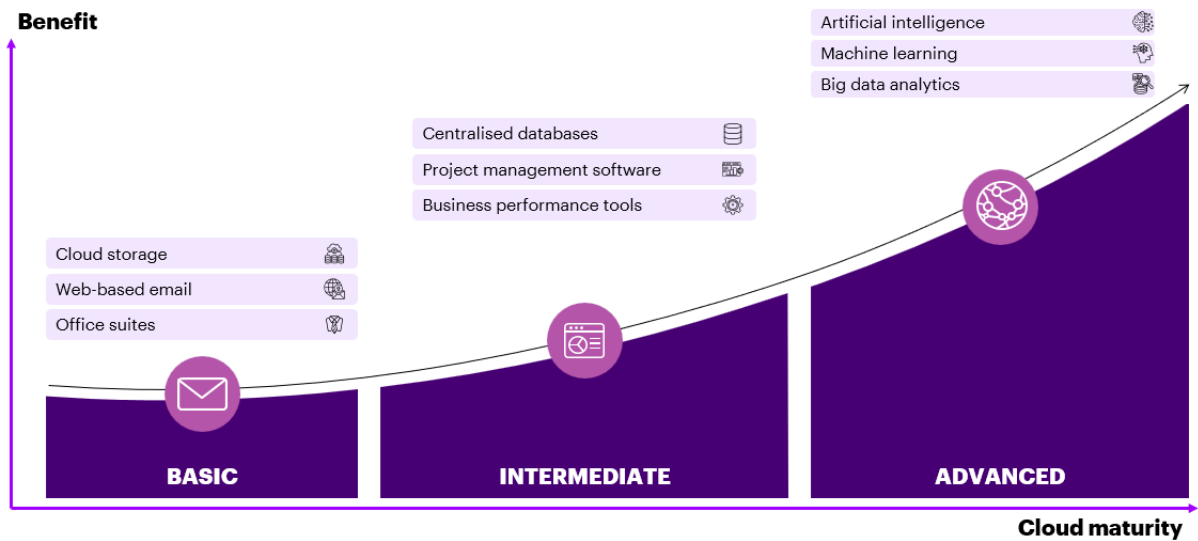
As the global economy increasingly digitises, the need for MSMEs to increase their cloud maturity is becoming increasingly pertinent. MSMEs that fail to leverage the scalability of cloud solutions may not only forfeit the ability to compete more effectively with fewer fixed IT costs, but may also pass up more sophisticated data analysis tools, more secure safeguards for digital assets, streamlined compliance with international regulations, and advanced technology applications (such as artificial intelligence, see Section 1.2.2). For many MSMEs to maintain their competitive edge in a dynamic, cloud-enabled economy, the sophistication of

⁸ Cloud computing as part of this definition includes information and communications technology (ICT) services that are provided over the internet or a private network to access servers, storage, network components and software applications

⁹ OECD (2023), OECD Going Digital Toolkit

their adoption will need to evolve and adapt with the technology according to their specific needs.

Figure 4: Spectrum of cloud maturity and example applications

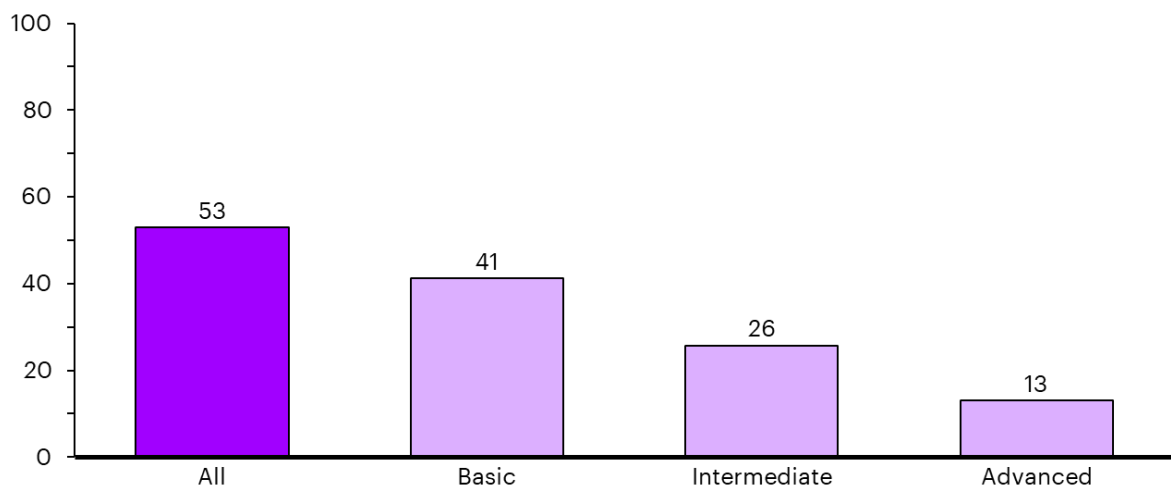


Note: Applications above are examples of types of uses for each of the levels of maturity. The lists are not exhaustive. Source: Accenture

The rate of cloud adoption across the United Kingdom varies considerably depending on the technology types. The OECD reports that 53% of all businesses use at least a basic level of cloud technology in their business, although intermediate and advanced adoption rates are far lower with 26% and 13% of businesses, respectively (see Figure 5).

Figure 5: Cloud adoption in the UK by sophistication, all businesses (2022)

% of all firms adopting cloud technology



Source: OECD (2023)

1.2.2 Advanced cloud usage unlocks the potential for emerging and innovative technologies

Embracing advanced cloud adoption also allows businesses to select from a variety of innovative and cutting-edge technologies to meet their unique business needs and secure a

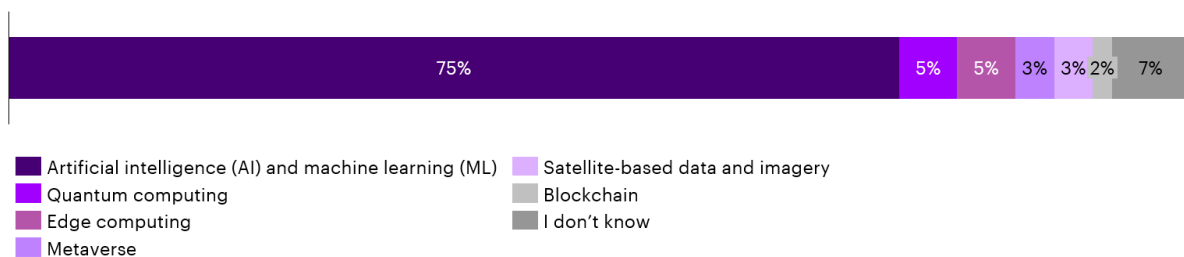
competitive edge in the market. Cloud technology has increased the viability and proliferation of a wide range of tools, business models, and technologies that, together with cloud, generate societal and economic impact. Advanced applications of cloud include:

- artificial intelligence (AI), encompassing generative AI
- machine learning (ML)
- internet of things (IoT)
- quantum computing; and
- edge computing.

These examples form a growing list of advanced technologies that have become accessible to a wider base of users through cloud technology (see Appendix D of the global report for a full description of each technology supported by cloud).¹⁰ Of these technologies, generative AI is experiencing the most rapid and dramatic growth; over the next 10 years generative AI is expected to grow at an annual average rate of 27%.¹¹ Although the technology has only recently been adopted by the wider public, generative AI is already disrupting and enhancing businesses’ processes, accelerating innovation, and facilitating greater speed and creativity across a variety of industries. Businesses and employees are already experimenting with generative AI to create content that supports a range of tasks from writing text and code to generating images.¹² As shown in Figure 6, 75% of UK MSMEs identified AI (including generative AI and natural language processing (NLP)) and ML as the technologies likely to be most significant in creating societal impacts in 2030.^{13,14} Generative AI could be used by cloud-enabled MSMEs for a wide variety of applications, such as helping medical professionals analyse patient data and testing results to inform decision making, or generating practice exam questions and content with instant feedback available to support individualised learning pathways.

Figure 6: Technologies supported by cloud creating the most significant societal impacts in 2030

Average % of cloud-enabled MSMEs across several industries in the United Kingdom that believe a technology supported by cloud will be the most significant in creating societal impacts in 2030



Source: Accenture societal impact survey (2023), n = 50. ‘Artificial intelligence (AI) and machine learning (ML)’ includes subsets generative AI and natural language processing (NLP).

¹⁰ Damian Mazurek, (2023), Leveraging Cloud-based AI/ML Services to elevate your business.

¹¹ Precedence Research (2023), Generative AI Market size to hit USD 118 Bn by 2032

¹² AWS (2023), Generative AI on AWS.

¹³ Accenture societal impact survey (2023), n = 50. 75% of UK MSMEs is consistent with the 78% of MSMEs globally out of a sample of 562 who identified AI and ML as the technologies likely to be most significant in creating societal impacts by 2030.

¹⁴ Survey responses were from MSMEs working in healthcare, education, agriculture, finance, and sustainability.

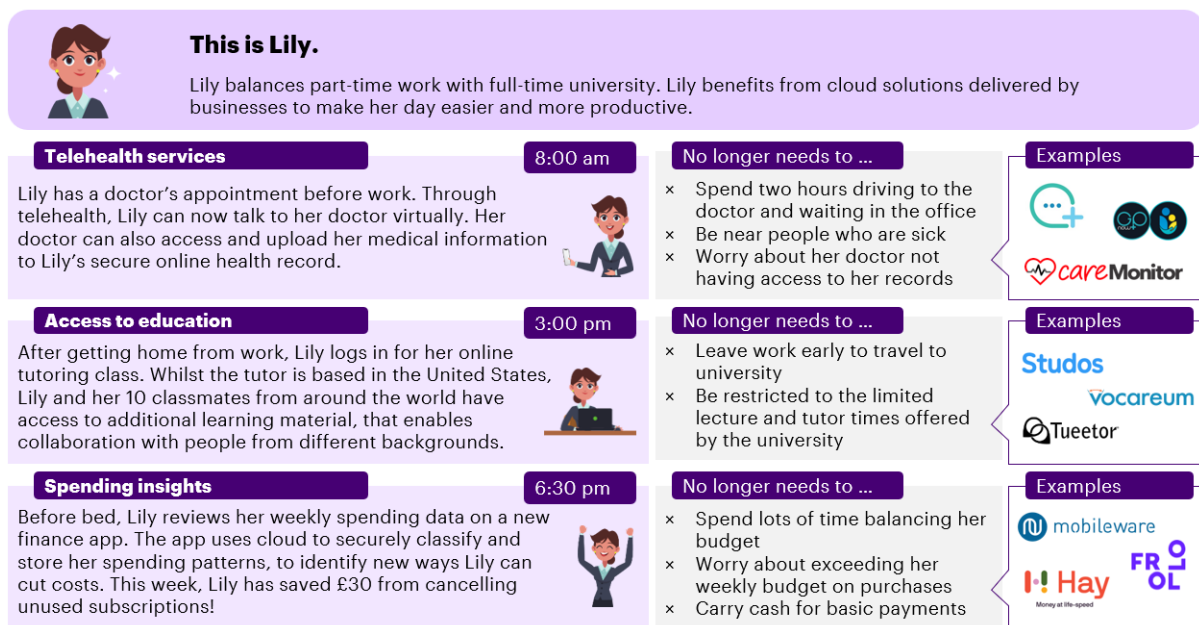
1.2.3 A more productive, cloud-enabled economy offers societal as well as economic benefits

While the opportunity to scale and grow businesses has a clear impact on economic activity (see Chapter 2), in many cases businesses can also create a positive societal impact. Cloud has opened up a range of emerging technologies that are underpinning a new wave of digitally-led innovation to address some of society’s most pressing, global issues. Cloud technology offers MSMEs new ways to produce and commercialise technological solutions that generate positive societal benefits, in addition to economic benefits, across a range of industries. Although this list of industries is not exhaustive, the estimation of the societal impact of cloud technology is focused on the following industries:

- healthcare
- education
- agriculture
- finance; and
- sustainability and disaster response.¹⁵

While these industries are not the only ones that are impacted by cloud technology, they face increasingly complex challenges that could lead to less equitable societal outcomes if they do not adapt and harness the benefits offered by cloud technology. These industries are also directly linked to the UN Sustainable Development Goals (SDGs), particularly the overarching objectives of improved healthcare (Goal 3), education (Goal 4), and economic prosperity and equality (Goal 9 and 10).¹⁶ Figure 7 demonstrates through a stylised cameo how cloud technology supports access to these industries for individuals through digitisation.

Figure 7: The impact of cloud-enabled MSMEs on individuals



Notes: Examples include MSMEs and startups using cloud solutions from AWS case studies
Source: AWS¹⁷

¹⁵ The report chose to focus on these industries since most societal impact case studies reviewed fell into one or more of these industries. These labels also benefit from matching the economic modelling data as they are taken directly from the International Standard Industrial Classification (ISIC).

¹⁶ United Nations (2023), Sustainable development goals.

¹⁷ AWS (2023), Customer Success Stories.

2 Unlocking £6.9 billion in productivity benefits within key societal sectors

MSMEs are a major driver of economic performance in the United Kingdom, accounting for 99% of all firms, 61% of jobs, and about 50% of Gross Domestic Product (GDP).^{18,19} Cloud technology is helping to create and scale MSMEs (see Chapter 1), the impact of which can be identified in overall, aggregate economic performance. The impact of further cloud adoption and maturity on aggregate economic output is estimated with a novel economic model, based on analysing current data that captures the relationship between adoption and economic activity. In Chapter 3, this analysis is taken to the next level of granularity, assessing how much of this impact can be attributed to key societal sectors of healthcare, agriculture, and education.

Box 1: Modelling the economic potential of a cloud-enabled economy

This research estimates the impact of cloud on economic productivity at the country level using data from the OECD to capture the relationship between cloud adoption rates and GDP (controlling for capital and labour inputs). A full explanation of the modelling approach, data, and outputs can be found in Appendix A of the global report.

The UK is now one of the largest cloud technology markets in Europe, with an estimated 53% of all businesses purchasing cloud services.²⁰ The UK has seen a notable acceleration in recent years, more than doubling from only 24% in 2014. Cloud technology has become an essential asset during the COVID-19 pandemic as the UK endured some of the longest lockdowns globally of around 220 days in many regions, forcing many MSMEs to work remotely.²¹ In a 2020 survey, 51% of UK business leaders believed the shift to a cloud-based business model saved their business during COVID-19, with 60% substantially increasing their use of cloud technology in the pandemic and beyond.²²

However, the range of new technologies underpinned by cloud is accelerating, with advances in technologies such as generative AI, that also offer significant economic and societal potential. Continued investment from UK industries and the government is required to continue realising the benefits of the cloud-enabled economy.

¹⁸ UK Government (2021), Business population estimates for the UK and regions 2021: statistical release.

¹⁹ Bank of England (2020), Open data for SME finance: What we proposed and what we have learnt.

²⁰ Accenture analysis of OECD data. See global report for full methodology.

²¹ Statista (2021), The Lost Months of the Coronavirus Pandemic

²² Experis (2020), Cloud adoption comes of age during the COVID-19 pandemic



Annual productivity benefits unlocked by cloud-enabled MSMEs in key societal sectors are expected to reach £6.9 billion by 2030



2 million people in the United Kingdom are expected to be employed by cloud-enabled MSMEs in key societal sectors by 2030

The productivity benefits of the cloud-enabled economy to UK societal sectors would be significant. Through successful transition to a cloud-enabled economy, MSMEs in the healthcare, education, and agriculture industries within the UK are expected to unlock £6.9 billion in combined annual productivity benefits by 2030, a 43% increase from £4.8 billion. Under this scenario, it is estimated that two million people would work at cloud-enabled MSMEs in these industries, which would be 6% of the total jobs in the UK, an increase from 3% currently. This reflects the increasing ubiquitousness of cloud technology in almost all forms of digital technology and occupations across the economy.


3 The societal impact of the cloud-enabled economy

MSMEs that harness cloud technology have the potential to create significant societal impact in the UK. We define “societal impact” in reference to the positive changes and improvements in outcomes facilitated by cloud technology in areas such as healthcare, education, and agriculture. By leveraging cloud technology, MSMEs can enhance the efficiency, affordability, and accessibility of services in these industries, enabling advancements such as telemedicine, online education, precision agriculture, financial access and autonomy, and sustainable technology. These solutions will lead to improved social wellbeing and development.

3.1 Driving innovation and improving access to healthcare and life sciences


Approximately 16% of people in the UK live in rural and remote areas, which imposes additional barriers to accessing healthcare.²³ Cloud technology is helping to overcome these barriers by enabling MSMEs to make healthcare easier to access whilst also driving efficiency in healthcare delivery and supporting decisions around patient healthcare. Through remote consultations and monitoring of health indicators, cloud technology can help make healthcare more accessible to underserved communities throughout the UK. If the UK were to achieve a cloud-enabled economy, MSMEs in healthcare are expected to unlock £3.3 billion in annual productivity benefits by 2030. Cloud-enabled MSMEs are expected to support 58 million virtual health consultations per year by 2030.²⁴

Impact of MSMEs on healthcare in the cloud-enabled economy, by 2030



£3.3 billion in annual productivity benefits unlocked through cloud-enabled MSMEs in the healthcare sector, an increase from £2.3 billion currently

58 million virtual consultations supported by cloud-enabled MSMEs, a 65% increase from 35 million consultations currently



Note: Estimates for the number of telehealth consultations produced through market size estimates (see Appendix C of the global report) and are calculated separately to the GDP contribution. Current values are annual 2022-2023 values based on the latest available data.

Cloud technology is also important for streamlining administrative tasks, creating efficiency for healthcare providers. Healthcare providers can use cloud technology to support informed patient healthcare decisions, helping providers to collaborate and easily share patient information, and assisting them to take insights from large amounts of data to make treatment personalised and tailored. Technologies supported by cloud, particularly generative AI, also have significant potential to change the healthcare industry, from the delivery of healthcare to

²³ OECD (2022), Rural population.

²⁴ Remote health consultations can also be supported by telephone or through large cloud-enabled firms.

administrative functions. While generative AI is still a nascent technology, MSMEs can use it to support clinical decision making, helping medical professionals analyse data more accurately, along with supporting efficiency in research and development.²⁵

Research and development efforts within healthcare can be enhanced through data analytics which utilise cloud technology. For example, the UK-based MSME Lifebit streamlines and analyses over 10 million datasets for life sciences organisation to leverage in their research.^{26,27} As another example, uMotif is an MSME that helps therapeutic research studies reach 90% patient compliance with the rules of the study by allowing patients to conveniently enter information through an app.^{28,29}

²⁵ WE Forum (2023), How will generative AI impact healthcare?

²⁶ AWS (2021), Lifebit Powers Collaborative Research Environment for Genomics England on AWS

²⁷ Lifebit (2023)

²⁸ AWS (2020), uMotif's Patient-centric Approach Captures Clinical Trial Data Supported on a Global Scale by AWS

²⁹ uMotif (2023)

Akrivia uses natural language processing to analyse previously under-used health records, supporting research into drugs and treatments.



**Industry:
Healthcare**



**Size: Small
(<50 employees)**



Locations: England and Wales

Akrivia is a small health-tech company operating since 2019 across England and Wales. Akrivia's founders identified an opportunity to harness large volumes of previously underutilised medical data to streamline and fast-track medical research and pharmaceutical trials relating to dementia and mental health issues.

There is a significant unmet need for treatments to dementia and mental health conditions, with around 7% of people in the UK over age 65 living with dementia, and one in four adults in the UK experiencing a diagnosable mental health issue in a given year. To develop new treatments and identify suitable trial participants, researchers require large volumes of health data. However, the majority of health records are free-form text that can't be analysed at scale, representing a significantly underutilised source of data. Akrivia uses cloud-based natural language processing (NLP) to capture, decipher, consolidate and arrange de-identified patient data covering medical history, symptoms, and medications.

"We use Akrivia Synapse, our AI driving NLP data enrichment solution to unlock and additional 75% of data providing insights that have previously been inaccessible."

David Newton, COO.

So far, Akrivia has applied its NLP technology, Akrivia Synapse, to over 4.5 million patient records, deriving millions of pieces of vital information about patient treatments and their outcomes. The National Institute of Health and Care Research (NIHR), National Health Service (NHS) trusts, academia, and pharmaceutical



and biotech companies have used Akrivia's data to conduct observational research based on real patient data as well as to efficiently and effectively target clinical trials.

Over 20 publications have been made utilising Akrivia's data platform, including research on outcomes for people with treatment resistant depression. Clinical trials are increasingly focused on sub-groups with specific conditions, and Akrivia's platform helps pharmaceutical companies find relevant sites for trials, including in places with disadvantage or greater clinical need.

Patient data security and confidentiality is essential for healthcare companies, and cloud allows Akrivia to maintain the highest security standards, including an internationally recognised ISO27001 certification. This same security certification will facilitate and streamline Akrivia's planned international expansion in the future. Akrivia indicated that, without cloud, the upfront costs of the infrastructure required to operate the NLP tool across such large datasets would have proved prohibitively expensive for the company. Similarly, without cloud Akrivia would not be able to share such quantities of information with end users.

Source: Accenture consultations, Li et al., (2022), Neural Natural Language Processing for unstructured data in electronic health records: A review; NHS (n.d.), Adult and older adult mental health; Care Policy and Evaluation Centre (2019), Projections of older people with dementia and costs of dementia care in the United Kingdom, 2019-2040

3.2 Improving access to engaging and personalised education

Around 85-90% of UK secondary schools have digital devices for pupils to learn remotely and the technology to enable live remote lessons, with teachers agreeing technology has improved educational attainment, reduced workload, and decreased time spent on tasks.³⁰ Cloud technology is already contributing to a more equitable, safe, and accessible education system in the UK by providing new learning opportunities for a wider audience, including remote communities or adults with limited time who are looking to boost or diversify their skills. These students and adults will be able to learn in a more collaborative environment, as cloud technology supports them to interact and share content more readily. MSMEs are already providing online learning tools. Cloud technology can also help reduce the administration workload for teachers, enabling them to spend more time educating students. Under a cloud-enabled economy, MSMEs in education are expected to unlock £3.1 billion in annual productivity benefits by 2030. Through supporting the education industry, cloud-enabled MSMEs are expected to facilitate four million school students and 11 million adults in the UK to receive online learning by 2030.

Impact of MSMEs on education in the cloud-enabled economy, by 2030



£3.1 billion in annual productivity benefits unlocked through cloud-enabled MSMEs in the education sector, an increase from £2.2 billion currently

4 million primary to high school students using online education via cloud-enabled MSMEs, a 33% increase from 3 million students currently



11 million adults accessing education via cloud-enabled MSMEs, a 175% increase from 4 million adults currently

Note: Estimates for the number of students and adults accessing cloud-based education produced through market size estimates (see Appendix C of the global report) and are calculated separately to the GDP contribution. Current values are annual 2022-2023 values based on the latest available data.

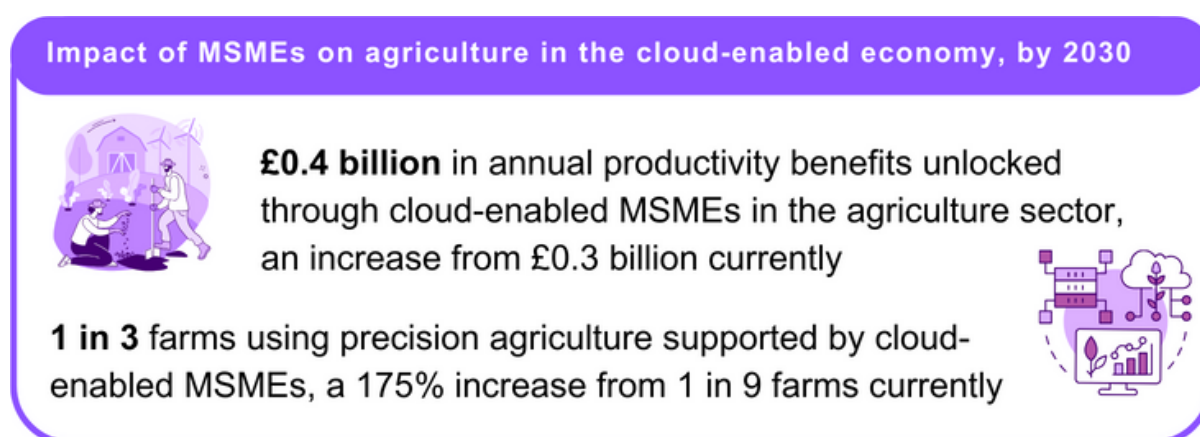
Cloud-enabled MSMEs are also introducing advanced analytics into the classroom, helping to personalise learning. Personalised content and feedback can help students with different learning styles work at their own pace, and reduce the administration burden on teaching staff. Educators are also utilising cloud-based learning analytics to monitor the quality, safety, and security of online learning environments. AI, and in particular, generative AI, could be

³⁰ UK Government (2021), Education Technology (EdTech) Survey 2020-21.

especially useful in helping educators provide differentiated learning pathways based on the needs of individual students.^{31,32}

3.3 Developing smarter and more sustainable farming practices

MSME cloud services are being used by the agricultural industry in the UK to support smarter, more sustainable farming practices. Policies such as the Agricultural Transition Plan, which includes the Sustainable Farming Incentive (SFI), are expected to help accelerate the embrace of innovation and precision technologies within the UK's agricultural industry.^{33,34} These technologies can assist agricultural decision making by employing sophisticated monitoring devices that provide better, real-time data about crops, livestock health, and resource consumption (referred to as precision agriculture).³⁵ In addition to supporting the use of data or supply chain tools, cloud technology is also enabling automated vehicles and equipment, which helps to improve the efficiency of agriculture. Under a cloud-enabled economy, MSMEs in agriculture are expected to unlock £0.4 billion in annual productivity benefits by 2030. Precision agriculture technology supported by cloud-enabled MSMEs is expected to be in operation in one in three farms across the UK by 2030.



Note: Estimates for the number of farms using precision agriculture produced through market size estimates (see Appendix C of the global report) and are calculated separately to the GDP contribution. Current values are annual 2022-2023 values based on the latest available data.

3.4 Improving financial access and wellbeing

The digitisation of the finance sector has led to wave of disruption, increased competition, and new types of products and services that better service customers.³⁶ Alongside the rapid adoption of smart devices, a critical part of the proliferation of digital finance options has been cloud technology that supports fast and secure methods of transferring financial information and better access to information.³⁷ As such, cloud-native MSMEs in the finance industry (referred to as fintechs) represent one of the fastest growing markets in the world,

³¹ World Economic Forum (2023), Can AI improve education? Here are 4 potential use cases.

³² Stanford University, Human-Centered Artificial Intelligence, (2023) AI Will Transform Teaching and Learning. Let's Get it Right.

³³ Department for Environment, Food and Rural Affairs (2020), Agricultural Transition Plan 2021 to 2024

³⁴ Department for Environment, Food and Rural Affairs (2023), Sustainable Farming Incentive: Full Guidance

³⁵ FAO (2022), Leveraging automation and digitalization for precision agriculture: Evidence from the case studies.


³⁶ OECD (2020), "Digital disruption in banking and its impact on competition".

³⁷ Ibid.


expected to rise from US\$134 billion in 2022 to US\$557 billion globally by 2030 – more than a 400% increase.³⁸

The rise of fintech apps has not only been seen an increase in the number of financial services companies, but also a boost in convenience and access, individual autonomy over financial decisions, better access to information, and tighter security frameworks. Snoop is an MSME in the UK providing a cloud-based app that enables customers to see their banking accounts in one place and receive insights on their transactions through AI and ML, helping them make informed financial decisions.^{39,40} According to the Accenture societal impact survey, by 2030, one in four people globally are expected to be using financial services supported specifically by cloud-enabled MSMEs.⁴¹ Globally, 15% of cloud-enabled MSMEs working with the finance sector are expected to be helping budget-constrained customers or small businesses to better manage their finances.^{42,43} AI has the potential to unlock even greater individual financial wellbeing in a cloud-enabled economy by allowing customers to automate more elements of personal finances.⁴⁴ While this technology is still nascent, the possibility of integrating AI to perpetually monitor and screen for better fees or financial products holds enormous potential to improve financial health.⁴⁵

Impact of MSMEs on finance in a cloud-enabled economy by 2030



1 in 4 people globally using financial services supported by cloud-enabled MSMEs



Globally, **15%** of surveyed cloud-enabled MSMEs working with the finance sector help budget-constrained customers or small businesses better manage their finances

Source: Accenture societal impact survey (2023), n = 188. Based on global results across 12 countries.

For many countries, a cloud-enabled financial services sector is not far away, with many MSMEs already incorporating or exploring the use of cloud-supported technologies, such as AI and ML, to improve outcomes for consumers across a range of applications.⁴⁶ A sample of MSMEs operating in the financial services space globally indicated that the most common areas for these MSMEs to be active were in providing digital banking and budgeting or financial management tools.^{47,48} The improvements in societal outcomes most often attributed to these MSMEs were increased affordability of services, improved financial literacy and education, and fraud detection.^{49,50}

³⁸ Vantage market research (2023)

³⁹ Snoop (2023).

⁴⁰ AWS (2023), Helping Fintech Startup Snoop Deploy Quickly and Scale Using Amazon ECS with AWS Fargate.

⁴¹ Accenture societal impact survey (2023), n = 188.

⁴² Accenture societal impact survey (2023), n = 188.

⁴³ Based on the number of cloud-enabled MSMEs currently supporting this outcome.

⁴⁴ Crunchbase (2023) How the future of personal finance is self-driving money

⁴⁵ Crunchbase (2023) How the future of personal finance is self-driving money

⁴⁶ IMF (2021), Powering the Digital Economy: Opportunities and Risks of Artificial Intelligence in Finance.

⁴⁷ Accenture societal impact survey (2023), n = 188.

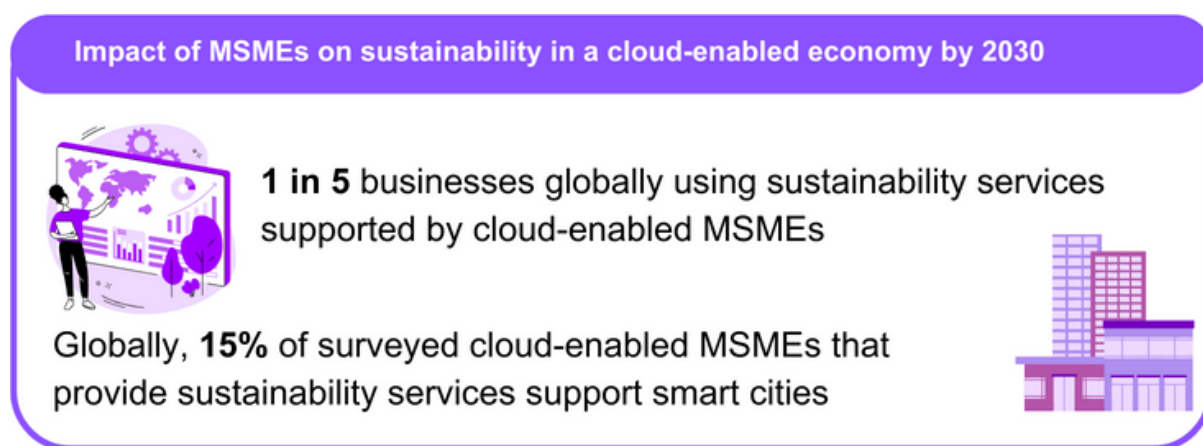
⁴⁸ Based on the services that cloud-enabled MSMEs are currently delivering.

⁴⁹ Accenture societal impact survey (2023), n = 188.

⁵⁰ Based on the number of cloud-enabled MSMEs currently supporting this outcome.

3.5 Designing a sustainable future

Developing the tools and technologies that will support a sustainable future is one of the most pressing global challenges, but also one filled with enormous economic potential. Cloud-enabled MSMEs can employ technology and digitisation to directly reduce environmental impact through innovations such as more efficient resource usage and smarter waste management. According to the Accenture societal impact survey, by 2030, one in five businesses globally are expected to be using services provided by cloud-enabled MSMEs to directly address their climate and sustainability objectives, such as through energy or emissions monitoring and reduction.⁵¹ And it's not only businesses using these services; across the world, cities and towns are increasingly turning to cloud-based technology solutions provided by MSMEs to achieve a range of sustainable outcomes.^{52,53} Globally, 15% of cloud-enabled MSMEs providing services to achieve sustainability goals are expected to be supporting "smart cities", such as through optimising traffic flows or making waste removal more efficient, and enabling the tracking or reduction of electricity usage.^{54,55,56,57}



Source: Accenture societal impact survey (2023), n = 66. Based on global results across 12 countries.

According to the Accenture societal impact survey of global MSMEs, cloud technologies have already enabled these businesses to provide smarter resource management and usage, access to sustainable and renewable technologies, carbon footprint monitoring, and sustainability information.⁵⁸ Through these sustainable solutions, global MSMEs are helping to support wider sustainability goals including more efficient use of energy and water, improving waste management, supporting better air quality, and increasing the availability of renewable energy.⁵⁹ One such MSME is OpenSensors, a London-based company using IoT technology to monitor and report air quality within commercial buildings.^{60,61}

⁵¹ Accenture societal impact survey (2023), n = 66.

⁵² IDC (2023), Smart Cities.

⁵³ IDC (2021), The Next Frontier: AI and Digital Twins in Smart Cities.

⁵⁴ Accenture societal impact survey (2023), n = 66.

⁵⁵ Based on the number of cloud-enabled MSMEs currently supporting this outcome.

⁵⁶ AWS (2023), Building Smart Cities with AWS Cloud.

⁵⁷ OECD (2021), Measuring smart city performance in COVID-19 times: Lessons from Korea and OECD countries.

⁵⁸ Accenture societal impact survey (2023), n = 66.

⁵⁹ Accenture societal impact survey (2023), n = 66.

⁶⁰ OpenSensors (2023)

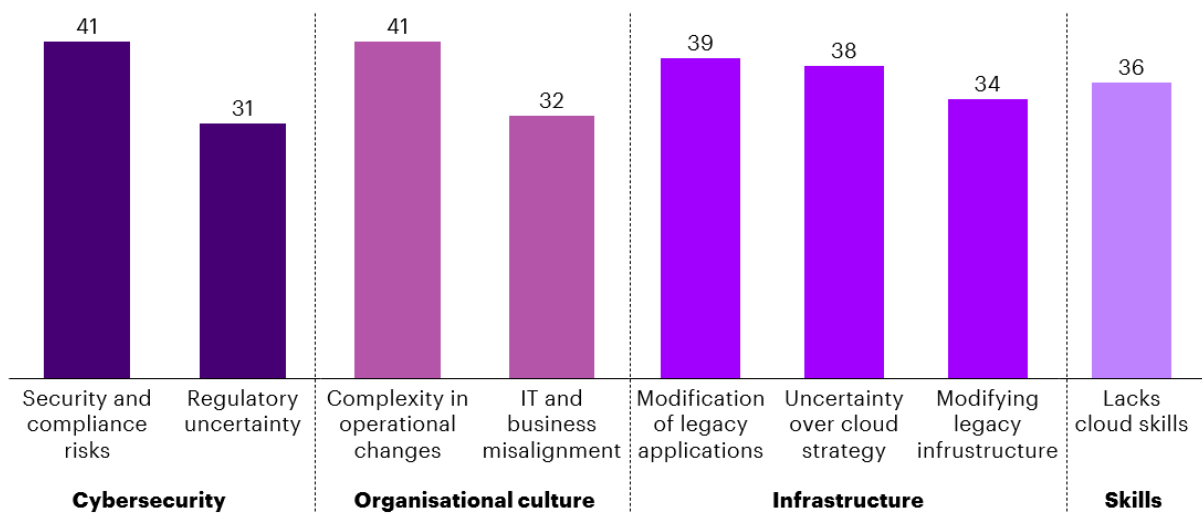
⁶¹ AWS (2023), OpenSensors' Yodit Stanton: data-powered solutions to transform the workplace

4 Achieving the cloud-enabled economy

With businesses across the UK at starkly different points along the adoption spectrum, the UK’s path to a cloud-enabled economy involves a combination of increasing sophistication and further encouraging greater levels of overall adoption. However, barriers to adoption remain despite the potential upside. A survey of global business leaders, conducted by Accenture, shows that persistent barriers to adoption in developed countries, like the UK, continue to concern cybersecurity, reluctant organisational cultures, insufficient infrastructure (e.g., software and hardware) or difficulty transitioning, and digital cloud skills (see Figure 8). Unlocking these opportunities in the UK by 2030 requires continued coordinated action from businesses, wider industry stakeholders and the UK Government to address the barriers to cloud technology uptake.

Figure 8: Primary barriers to cloud technology uptake

% of respondents listing barrier in top three responses



Source: Accenture (2023). Survey responses from 2022, n = 800.

To address each of these complex challenges MSMEs should evaluate barriers at the firm level, to identify specific security, IT resources, organisational culture, and skills required to be successful. This will help MSMEs to develop holistic cloud solutions, optimised and scaled to improve performance, and reduce costs.

4.1 Holistic strategies to overcome business-specific barriers to cloud adoption

MSMEs can adopt a range of internal policies and actions to overcome these barriers and further integrate cloud solutions across all business functions, thereby maximising their productivity dividend overtime (see Figure 9).

Figure 9: Steps for MSMEs to accelerate cloud maturity

■ Cybersecurity
 ■ Infrastructure
 ■ Skills
 ■ Organisational culture

Steps	Description	Barriers addressed			
1 Identify how cloud can streamline strategic goals	<ul style="list-style-type: none"> Identify how cloud solutions can meet your goals Identify a cloud partner that can help navigate the process Examine case studies of how MSMEs have used cloud to transform their business and create impact Interview employees to determine which barriers are preventing these systems and/or processes from being introduced or optimised at the firm level 				✓
2 Evaluate industry and government support	<ul style="list-style-type: none"> Examine the UK Government’s cloud policies and programs offered by industry to address business-specific barriers and accelerate cloud maturity This could include R&D tax credits from the UK Government, or sponsorship programmes for startups run by cloud providers such as AWS 	✓	✓	✓	✓
3 Educate all employees	<ul style="list-style-type: none"> Support employees to upskill in cloud, and utilise training from cloud providers where relevant Identify specific skill shortages to focus employees’ training 	✓		✓	✓
4 Review data security arrangements	<ul style="list-style-type: none"> Review data security arrangements from the cloud provider and determine whether additional internal policies are required Review security features of cloud and best practice data policies Simplify and harmonise policy across the business, with clear guidelines for different functional applications of cloud 	✓			
5 Create a whole-of-business cloud migration strategy	<ul style="list-style-type: none"> Evaluate the costs and benefits of alternative strategies to determine a whole-of-business solution that meets business goals MSMEs should prioritise solutions which deliver the greatest net benefit in the medium to long term Determine the scale and complexity of the cloud infrastructure required MSMEs with less cloud experience could consider enlisting cloud partners such as consultants to achieve this 	✓	✓	✓	✓










Source: Accenture

4.2 Strong policy support to address structural barriers and incentivise MSME cloud adoption

The UK’s acceleration of cloud technology relative to other European countries is partly attributable to strong cloud technology leadership by the UK Government. This has included a variety of policies addressing the barriers discussed above in Section 4.1. In particular, the UK has a world leading cloud first policy, which uniquely specifies the use of ‘Public Cloud First’ to enhance the benefits of cloud adoption achieved by scale. Continuing to address structural barriers to cloud adoption can be achieved through several mechanisms, including policy reforms. International examples offer best practice solutions for further addressing barriers to cloud adoption (see Figure 10).

Figure 10: Global best-practice examples of cloud adoption policies

■ Cybersecurity ■ Infrastructure ■ Skills ■ Organisational culture

Policy	Key existing support	Future policy	International policy examples	Barriers addressed
Invest in digital infrastructure	The UK has connected 64% of premises to a gigabit broadband connection as of 2022. An additional £5 billion will be spent to subsidise the rollout in rural areas.	Continued investment into regional and rural areas and connecting more premises to full optic fibre connections would improve speeds to facilitate cloud.	 Singapore optic fibre accounts for 93% of broadband connections  Thailand optic fibre accounts for 94% of broadband connections  Canada optic fibre accounts for 94% of broadband connections	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓
Invest in cloud skills and training	The UK Digital Strategy announced in 2022 includes working with industry and training experts to upskill the workforce. The digital skills gap is estimated to cost the UK economy as much as £63 billion a year in potential GDP.	Continued support for digital skills training, with a focus on emerging cloud skills. Subsidising the cost of cloud training could also improve uptake in training programs.	 Australia's National Cloud Computing Strategy includes cooperation with industry and educators to enhance cloud training  Brazil's Digital Transformation Strategy (E-Digital) includes partnerships with industry and educators to provide cloud training and certifications	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓
Harmonise data privacy policy across regions	As well as having its own Data Protection Act 2018, the UK maintains adequacy with the EU GDPR (General Data Protection Regulation) but has the ability and independence to review as required.	Work with experts and the international community to harmonise policy, while maintaining principles that promote the acceleration of the cloud economy for MSMEs.	 The international community could work together in forums such as the G7, G20, or the Global Cross Border Privacy Rules (CBPR) Forum to harmonise data policies.	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓
Create clear guidelines for industry	The UK does not have clear cloud implementation guidelines across industry regarding data security laws. However, the NHS does have a Cloud Security-Good Practice Guideline for health and care organisations.	Work with experts to develop clear cloud guidelines for industry to promote confidence in cloud solutions.	 Japan's Data Protection Laws include clear guidelines for the finance, healthcare and telecommunications sectors	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓
Incentivise cloud adoption and maturity	As of 2023, businesses with more than 40% of expenditure on cloud R&D can claim back 27% of costs. The cost of IT equipment, plants, or machinery is also fully tax deductible.	Continued ongoing support for MSMEs to reduce the cost of transitioning to cloud and encourage innovation.	 United States' incentives include cloud being fully tax deductible and tax credits for cloud-related investments	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓
Improve cloud-first policies	United Kingdom's Cloud first policy (2013) is a whole-of-government approach to Public Cloud first, with clear guidelines and procurement policies.	Continue evolving policy in line with best practice and consider establishing targets or procurement policies to move away from legacy IT and accelerate government cloud adoption.	 Singapore's Technology Agency (GovTech) has spent billions of dollars (\$870 million in 2020 alone) to shift 60% of less sensitive government systems to cloud. They are on track to reach the target of 70% by Q3 2023.	Cybersecurity: ✓ Infrastructure: ✓ Skills: ✓ Organisational culture: ✓

Source: UK Parliament,⁶² Lim, S.,⁶³ Statista,⁶⁴ Government of Canada,⁶⁵ UK Government,⁶⁶ Australian Government,⁶⁷

⁶² UK Parliament (2022), Gigabit-broadband: Funding for rural and hard to reach areas

⁶³ Lim, S. (2019), The city of the future: What will a full-fiber broadband city look like

⁶⁴ Statista (2021), Share of fiber optic internet connection in Thailand

⁶⁵ Government of Canada (2023), Digital Skills for Youth program

⁶⁶ UK Government (2022), New Digital Strategy to make UK a global tech superpower

⁶⁷ Australian Government (2013), The National Cloud Computing Strategy

Federal Government of Brazil,⁶⁸ Macaulay, T.,⁶⁹ Coker, J.,⁷⁰ GDPR EU,⁷¹ Delphix,⁷² Computerworld,⁷³ Mcguire Sponcel,⁷⁴ UK Government⁷⁵ GovTech Singapore,⁷⁶ Teng, R.,⁷⁷ NHS Digital⁷⁸

⁶⁸ Federal Government of Brazil (2018), Brazilian Digital Transformation Strategy

⁶⁹ Macaulay, T. (2023), New plans for a GDPR replacement have divided Britain's tech sector

⁷⁰ Coker, J. (2023), Replacing GDPR in the UK: A Cost-Benefit Analysis

⁷¹ GDPR EU (n.d.), What is GDPR, the EU's new data protection law

⁷² Delphix (2020), The Japan Act on the Protection of Personal Information Explained

⁷³ Computerworld (2023), UK Spring Statement: Gov't pledges incentives for AI and quantum development

⁷⁴ Mcguire Sponcel (2020), Calculating cloud computing expenses

⁷⁵ UK Government (2022), Government Cloud First policy

⁷⁶ GovTech Singapore (2020), Developing ICT systems on the cloud helps the Government deliver more agile and user-centric digital services

⁷⁷ Teng, R. (2023), Key lessons from the Singapore government's ambitious whole-of-government cloud migration strategy

⁷⁸ NHS Digital (2022), Cloud security- good practice guide.

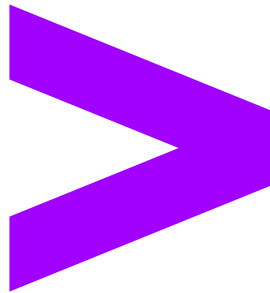
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