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A report from the
Deloitte Center for Integrated Research

Teach the world, feed the world, save the world: 5G and cloud archetypes for social good

Advancing the social impact agenda with next-generation cloud infrastructure

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Technology for social impact

SOCIAL IMPACT IS an increasingly important business measure as organizations look to become social enterprises.[1] Today's technology organization has a unique opportunity to use ***technology for social impact*** and to adopt strategies that create strategic social and business value—be it the ability to expand access to education, enhance food production, or create safer and more equitable cities and communities. While it may apply tremendous pressure on technology and even technologists, today's technologies, such as cloud, are up for the challenge. Innovative infrastructure combinations,[2] such as 5G for information connectivity and cloud for computing are coming together with transformative potential. In fact, in one of Deloitte's recent surveys, more than 80% of executives surveyed said advanced connectivity is important to capitalize on advanced technologies (artificial intelligence or AI, edge computing, and data analytics).[3] The question is, how to unlock the technology's potential?

The 5G/cloud potential

A marriage of equals and archetypes

5G BRINGS WITH it the promise of high-definition mobile video streaming, distributed information networks (satellites, sensors, etc.), high-speed (low-latency) data streaming and computing,[4] and distinct opportunities to address a host of challenges.[5] The promise of 5G is pertinent given it helps to address streaming access. In the United States alone, reliable streaming **access** is an issue—11 million people (approximately 3.3% of the US population) live in rural and "less urban" areas and about 2 million live in poverty[6] in **broadband-dead zones**. Almost 50% (over 160 million) Americans did not have access to 25 mbps broadband as of 2018, and about 40% of US families in rural areas do not have high-speed home internet even now.[7]

These pressing social challenges require architects[8] to innovate in the real world in areas like virtual learning and work, precision agriculture, and mobility.

To manage the access challenge, the US government created a US$9 billion 5G fund for high-speed rural connectivity[9] and approved a US$137 million investment to bring high-speed internet to homes and businesses over the next decade.[10] Nonetheless, *more can be done*. A marriage of 5G (makes information access more equitable and affordable) and the cloud (flexible, high-speed)[11] is a collaborative solution that can increase control and infuse intelligence into these scenarios.[12]

The 5G/cloud relationship is a marriage that can produce three distinct functional "archetypes."

- **Instant access:** Broader connectivity access that eliminates bandwidth deserts and allows organizations to spin up virtual infrastructure quickly
- **Distributed data:** Infrastructure that takes advantage of unfettered real-time data streaming powered by 5G and increases the ability to offload data from end-point devices (IoT, etc.) to the cloud for greater computing power and the spatial web's[13] promise
- **High speed/high throughput:** Activates advanced ultra-low-latency use cases that bring together faster data streaming and faster computing power

Tech talk aside, with the right strategy, these "archetypes" can potentially deliver real business and social impact.

Making an impact

Teach the world, feed the world, save the world

5G PLUS CLOUD could arguably help social enterprises solve several government, business, and social challenges (figure 1). Three use cases where the stakes are high, and the need is real are:

- **Virtual learning, digital education, and remote work:** 5G plus cloud could eliminate bandwidth deserts and quickly power software and services.
- **Precision agriculture:** 5G plus cloud could unlock real-time data streaming and power intelligent edge/cloud computing networks.
- **Mobility:** 5G plus cloud could transmit and compute data at high speeds to build smarter, greener, safer cities.

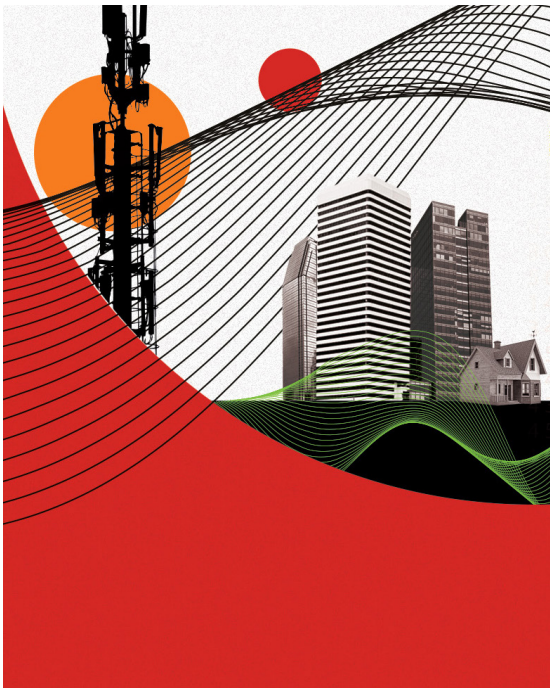
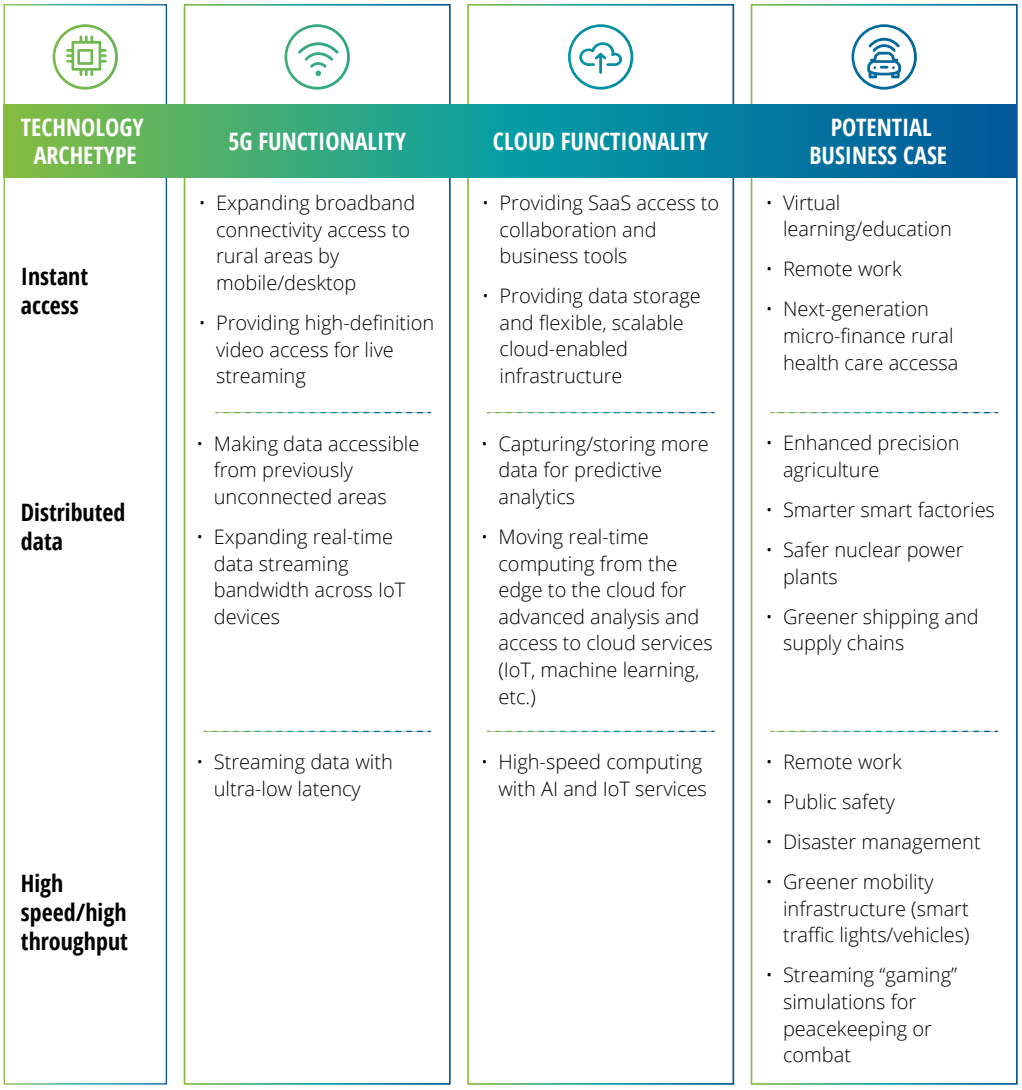


FIGURE 1

Three technology archetypes for 5G plus cloud and potential business cases



TECHNOLOGY ARCHETYPE	5G FUNCTIONALITY	CLOUD FUNCTIONALITY	POTENTIAL BUSINESS CASE
Instant access	• Expanding broadband connectivity access to rural areas by mobile/desktop • Providing high-definition video access for live streaming	• Providing SaaS access to collaboration and business tools • Providing data storage and flexible, scalable cloud-enabled infrastructure	• Virtual learning/education • Remote work • Next-generation micro-finance rural health care accessa
Distributed data	• Making data accessible from previously unconnected areas • Expanding real-time data streaming bandwidth across IoT devices	• Capturing/storing more data for predictive analytics • Moving real-time computing from the edge to the cloud for advanced analysis and access to cloud services (IoT, machine learning, etc.)	• Enhanced precision agriculture • Smarter smart factories • Safer nuclear power plants • Greener shipping and supply chains
High speed/high throughput	• Streaming data with ultra-low latency	• High-speed computing with AI and IoT services	• Remote work • Public safety • Disaster management • Greener mobility infrastructure (smart traffic lights/vehicles) • Streaming "gaming" simulations for peacekeeping or combat

[a] Alex Schulte, Melissa Majerol, and Jessica Nadler, "Narrowing the rural-urban health divide," Deloitte Insights, November 27, 2019.

Source: Deloitte analysis.

Instant infrastructure access

Teach the world

BEFORE THE GLOBAL pandemic struck, organizations were reimagining digital education. Analysts expected the e learning market to grow from US$200 billion in 2019 to US$375 billion in 2026.[14] Learning institutions were exploring digital education and ed-tech strategies that connected parents, teachers, peers, administrators, and mentors with the student across integrated, personalized, and continuous learning experiences.[15] Universities were embracing digital platforms for hybrid-learning models combining on campus and online learning to drive skills, mentorship, and intern opportunities.[16] In adolescent and secondary education (K-12), institutions had embraced digital solutions to create smart classrooms and parental-engagement apps for the youngest students, but not for digital and remote learning.

The global pandemic changed all of that. People across the globe were forced to embrace virtual learning almost instantaneously *and* at scale. Beyond the technical challenges, this change—inflection point, really—highlighted existing inequities related to high-speed internet access and collaboration tools. Both are *essential* for K-12 virtual learning, *an enabler* for diverse and personalized digital learning strategies across higher education, and a *lifeline* to remote work for recent graduates. Take K-12, for example. If only one in five students in California has high-speed internet access and a computer at home,[17] virtual learning is a nonstarter.

In response to the pandemic and its effects, the government passed the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) to provide roughly US$30 billion in education relief for states, K-12 schools, and higher-education institutions (including student grants).[18] Telecommunications and technology providers donated and discounted 5G mobile hotspots, cloud-enabled video conferencing, physical devices to support students,[19] and distance-learning solutions to standardize digital classrooms and activities.[20]

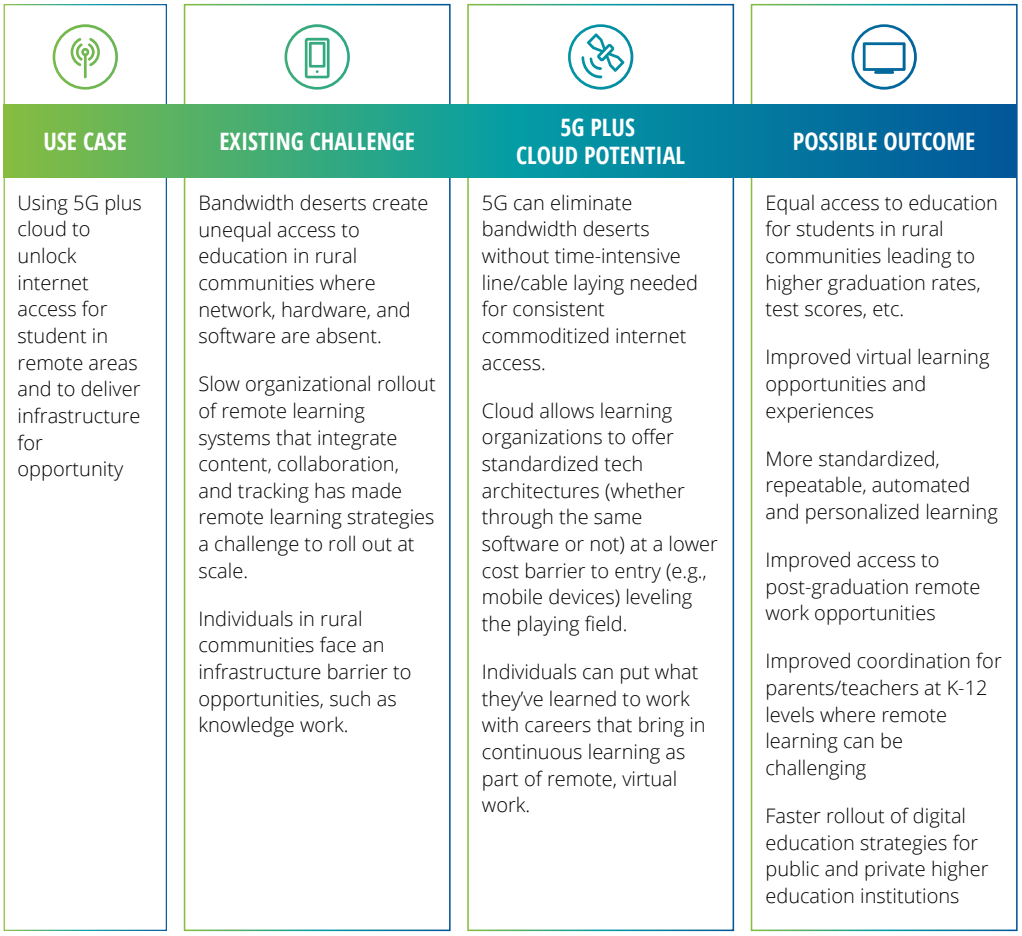
Organizations with existing cloud-based platforms had an advantage when ramping remote learning.[21] By combining the cloud with 5G, education institutions stand to scale that infrastructure and expand K-12 access to the roughly 3 million US students that don't have access to a home internet connection[22] and the 16.9 million children that lack the high-speed home internet access needed to support online learning[23] and are being "left behind" (figure 2).

The long-term stakes are high. Early research related to remote learning during the pandemic shows disenfranchisement comes at a tremendous cost—a third of math progress is lost and low-income students are disproportionately impacted.[24]

Ultimately, 5G plus cloud can unlock internet access and allow for the instant access to software and services needed to *teach the world*, and:

FIGURE 2

Instant access to virtual learning and digital education with 5G plus cloud



Source: Deloitte analysis.

- **Transform learning:** Allowing students to gain improved virtual learning access, to create more standardized and repeatable educational experiences, and to tailor personalized coursework

- **Deepen engagement:** Allowing learning institutions to create automated processes that track and increase student engagement and also involve parents

- **Innovate education:** Creating a digital education foundation on which to build in new experiences, such as gamified learning through videos and virtual reality

Expanding the operating model beyond technology

There is no easy answer to rethinking the student, educational institution, and technology relationship. As described in *The future(s) of public higher education*,[25] there are five potential models that could still work for the future of public higher education. These are the Entrepreneurial University, Sharing University, Experiential University, Subscription University, and Partner University. These models can contribute toward a vibrant, innovative, and efficient public higher education system.

Distributed data

Feed the world

WHEN SPEAKING OF Land O'Lakes' 150 million acres of productive cropland, Beth Ford, president and CEO, said, " ... unreliable or nonexistent high-speed internet in rural areas keeps these [data-based, precision agriculture] tools out of reach for many ... we will work to address this need and help farmers remain profitable and sustainable."[26]

This sets the stage for smart agriculture tools. Smart agriculture was a US$11.45 billion business in 2018 and is expected to expand to US$30 billion by 2027 with increased focus on livestock monitoring, disease recognition, farm resource consumption, efficiency, and productivity.[27] Agricultural robots make up US$6.5 billion of that industry and are driving innovation in field mapping, aerial data collection, planting and seeding operations, and more.[28] The use of satellite data, agricultural IoT,[29] and edge computing being on the rise is giving technology a life-or-death role to play in agriculture. These tools are being used for monitoring and optimizing food sources and water supply, given rising populations and the risk of climate change.[30]

The US government has set up a US$5 billion 5G fund for rural connectivity. Of this, at least US$1 billion is expected to be reserved for 5G to quickly collect and process satellite data to support precision agriculture[31] with a focus on making farmland output more bountiful and profitable,[32] and enabling "smart farming" that has the potential to create more than US$10 billion in business value in the United States alone.[33]

Taking it to the next level, by teaming cloud-native 5G networks and edge solutions with cloud storage and computing, enterprises can advance to more distributed computing. As a result, farmers can move from using reactive networks able to analyze limited data to intelligent edge computing across IoT and artificial intelligence services as well as back-end data analytics.[34]

Ultimately, 5G can eliminate bandwidth deserts, and the cloud can allow for more data processing across the network, allowing farming organizations to:

- **Increase crop production:** Farmers can use drones for landscape and insect imaging. They can use cloud-enabled analysis to identify pests and then perform precision crop-dusting strikes to deliver the right chemical mix to kill insects but leave the crops unharmed. This can help early mitigation of plant stress and optimized seeding, fertilizing, growing, harvesting, distribution, and lower farm carbon footprint.[35]

- **Preserve water to manage scarcity:** By analyzing weather, drone, satellite, and other data to understand the moisture level of the soil, and adjusting watering, farmers can apply the right amount of water to individual zones and save 15% of the water on average.[36]

- **Improve the downstream supply chain:** In the United States, farms contribute more than US$130 billion to the economy.[37] However, between 30% and 40%—equating to US$161 billion—of food produced is wasted

every year. Cloud-enabled big farming has downstream potential across the full food supply chain, from the farm to the store and then to the table, by reducing waste and improving margins. Several startups are looking at analytics for retailers to manage ordering based on past consumption and adjusting it based on dramatic changes to product consumption due to the global pandemic.[38]

FIGURE 3

Distributed data to advance precision agriculture with 5G plus cloud

USE CASE	EXISTING CHALLENGE	5G PLUS CLOUD POTENTIAL	POSSIBLE OUTCOME
Deploying 5G plus cloud to facilitate smart agriculture and optimize food sources and water supply	Agri-businesses are facing a growing set of challenges related to climate change and population growth, resulting in pressure on the global food production and growing demand for clean resource management. Bandwidth deserts create data holes where important information cannot be captured across rural farms or relayed to backend cloud systems. 4G plus IoT/edge infrastructures require organizations to be selective about what data to collect and analyze.	5G can eliminate bandwidth deserts/data holes as 5G radio-fitted devices deployed in the field can send more data to a backend cloud system for analysis. The cloud allows organizations to process more data and employ integrated machine learning and IoT services to take advantage of the spatial web.	• Better control of groundwater by regulating its availability/use in climate-related drought conditions and natural extraction • Improved visibility into the health of the land/animals for more strategic planting and harvesting • Increased food production (crops, milk, eggs, etc.) • Better understanding of fuel usage, productivity levels, and business performance

Source: Deloitte analysis.

READING TO CONSIDER RELATED TO THE BUSINESS CASE

For additional resources on precision agriculture strategies and technologies, read:

- Joe Mariani and Junko Kaji, "From dirt to data: The second green revolution and the Internet of Things," *Deloitte Review* 18, January 25, 2016.
- Chris Arkenberg et al., *Unbundling the cloud with the intelligent edge: How edge computing, AI, and advanced connectivity are enabling enterprises to become more responsive to a fast-moving world*, Deloitte Insights, September 8, 2020.

High speed/high throughput

Save the world

PERHAPS ONE OF the most exciting yet illusive aspects of the 5G plus cloud technology combination is the ultralow latency data streaming and computing potential—think autonomous vehicles and connected motorcycles that could save thousands of lives[39] by using location, health, vehicle, weather, and other data and 5G, the edge, and the cloud to create safer and smarter experiences. Yes, the long-term potential is exciting. The short-term promise, however, is limited and technology strategies for social good would be better served by focusing on mobility more broadly. Deloitte's Future of Mobility research has estimated that data traffic associated with mobility and transportation could grow to 9.4 exabytes every month by 2030,[40] likely making cloud a critical component to manage this type of infrastructure with high speed and throughput.

Mobility infrastructure that brings together 5G and cloud can help across safety, emissions, congestion, convenience, access, and equity.[41] To begin to imagine the potential for carbon reduction, for example, look at what just one US city was able to accomplish by implementing "smart" traffic signals. Not only did commuter travel time reduce, but the vehicle idle time dropped by more than one-third.[42] The reduced idle time is significant, given that the transportation industry is the greatest contributor to carbon emissions at 28% with light-duty vehicles (59%) and medium- and heavy-duty trucks (23%) as the biggest contributors.[43] Another city implemented a cloud-based command center to analyze data and insights across mobility, construction waste, and public safety across city resources used by 1.2 million tourists annually. It reduced energy cost by 20% and operational costs by 40%. Additionally, it saved 900,000 euros (roughly US$1 million) annually for waste management and 10%–27% in terms of mobility through an electrical vehicle-charging network across bikes, kiosks, buses, etc.[44]

Low-latency internet and computing have the potential to take mobility initiatives related to sustainability and public safety to the next level.

IMAGINE BEING ABLE TO:

- Create a virtual twin for a city to measure and manage adverse environmental impacts before they happen
- Simulate real-time "gaming" scenarios to advance peacekeeping initiatives
- Run risk scenarios related to catastrophic events, including everything from a major oil spill to a nuclear reactor malfunction
- Create safer and greener traffic management systems with connected wearables, cars, and surrounding infrastructures that save lives and reduce carbon emissions

Making an impact

The cloud-carbon equation

IN DECIDING TECHNOLOGY-FOR-SOCIAL-IMPACT strategies that tap into the power of 5G and the cloud, another consideration should be the cloud's carbon footprint. Data centers are massive consumers of electricity—thought to currently account for 2% of total global consumption with the potential to rise to 8% by 2030.[45] The technology, media, and telecom sector is facing pressure on energy efficiency and sustainability;[46] 72% organizations are starting to feel the pressure to demonstrate how their energy-management measures address climate-related risks and 74% have raised their reduction targets for their company's carbon footprint/emissions.[47]

When moving to the cloud, aim for a zero-sum game that reduces the organization's existing data center footprint. Shared cloud hardware can achieve 80%–90% improvement in energy consumption,[48] raising 5%–15% hardware utilization in a physical data center to up to 80%–100% utilization in the cloud.[49] This is possible when all of the hyperscalers are investing in their carbon neutral/negative strategies related to their cloud-enabled data centers and computing infrastructure. These strategies include a focus on data center energy efficiency, clean energy credits, use of recycled plastics and more.[50] For example, one cloud provider was able to reduce energy use by 40% (15% overall energy use) for its data center cooling with the help of AI, to predict computational load and manage cooling load, while ensuring optimal performance.[51]

When moving to the cloud, aim for a zero-sum game that reduces the organization's existing data center footprint.

As organizations look *ahead* to understand how they can capture new growth opportunities from sustainability, *inside* to find ways to reconfigure their operations to accelerate sustainability transformation, and *around* for opportunities to leverage their business ecosystem,[52] they should ensure they are measuring the business value of the social impact.[53] For 5G and cloud archetypes that starts with building the business case—how organizations can understand and apply the need for instant access, distributed data, and high-speed/high-throughput infrastructures to the business—and ends, hopefully, with a more sustainable world and better business outcomes.

Endnotes

1. Erica Volini et al., *Introduction: The social enterprise at work: Paradox as a path forward,* Deloitte Insights, May 15, 2020.
2. Jason Killmeyer and Brenna Sniderman, "Navigating a new industrial infrastructure," *MIT Sloan Management Review*, January 31, 2019.
3. Dan Littmann et al., *Enterprises building their future with 5G and Wi-Fi 6: Deloitte's Study of Advanced Wireless Adoption*, Deloitte Insights, June 1, 2020.
4. Gartner, "Gartner survey reveals two-thirds of organizations intend to deploy 5G by 2020," press release, December 18, 2018.
5. David Smud et al., *Connecting the future of mobility: Reimagining the role of telecommunications in the new transportation ecosystem*, Deloitte University Press, February 28, 2017.
6. United States Department of Agriculture: Economic Research Service, *Rural poverty & well-being*, February 12, 2020.
7. Future Ready Schools, *Students of color caught in the homework gap*, 2020; John Kahan, "It's time for a new approach for mapping broadband data to better serve Americans," Microsoft, April 8, 2019.
8. Dan Bieler et al., "The CIO's guide to 5G connectivity and strategy," Forrester, April 12, 2019.
9. Alex Wyglinski, "Coronavirus shows how important 5G networking is," *Hartford Courant*, April 11, 2020.
10. Tara Lachapelle, "5G won't help rural Americans shelter in place," Bloomberg, March 23, 2020.
11. Flexera, *Flexera 2020 state of the cloud report*, 2020.
12. Chris Arkenberg et al., *Unbundling the cloud with the intelligent edge: How edge computing, AI, and advanced connectivity are enabling enterprises to become more responsive to a fast-moving world*, Deloitte Insights, September 8, 2020.
13. Allan V. Cook et al., *The Spatial Web and Web 3.0: What business leaders should know about the next era of computing*, Deloitte Insights, July 21, 2020.
14. John Moore, "Remote learning technology emerges as top ed market focus," SearchITChannel, TechTarget, July 31, 2020.
15. Preeta Banerjee and Gerald Belson, "Digital education 2.0: From content to connections," *Deloitte Review* 16, January 27, 2015.
16. Douglas Thomas and John Seely Brown, *A New Culture of Learning: Cultivating the Imagination for a World of Constant Change* (Createspace Independent Publishing Platform, 2011); Tiffany Fishman and Linsey Sledge, *Reimagining higher education: How colleges, universities, businesses, and governments can prepare for a new age of lifelong learning*, Deloitte University Press, May 22, 2014.
17. Carolina Milanesi, "Spotty broadband is robbing students of their education during COVID-19," *Fast Company*, April 22, 2020.
18. Department of Education, United States of America: Office of Elementary & Secondary Education, "Education Stabilization Fund," accessed October 5, 2020.
19. Milanesi, "Spotty broadband is robbing students of their education during COVID-19."

20. PR Web, “AT&T and Learning Undefeated debut new STEM distance learning program for teachers & students learning online this school year,” July 21, 2020.

21. Moore, “Remote learning technology emerges as top ed market focus.”

22. Piper Hudspeth Blackburn, “Rural families without internet face tough choice on school,” US News & World Report, August 14, 2020.

23. Future Ready Schools, *Students of color caught in the homework gap*.

24. Dana Goldstein, “Research shows students falling months behind during virus disruptions,” *New York Times*, June 5, 2020.

25. Jeffrey Selingo, Cole Clark and Dave Noone, *The future(s) of public higher education*, Deloitte Insights, October 23, 2018.

26. Microsoft, “Land O’Lakes and Microsoft form strategic alliance to pioneer new innovations in agriculture and support rural communities,” July 15, 2020.

27. PRNewswire, “Global Smart Agriculture Market Outlook (2018 to 2027)—Featuring DeLaval, Deere & Company and BouMatic among others,” July 15, 2020.

28. Associated Press, “Agricultural robots market growth—CAGR of 24.1% 2020–2027 | Latest statistical report by Reports And Data,” July 27, 2020.

29. Heather Hall, “Purdue University to collaborate in NSF-funded Engineering Research Center to develop the IoT for precision agriculture,” *R&D World*, August 11, 2020.

30. PRNewswire, “Agriculture IoT market size is projected to reach USD 48,714 million by 2025,” Valuates Reports, July 17, 2020.

31. Christine Fisher, “FCC rolls out a $9 billion fund for rural 5G connectivity,” Engadget, December 4, 2019.

32. Michael Robin, “How to profit from precision farming data,” *Western Producer*, July 16, 2020.

33. Joe Mariani and Junko Kaji, “From dirt to data: The second green revolution and the Internet of Things,” *Deloitte Review* 18, January 25, 2016.

34. Intel, “Top use cases for 5G technology,” accessed October 10, 2020.

35. Deloitte Press Room podcasts, “The Internet of Things in the real world: Exploring IoT in transportation, agriculture, industry and more,” Deloitte, September 27, 2017; Hewlett Packard News Advisory, “HPE Center of Excellence enables farmers to increase crop yield, nutritional value and revenue,” June 8, 2020.

36. Deloitte, “The Internet of Things in the real world.”

37. US Department of Agriculture: Economic Research Service, *Ag and food sectors and the economy*, November 6, 2020.

38. Luke Dormehl, “The U.S. wastes $161B worth of food every year. A.I. is helping us fix that,” Yahoo Finance, August 2, 2020.

39. Hope Reese, “How a connected motorcycle could save thousands of lives,” Tech Republic, February 24, 2020.

40. David Smud et al., *Connecting the future of mobility.*

41. Scott Corwin, “Self-driving cars may never dominate … and that’s OK,” *Forbes*, January 10, 2020.

42. Carnegie Mellon University, “Pittsburgh’s smart traffic signal’s started at CMU,” 2018.

43. United States Environmental Protection Agency, “Fast facts on transportation greenhouse gas emissions,” accessed October 5, 2020.

44. Deloitte, “A city sees what’s possible for its citizens and visitors with a cloud-based command center,” accessed October 5, 2020.

45. *Verdict*, “Environmental sustainability—the new cloud computing battleground,” January 27, 2020.

46. “Technology, Media, and Telecommunications Predictions, 2021,” Deloitte Insights, 2020, pp 20-21.

47. Marlene Motyka et al., *Energy management: Paused by pandemic, but poised to prevail—Deloitte Resources 2020 Study*, Deloitte Insights, July 8, 2020.

48. Rob Bernard, “Microsoft Cloud delivers when it comes to energy efficiency and carbon-emission reductions, study finds,” Microsoft Corporate Blogs, May 17, 2018; Nat Sahlstrom, “Reducing carbon by moving to AWS,” Amazon, November 26, 2019.

49. Daniel Bizo, *The carbon reduction opportunity of moving to Amazon Web Services*, 451 Research, October 2019; Robert Huang and Eric Masanet, *Data center IT efficiency measures*, National Renewable Energy Laboratory, January 2015.

50. *Dezeen*, “Microsoft teams up with Nike, Mercedes-Benz and Unilever to launch Transform to Net Zero initiative,” July 27, 2020; Ruth Porat “Alphabet issues sustainability bonds to support environmental and social initiatives,” Google, August 3, 2020; Amazon, “Sustainability in the Cloud,” accessed October 10, 2020.

51. Adam Vaughan, “Google uses AI to cut data centre energy use by 15%,” *Guardian*, July 20, 2016.

52. Sarah Kerrigan and Duleesha Kulasooriya, *The sustainability transformation: Look ahead, look inside, and look around*, Deloitte Insights, July 31, 2020.

53. Rhonda Evans and Tony Siesfeld, Measuring the business value of corporate social impact: Beyond social value to enterprise performance, Deloitte Insights, July 31, 2020.

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