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Realising a cloud-enabled economy in India:

How cloud drives economic and societal impact through small businesses

2023

By 2030, small businesses can deliver greater societal value in a cloud-enabled India

Across key sectorsⁱ this opportunity is expected to represent:

₹1.6 trillion combined annual productivity benefits unlocked through cloud-enabled small businesses in healthcare, education, and agriculture



This represents a 152% increase on current levels



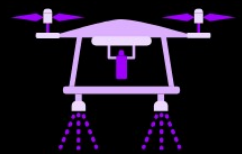
45.9 million people in India (9% of the workforce) employed by cloud-enabled small businesses within healthcare, education and agriculture

47 million telehealth consultations supported by small business services using cloud



99 million school students engaging in online learning via cloud-enabled small businesses

1 in 9 farms using cloud-enabled precision agriculture technologies supported by small businesses



i. Key societal sectors are healthcare, education, and agriculture.
Current values are annual 2022-2023 values based on the latest available data.

Overview

Small businesses and startups (defined as businesses with between 1 and 250 employees) are a major driver of economic performance in India with 69% of businesses (325 million in total) employing fewer than 10 people.¹ Small businesses are also a major source for innovation and disruption in the economy, leveraging old and new technologies to fill gaps in the current market and bring 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 has driven economic and societal benefits by creating new business models, reducing costs, and supporting new opportunities for entrepreneurs and startups. Around 28% of all businesses across India now utilise at least some basic form of cloud technology such as office tools and storage, although usage of more intermediate and advanced tools, such as artificial intelligence (AI) and big data analytics, is expected to be far lower based on adoption data observed in other major economies. Cloud technologies have most profoundly impacted small businesses by allowing them to start, operate, and scale their organisation more effectively.

The use of cloud technology by small businesses is expected to become increasingly widespread, advanced, and mature. With continuous advancements in technology and the decreasing costs of cloud services, small 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,” which would be characterised by high levels of overall cloud adoption across Indian businesses. It is anticipated that under this scenario, 90% of all businesses would adopt at least a basic level of cloud technology.^{2,3} For many businesses, however, this represents only the beginning of their cloud journey. The escalating sophistication in cloud technology beyond basic applications will be a pivotal driver for economic growth in the future. As small businesses tap into advanced cloud functionalities, such as AI, data analytics, and serverless computing, they can foster innovation, streamline operations, and customise consumer experiences at scale. These advanced uses can unlock new revenue streams, encourage innovation and the creation of new business models, and enhance competitiveness, collectively underpinning the future of the digital economy.

Assuming this scenario is achieved by 2030, a cloud-enabled Indian economy is expected to deliver even greater societal impact by supporting small businesses to produce innovative products and solutions or augment their existing operations. In certain societal sectors, namely health, education, and agriculture, this annual contribution is expected to reach ₹1.6 trillion. Not only that, but by 2030, cloud-enabled small businesses are expected to support 47 million remote health consultations, 99 million school students to access online education, and one in nine farms access more efficient and sustainable farming practices in India. Cloud-enabled small businesses are heavily involved with developing solutions to transition the economy towards a more sustainable future and designing digital finance solutions (through ‘fintechs’) that help to support better financial inclusion and wellbeing.

¹ United Nations (2023), Skilling, Entrepreneurship and Job Creation.

² Gartner (2022), The future of cloud computing in 2027: From technology to business innovation.

³ 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, Indian businesses and governments will need to collaborate to foster the continued adoption and maturity of cloud technology 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.

Indian governments 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 small businesses (businesses with between 1 and 250 employees)⁴, by enabling them to scale quickly, reduce costs, reach global markets, and access a range of technology resources that were previously unattainable.

Box 1: Definition of small business

This report uses the term “small business” to refer to businesses and startups with between 1 and 250 employees. The Organisation of Economic Cooperation and Development (OECD) defines businesses of these sizes collectively as micro, small, and medium enterprises (MSMEs), however, MSMEs have a different definition in India based on investment and turnover, rather than number of employees.

Source: Ministry of Micro, Small and Medium enterprises (2023), OECD (2023)

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.⁵ 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 small businesses 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.⁶

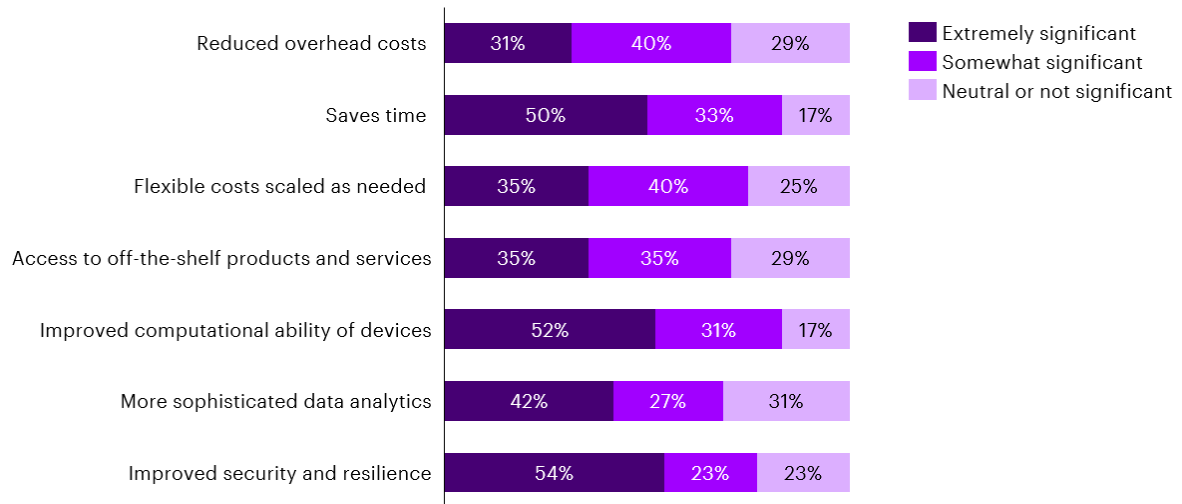
⁴ The definition of small business used in this report is taken from the OECD (2023) and covers enterprises with businesses between 1-250 employees.

⁵ AWS (2023), What is cloud computing?

⁶ Accenture societal impact survey (2023), n = 562.

Figure 1: The most significant benefits of cloud technology for small businesses

Average % of cloud-enabled small businesses across several industries in India that find cloud somewhat or extremely significant in providing a particular benefit



Source: Accenture societal impact survey (2023), n = 54. '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 access to on-demand functionalities supports small businesses to start, operate, and scale their business more efficiently and effectively.

Figure 2: End-to-end cloud technology applications for small businesses



Source: Accenture

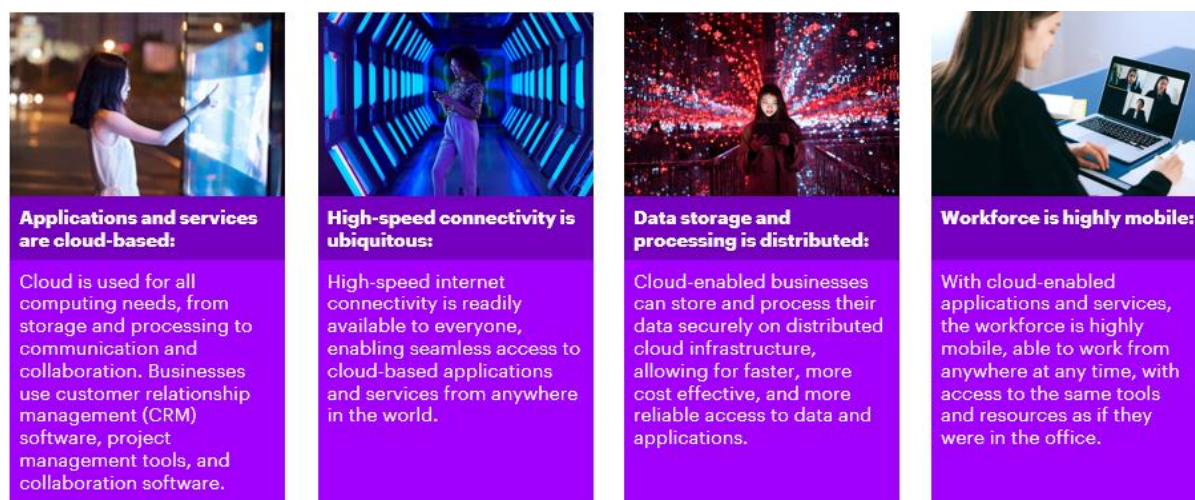
1.2 Achieving a cloud-enabled economy can unlock significant societal and economic potential

As cloud technology and applications develop further, the current wave of digital disruption will expand as businesses find new ways to innovate their products and business operations. A “cloud-enabled economy” refers to a future characterised by such innovation and productivity benefits brought about by high levels of cloud adoption. Based on an assessment of cloud industry forecasts, this report expects 90% of all businesses will adopt at least a basic level of cloud technology in a cloud-enabled economy scenario.^{7,8} 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).

⁷ David Smith and Dennis Smith (2022), “The future of cloud computing in 2027: From technology to business innovation”.

⁸ Laurence Goasduff (2021), “Gartner says cloud will be the centerpiece of new digital experience”.

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 OECD, and refers to the share of businesses that purchased cloud services⁹ as a proportion of all businesses, across all levels of maturity.¹⁰ 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 (ML) and AI platforms, big data analytics tools, internet of things (IoT) platforms, serverless computing, container management systems, and advanced security and compliance tools.

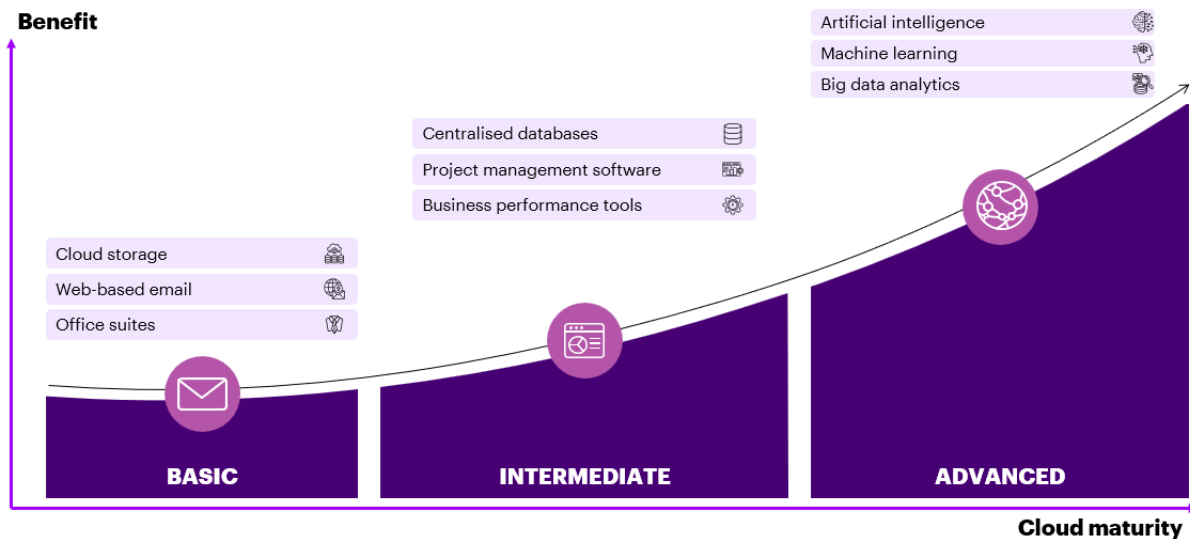
As the global economy increasingly digitizes, the need for small businesses to increase their cloud maturity is becoming increasingly pertinent. Small businesses that fail to leverage the scalability of cloud solutions may not only forfeit the ability to compete more effectively with fewer fixed IT costs, 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 small businesses to maintain their competitive edge in a dynamic, cloud-enabled economy,

⁹ 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

¹⁰ OECD (2023), OECD Going Digital Toolkit

the sophistication of 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

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 them a competitive edge in the market. Cloud 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 (see Appendix D of the [global report](#) for a full description of each technology supported by cloud).¹¹ 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%.¹² 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.¹³ As shown in Figure 5, 88% of Indian small businesses across several

¹¹ Damian Mazurek, (2023), Leveraging Cloud-based AI/ML Services to elevate your business.

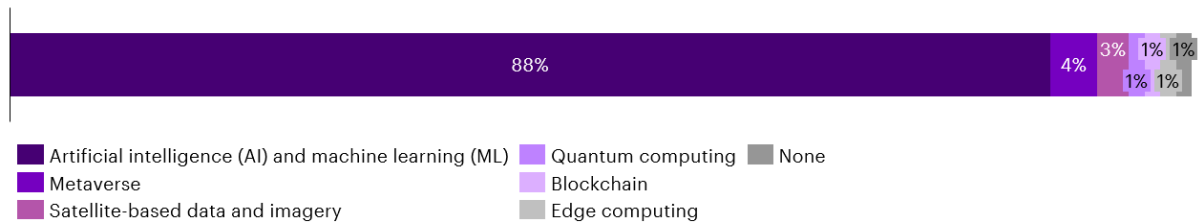
¹² Precedence Research (2023), Generative AI Market size to hit USD 118 Bn by 2032

¹³ AWS (2023), Generative AI on AWS.

industries 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.^{14,15} Generative AI could be used by cloud-enabled small businesses 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 5: Technologies supported by cloud creating the most significant societal impacts in 2030

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



Source: Accenture societal impact survey, n = 54. 'Artificial intelligence (AI) and machine learning (ML)' includes subsets generative AI and natural language processing (NLP).

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 small businesses 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.¹⁶

While these industries are not the only ones that are impacted by cloud technology, nor are they necessarily the largest, these industries 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

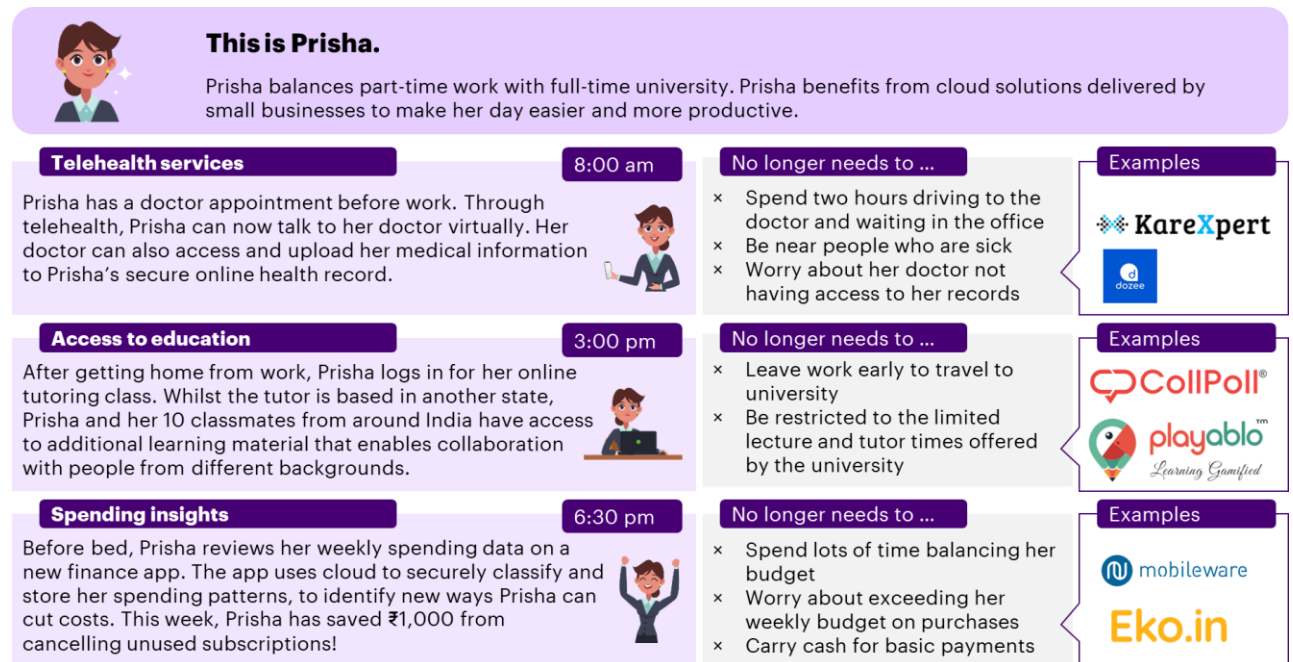
¹⁴ Accenture societal impact survey (2023), n = 54. 88% of Indian small businesses is consistent with the 78% of small businesses globally out of a sample of 562 who identified AI and ML as the technologies likely to be most significant in creating societal impacts by 2030.

¹⁵ Survey responses were from small businesses working in healthcare, education, agriculture, finance, and sustainability.

¹⁶ 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).

(Goal 3), education (Goal 4), and economic prosperity and equality (Goal 9 and 10).¹⁷ Figure 6 demonstrates through a stylised cameo how cloud technology supports access to these industries for individuals through digitisation.

Figure 6: The impact of cloud-enabled small businesses on individuals



Notes: Examples include **small businesses** and startups using cloud solutions from AWS case studies
Source: AWS¹⁸

¹⁷ United Nations (2023), Sustainable development goals.

¹⁸ AWS (2023), Customer Success Stories.

2 Unlocking ₹1.6 trillion in productivity benefits within key societal sectors

Small businesses are a major driver of economic performance in India. Cloud technology is helping to create and scale small businesses (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 2: 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 overall cloud adoption rates and GDP (controlling for capital and labour inputs). Using this observed relationship, this report considers a scenario in which the adoption rate is consistent with a “cloud-enabled economy”, characterised by an overall adoption rate of at least 90% of all businesses. The modelling then accounts for small businesses within agriculture, healthcare, and education sectors by observing current shares of gross value added (GVA) attributable to these breakdowns for each country. A detailed appendix of the methodology is included in the Global Report.

Note: Global report is available on the [AWS website](#).

The productivity benefits of the cloud-enabled economy to Indian societal sectors would be significant. Currently, around 28% of all businesses across India utilise at least some basic form of cloud technology such as office tools and storage, although usage of more intermediate and advanced tools, such as artificial intelligence (AI) and big data analytics, is expected to be far lower. Through successful transition to a cloud-enabled economy, small businesses in the healthcare, education, and agriculture industries within India are expected to unlock ₹1.6 trillion annually by 2030, a 152% increase from ₹0.6 trillion.¹⁹ Under this scenario, it is estimated that 45.9 million people would work at cloud-enabled small businesses in these industries, which would be 9% of the total jobs in India, an increase from 3% currently.

¹⁹ Industry contributions are estimated based on the industry value added as a percentage of GDP. See [global report](#) for full methodology.



Annual productivity benefits unlocked by cloud-enabled small businesses in key societal sectors are expected to reach ₹1.6 trillion by 2030



45.9 million people in India are expected to be employed by cloud-enabled small businesses in key societal sectors by 2030

India has the potential for significant growth in unlocking the potential of cloud technology, given it is still at a nascent stage of adoption compared to mature markets. Cloud technology spending as a proportion of GDP in mature markets like United States and Singapore is 4-5 times higher than India. However, India's cloud expenditure and adoption are experiencing rapid growth, with the public cloud market growing at 44%, which is almost double the global average of 26%.²⁰

²⁰ Oliver Wyman, NASSCOM (2022) 'Future of Cloud and its economic impact, The Opportunity for India'.

3 The societal impact of the cloud-enabled economy

Small businesses that harness cloud technology have the potential to create significant societal impact in India. We define “societal impact” in reference to the positive changes and improvements in outcomes facilitated by cloud technology in areas such as healthcare, agriculture, and education. By leveraging cloud technology, small businesses 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 technologies will support improved social wellbeing and development.

3.1 Driving innovation and improving access to healthcare and life sciences

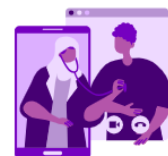
As India is the most populous country, access to basic services such as healthcare remain a challenge. In 2017-18, it was estimated that only 37% of the Indian population was covered by private healthcare, putting a significant strain on the public sector to support this shortfall, leading to long wait times and a reluctance to seek treatment.²¹ Cloud technology is helping to overcome these barriers by enabling small businesses 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 India. If India were to achieve a cloud-enabled economy, small businesses in healthcare are expected to unlock ₹199.5 billion in annual productivity benefits by 2030. Cloud-enabled small businesses are expected to support 47 million virtual health consultations per year by 2030.²²

Impact of small businesses on healthcare in the cloud-enabled economy by 2030



₹199.5 billion in annual productivity benefits unlocked through cloud-enabled small businesses in the healthcare sector, an increase from ₹79.2 billion currently

47 million virtual consultations supported by cloud-enabled small businesses



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

²¹ The Commonwealth Fund (2020), International Health Care System Profiles: India

²² Remote health consultations can also be supported by telephone or through large cloud-enabled firms.

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 administrative functions. While generative AI is still a nascent technology, small businesses can use it to support clinical decision making, helping medical professionals analyse data more accurately, along with supporting efficiency in research and development.²³

3.2 Improving access to engaging and personalised education

By 2035, one-fifth of the world’s working age population will be in India. This creates an enormous economic opportunity for India, provided it can educate and train the population to gain the skills they need.²⁴ Cloud technology can make education more equitable, safe, and accessible 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. Under a cloud-enabled economy, small businesses in education are expected to unlock ₹291.6 billion in annual productivity benefits by 2030. Through supporting the education industry, cloud-enabled small businesses are expected to facilitate 99 million school students and 248 million Indian adults to receive online learning by 2030.

Impact of small businesses on education in the cloud-enabled economy by 2030



₹291.6 billion in annual productivity benefits unlocked through cloud-enabled small businesses in the education sector, an increase from ₹115.8 billion currently

99 million primary to high school students using online education via cloud-enabled small businesses, a 165% increase from 37 million students currently



248 million adults accessing education via cloud-enabled small businesses

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.

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. Cloud technology can also help reduce the administration workload for teachers, enabling them to spend more time educating students. CollPoll is a business in India supporting collaboration and remote learning for over 100,000 users with cloud technology, providing a learning management system for content sharing in higher institutions, in addition to AI-proctored exams.^{25,26}

²³ WE Forum (2023), How will generative AI impact healthcare?

²⁴ Australian Department of Foreign Affairs and Trade (2023) Why India and why now?

²⁵ AWS (2022), CollPoll uses AWS to help universities digitally transform in India and beyond.

²⁶ CollPoll (2023).

Cloud-enabled small businesses 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, not to mention 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. For example, the Indian business PlayAblo offers a gamified learning platform to support online assessments, along with a dashboard to measure learning outcomes.²⁷ AI, and in particular, generative AI has the potential to be particularly useful in helping educators provide differentiated learning pathways based on the needs of individual students.²⁸

3.3 Developing smarter and more sustainable farming practices

The Indian agriculture industry is an important economic contributor both globally and domestically, however, parts of India's agriculture sector are relatively inefficient compared to other parts of the world (see Case study below). Cloud services are being used by the agricultural industry in India to support smarter, more sustainable farming practices. These technologies can assist agricultural decision making, by leveraging remote sensing, monitoring devices, and real-time data about crops, livestock health, and resource consumption (referred to as precision agriculture).²⁹ Under a cloud-enabled economy, small businesses in agriculture are expected to unlock ₹1.1 trillion in annual productivity benefits by 2030. Precision agriculture technology supported by cloud-enabled small businesses is expected to be in operation in one in nine farms across India by 2030.

Impact of small businesses on agriculture in the cloud-enabled economy by 2030



₹1.1 trillion in annual productivity benefits unlocked through cloud-enabled small businesses in the agriculture sector, an increase from ₹0.4 trillion

1 in 9 farms using precision agriculture supported by cloud-enabled small businesses, a 300% increase on current usage



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.

Small businesses in India are already supporting a data-driven approach and automation for agriculture. Krishitantra is providing over 500,000 registered farmers with soil testing in 30 minutes, enabling them to see results in a mobile app on nutrient levels, pH balance, and other factors.³⁰

²⁷ PlayAblo (2023).

²⁸ World Economic Forum (2023), Can AI improve education? Here are 4 potential use cases.

²⁹ FAO (2022), Leveraging automation and digitalization for precision agriculture: Evidence from the case studies.

³⁰ Krishitantra (2023).

Areete uses cloud-based wearable cattle devices and AI algorithms to monitor cattle health and reproduction, helping farmers improve yields



Industry:
Agriculture



Size: Small
(<30 employees)



Location: India

Areete is a startup based in Pune, India that focuses on supporting dairy farmers through the application of technology. India is the world's largest dairy producer and consumer but is comparatively inefficient in production of milk. On average, India produces only 1.36 tons of milk per cow, per year compared to the 5.64 tons per cow in developed countries yet relies heavily on agriculture to feed the largest domestic population globally. A primary reason for this difference in yields is the health and management of cattle in dairy farms across India.

Areete is a cloud first data management company attempting to improve productivity in dairy farming by providing wearable technology for livestock. This technology helps farmers monitor cow health through real-time, health indicators. Improvements to India's milk yields would help meet growing demand for milk and milk products, reduce costs, and reduce the number of cows needed to sustain the agriculture sector.

"Areete supports data-driven, targeted intervention to improve the health of cattle in India's dairy industry. This supports increased yields that contributes towards improved affordability and availability of dairy products across India."

Srinivas Subramanian, founder.

Areete's wearable cattle collars (known as the Ayushman Cowfit) enable 291 different data features to be analysed, including information on the cow's biometric information, rate of movement, and position. Farmers remotely monitor their cattle through Areete's cloud-based



software and determine if a particular cow has signs of illness or poor health, including elevated temperature or heart rate, and unusual idleness or rumination. Heat cycle indicators also allow farmers to monitor and manage breeding cycles of cattle more effectively. This information reduces the time spent physically monitoring and tending to cattle, whilst also significantly improving the quality of information used to make decisions relating to output and reproduction. Early studies indicate that use of **the Ayushman Cowfit can improve dairy yields by more than 10%**.

Cloud is central to the ability of Areete's wearable technology to deliver timely and informative analytics directly to farmers. Through Areete's cloud-based platform, pre-built AI algorithms sift through and analyse hundreds of real-time indicators on each cow to determine whether the animal is behaving abnormally or is in heat.

As a small company, Areete is focused on developing its AI algorithms further and expanding usage across India.

Source: OECD (2020), OECD-FAO Agricultural Outlook 2020-2029; OECD (2023), OECD-FAO Agricultural Outlook 2023-2032

3.4 Improving financial access and wellbeing

Digitisation of the finance sector has led to wave of disruption, increased competition, and new types of products and services that better service customers.³¹ 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.³² As such, cloud-native small businesses in the finance industry (referred to as fintechs) represent one of the fastest growing markets in the world, expected to rise from US\$134 billion in 2022 to US\$557 billion globally by 2030 – more than a 400% increase.³³ The rise of fintech apps has also a boost in convenience and access, individual autonomy over financial decisions, better access to information, and tighter security frameworks. 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 small businesses.³⁴ Globally, 15% of cloud-enabled small businesses working with the finance sector are expected to be helping budget-constrained customers or small businesses to better manage their finances.³⁵ 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.³⁶

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



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

Globally, **15%** of surveyed cloud-enabled small businesses 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.

Availability, access, and convenience of financial services is an also important feature of economic and social development in India. As of 2021, India had an unbanked population of around 22%, meaning that around 230 million adults in India do not have access to basic financial services such as a bank account.³⁷ Cloud technology can enable digitally accessible financial services such as finance and banking to reach more people, especially for those who face barriers to financial services, such as distance, affordability, or financial literacy. Cloud-based small businesses are already supporting digital banking and the use of advanced analytics to improve outcomes for people in India. These companies include Eko, an India-based small business that is using cloud technology to provide basic financial services, such as money transfer, to low and middle income workers.³⁸ Sub-K, explored in the case study below, is another cloud-enabled small business driving improved access to microfinance for women across India.

³¹ OECD (2020), “Digital disruption in banking and its impact on competition”.

³² Ibid.

³³ Vantage market research (2023), “Fintech market – Global Industry Assessment and Forecast”

³⁴ Accenture societal impact survey (2023), n = 188.

³⁵ Accenture societal impact survey (2023), n = 188. Based on the number of cloud-enabled small businesses currently supporting this outcome.

³⁶ Crunchbase (2023) “How the future of personal finance is self-driving money”

³⁷ World Bank (2021), The 2021 Global Findex Database.

³⁸ Eko (2023).

Sub-K is a fintech company digitising financial services and improving access to microfinance for underserved, female entrepreneurs



Industry:
Finance



Size: Large
(250+ employees)



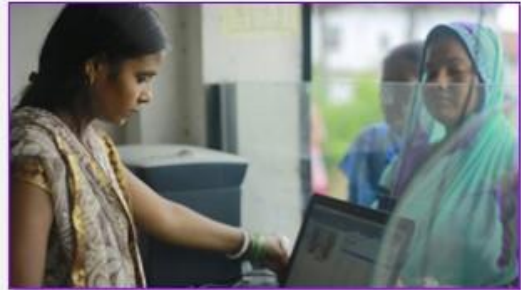
Location: India

Starting as a small business in 2010, Sub-K has grown into a large fintech company that focuses on helping vulnerable customers, particularly women, access financial services and credit. Women in developing countries such as India remain underrepresented by financial services: only 78% of women in India have a bank account and 42% of these accounts remain inactive. Utilising financial accounts for payments or other services enables women to access the formal economy, improve their economic stability, and gain financial independence, facilitating improved access to services including health and education. The financial exclusion of women also represents a significant cost to the economy each year with limited or poor access to financial services preventing women from starting more small businesses and securing higher wages.

“We are using cloud-based apps to make financial services convenient and accessible, along with using ML to harness new risk metrics for credit assessments, widening the group of women that can access microfinance.”

Srinivas Valluri, CTO.

Sub-K acts as an intermediary, working with a wide network of financial institutions across India to bring digital banking services to customers and microfinance options to women. Through a cloud-based app, Sub-K removes the need for physical financial interactions (which remain common among traditional lenders in India) and offers affordable loans with no collateral requirements.



Since Sub-K started in 2010, the company has supported **7 million women to access microfinance** and enabled 24 million transactions.

Cloud is the key distinguishing feature that separates Sub-K from other financial intermediaries and lenders. With a cloud-based app, Sub-K can manage a broader base of customers, update features and offer new products quickly and at scale. Beyond offering digital finance through a cloud-based app, cloud allows Sub-K to utilise new data and analytics tools to make finance ‘smarter’. Using AI and ML, Sub-K creates customer profiles, estimates default probabilities, and manages overall risk using larger and more sophisticated data sources. These advanced analytics support women disadvantaged by traditional credit worthiness assessments to access microfinance. Internally, Sub-K uses cloud-based data analytics and dashboards to understand and plan for patterns in customer usage of finance and identify underserved, but credit worthy, borrowers.

Source: World Bank (2021), The Global Findex Database 2021; Breza & Kinnan (2018), Measuring the Equilibrium Impacts of Credit: Evidence from the Indian Microfinance Crisis.

3.5 Designing a sustainable future

India is the third-largest emitter (7%) of greenhouse gases after China and the US and as a result, has the second-worst air pollution in the world.^{39,40} According to the Air Quality Life Index developed by the University of Chicago, air pollution shortens the average Indian life expectancy by five years.⁴¹ 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 small businesses 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 small businesses to directly address their climate and sustainability objectives, such as through energy or emissions monitoring and reduction.⁴² 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 small businesses to achieve a range of sustainable outcomes.⁴³ Globally, 15% of cloud-enabled small businesses 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.^{44,45}



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

According to the Accenture societal impact survey of global small businesses, 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.⁴⁶ Through these sustainable solutions, global small businesses 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.⁴⁷ Recity is a small business in India which uses cloud technology to map city waste flows, trace plastic in a supply chain, and automate the plastic waste value chain with a SaaS platform.⁴⁸ Recity is active across more than 22 Indian cities and have prevented 55,000 tonnes of plastic from entering the environment.⁴⁹

³⁹ Statista (2023), Emissions in India

⁴⁰ University of Chicago (2023), Air Quality Life Index - Country spotlight: India

⁴¹ University of Chicago (2023), Air Quality Life Index - Country spotlight: India

⁴² Accenture societal impact survey (2023), n = 66.

⁴³ IDC (2023), Smart Cities.

⁴⁴ Accenture societal impact survey (2023), n = 66.

⁴⁵ OECD (2021), Measuring smart city performance in COVID-19 times: Lessons from Korea and OECD countries.

⁴⁶ Accenture societal impact survey (2023), n = 66.

⁴⁷ Accenture societal impact survey (2023), n = 66.

⁴⁸ Recity (2023).

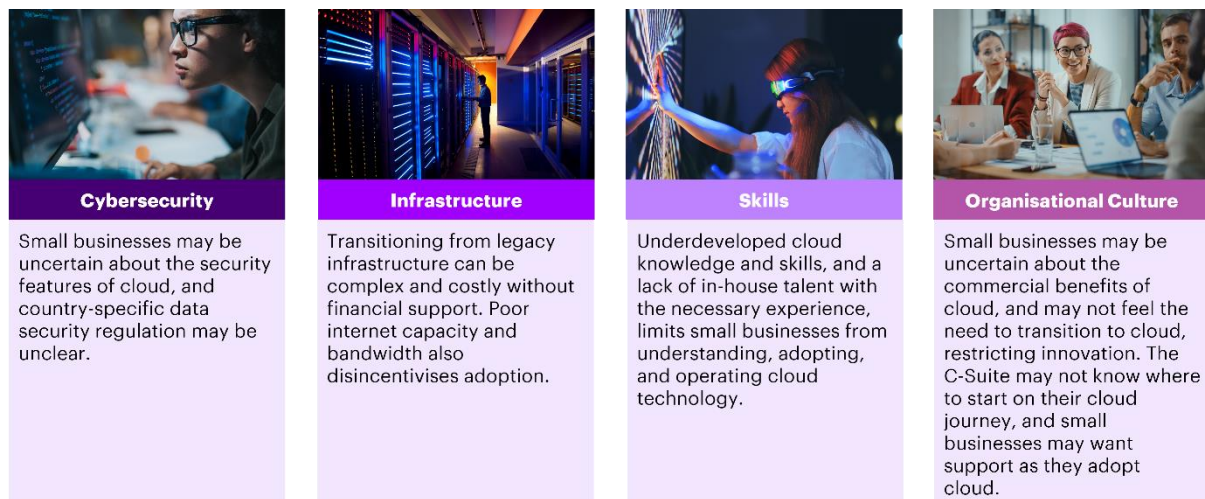
⁴⁹ Recity (2023).

4 Achieving the cloud-enabled economy

The cloud-enabled economy offers significant potential in terms of both economic and societal impact. As a nascent market, India’s path towards a cloud-enabled economy will primarily focus on increasing adoption rates. Historically, internet infrastructure and availability has been a major challenge to cloud uptake, however, projects like BharatNet are enabling increased access. Internet rates have grown rapidly from 18% in 2014 to 46% in 2021.⁵⁰ In addition, surveys have shown that awareness of cloud technology benefits, integration with legacy systems, and lack of in-house capability to drive transformation are also key barriers to uptake of cloud.⁵¹

As cloud adoption accelerates, the focus will then shift towards using cloud technology in new ways within firms who have already adopted to reach the full potential of the cloud-enabled economy. This will involve maturing cloud usage across more complex business functions and implementing more advanced technologies supported by cloud such as AI and ML.⁵² Unlocking these opportunities by 2030 requires continued coordinated action from industry and the Indian government to address key barriers to adopting cloud as summarised on Figure 7. Small businesses face cybersecurity and infrastructure (e.g., software and hardware) barriers to cloud adoption, along with skills barriers such as a lack of in-house talent who can start the cloud adoption process. There are also organisational culture barriers to cloud adoption for small businesses, including businesses that don’t use cloud not feeling the need to transition unless they are specifically looking at growth using cloud, the C-Suite not knowing where to start on a cloud adoption journey, and small businesses feeling they need support as they adopt cloud.

Figure 7: Firm-level barriers to cloud adoption



Source: Accenture⁵³

⁵⁰ The World Bank (2023).

⁵¹ Oliver Wyman, NASSCOM (2022) ‘Future of Cloud and its economic impact, The Opportunity for India’.

⁵² Technologies supported by cloud refer to technologies that are dependent on or are predominantly offered through cloud due to computational or data requirements. This includes AI, ML, IoT, and quantum computing.

⁵³ Accenture (2023), The race to cloud: Reaching the inflection point to long sought.

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

Small businesses can adopt a range of internal policies and actions to adopt cloud solutions across all business functions and maximise their productivity dividend overtime (Figure 8).

Figure 8: Steps for small businesses to accelerate cloud maturity

Steps	Description	Barriers addressed			
		Cybersecurity	Infrastructure	Skills	Organisational culture
1 Identify how cloud meet business needs	<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 small businesses 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 Indian government’s cloud policies and programs offered by industry to address firm-specific barriers and accelerate cloud maturity This could include operational support or R&D tax credits from the Indian government, or sponsorship programs for startups run by cloud providers such as AWS 	✓	✓	✓	✓
3 Educate 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 their 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 Small businesses 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 Small businesses 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 small business cloud adoption

In recent years, India has had reasonable policy support for cloud adoption compared to other nations. India has a variety of policies addressing the barriers discussed in Section 4.1, and international counterparts can offer examples for further addressing cybersecurity, infrastructure or IT resources, skills and culture barriers to cloud adoption in organisations (see Figure 9).

Figure 9: Global best-practice examples of cloud adoption policies

■ Cybersecurity
 ■ Infrastructure
 ■ Skills
 ■ Organisational culture

Policy	Key existing support	Best practice	International policy examples	Barriers addressed
Invest in digital infrastructure	While India has the 69 th fastest internet speed in the world, they have the most internet users globally supported by the Digital India initiative, with access to almost half of the population as of 2022. India has announced a task force to support rollout of an ultra high-speed internet connectivity with 6G roll out by 2030.	Additional investment into rural areas and connecting more premises to full optic fibre connections would improve speeds to facilitate cloud.	 Brazil national broadband plan aims to improve access to highspeed broadband across the country  Giga Thailand Infrastructure fibre broadband as the new country-wide infrastructure of Thailand  Universal broadband fund brings Internet at speeds of 50/10 Megabits per second (Mbps) to rural and remote communities	<div style="display: flex; justify-content: space-between;"> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> </div>
Invest in cloud skills and training	The NASSCOM FutureSkills Prime initiative is targeted at delivering world-class training to Indian businesses, workers, and students. This includes cloud-specific training.	Continued developing cloud skills programs and industry partnerships in line with best-practice, especially for MSMEs.	 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	<div style="display: flex; justify-content: space-between;"> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> </div>
Harmonise data policies across regions	The Digital Personal Data Protection Bill aims to accord rights to individuals to protect their personal data and is one of several initiatives of the Government to enhance safety and security in the digital age.	Continue to work with experts to harmonise data policies such as cross-border data flows.	 The international community could work together in forums such as the G7 or G20 to harmonise data policies.	<div style="display: flex; justify-content: space-between;"> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> </div>
Incentivise cloud adoption and maturity	India supports small businesses with general tax incentives and a wide variety of schemes such as MUDRA, SIPEIT, CGTMSE, Digital MSME, and others which focus on areas including credit, operations, and ICT adoption. India also has R&D tax credits available for businesses.	Continued ongoing financial support for MSMEs to encourage innovation through cloud adoption.	 United States' incentives include cloud being fully tax deductible and tax credits for ongoing cloud-related investments  Australia's Small Business Technology Investment Boost and Small Business Skills and Training Boost has a temporary 120% tax deduction on cloud training and systems costs for small businesses in 2023	<div style="display: flex; justify-content: space-between;"> <div style="width: 20px; height: 20px; background-color: #cccccc;"></div> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> <div style="width: 20px; height: 20px; background-color: #0000ff;"></div> </div>

Source: World Population Review,⁵⁴ Statista,⁵⁵ Lim, S.,⁵⁶ Statista,⁵⁷ Government of Canada,⁵⁸ Australian Government,⁵⁹ Federal Government of Brazil,⁶⁰ Badgamia, N.,⁶¹ Delphix,⁶² Bordoloi, P.,⁶³ Mcguire Sponsel,⁶⁴ Government of India,^{65,66,67,68,69} Cloud Management Office,⁷⁰ UK Government⁷¹, CGTMSE⁷², Invest India⁷³.

⁵⁴ World Population review (2023), Internet speeds by country 2023.
⁵⁵ Statista (2022), Internet penetration rate in India from 2007 to 2022.
⁵⁶ Lim, S. (2019), The city of the future: What will a full-fiber broadband city look like.
⁵⁷ Statista (2021), Share of fiber optic internet connection in Thailand.
⁵⁸ Government of Canada (2023), High-speed Internet for all Canadians.
⁵⁹ Australian Government (2013), The National Cloud Computing Strategy.
⁶⁰ Federal Government of Brazil (2018), Brazilian Digital Transformation Strategy.
⁶¹ Badgamia, N. (2022), Explained: What is India's Digital Data Protection Bill, 2022 all about?
⁶² Delphix (2020), The Japan Act on the Protection of Personal Information Explained.
⁶³ Bordoloi, P. (2023), The Cost Conundrum: Indian SMEs Struggle with Cloud Infrastructure Expenses.
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⁶⁵ Government of India (2013), Government of India's GI Cloud (Meghraj) Strategic Direction Paper.
⁶⁶ Government of India (n.d.), Government Schemes for Startups.
⁶⁷ Department of Science and Technology (2021), Support for International Patent Protection in Electronics and Information Technology
⁶⁸ Government of India (2023), MSME Insider.
⁶⁹ Government of India (n.d.), Existing Schemes (Ministry of MSME).
⁷⁰ Cloud Management Office (n.d.), Guidelines for Enablement of Government Departments for Adoption of Cloud.
⁷¹ UK Government (2022), Government Cloud First policy.

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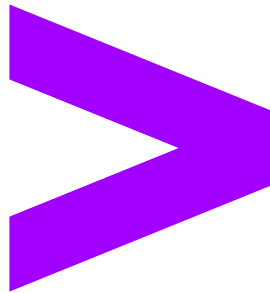
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⁷² CGTMSE ([n.d.](#))

⁷³ Invest India ([2023](#)), FAQ: MUDRA.



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