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# Connecting American enterprises to the 5G innovation platform

**Six opportunities to  
advance your strategy**

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# Introduction

4G technology dramatically changed the world over the past decade, and the United States has led the way. After being slow to roll out 3G, the American technology sector course-corrected to achieve early success in the broader 4G ecosystem across multiple areas, including wireless service, mobile operating systems and app stores, IP transport, mobile advertising, hyperscale data centers and more. This has created jobs for millions of Americans, driven remarkable economic growth and created entirely new industries.

Now the 5G era is upon us, enabling even faster connectivity speeds, ultra-low latency and greater bandwidth to unlock unprecedented business opportunities. Contrary to popular belief, however, not all 5G innovations revolve around grandiose visions for the future. There are many opportunities industries can seize right now to become part of the broader 5G ecosystem, helping them drive local and global prosperity and remain competitive

for years to come.

This paper explores six of these opportunities, highlighting their potential impact and outlining practical actions enterprises can take today to ensure their place among the 5G winners of tomorrow. First, however, it's important to understand the factors shaping the 5G innovation landscape and the strategic importance of early adoption.

## U.S. economic impact

Innovation built on 4G infrastructure contributed

**\$250bn<sup>1</sup>**

in GDP growth. 5G-enabled innovations are expected to contribute

**\$1.5tr**

by the end of this decade.<sup>2</sup>



<sup>1</sup> "The 4G Decade: Quantifying the Benefits." CTIA. July 2020. <https://api.ctia.org/wp-content/uploads/2020/07/The-4G-Decade.pdf>

<sup>2</sup> 5G Promises Massive Job and GDP Growth in the US." BCG. February 2021. <https://www.bcg.com/en-us/publications/2021/5g-economic-impact-united-states>

# The 5G innovation landscape

4G represented a clear landscape centered around one universal device (smartphones), universal connectivity (4G with Wi-Fi offload) and apps in centralized data centers. The monetization of 4G followed a few business model pillars consisting of volume-based traffic charges for connectivity, a revenue share between app developers and app stores, and mobile advertising supporting freemium services.

The 5G-powered landscape, on the other hand, is one of limitless possibilities. But it isn't the enhanced connectivity alone that makes it valuable: When combined with other disruptive technologies 5G enables

the largest innovation platform in history – one that fuels powerful market disruption through a multitude of transformative use cases.

## What's driving the 5G innovation momentum for U.S. enterprises?

- **Push for accelerated digital transformation** – Digital innovations rely on data, and data requires connectivity.
- **Not-so-universal connectivity** – Cellular connectivity used to be universal but can be differentiated in the future when network slicing, private 5G networks and access to network APIs change the game.
- **International competition**
  - Several foreign governments are focusing on 5G as a vital infrastructure for digital transformation of industries.
  - 180 operators in 72 countries have launched commercial 3GPP-compatible 5G services (either mobile or fixed wireless access).<sup>3</sup>
- **An ecosystem of ecosystems** – The 5G ecosystem is expanding to include a larger spectrum of building blocks in addition to connecting with industry-specific vertical ecosystems.
- **Exponential innovation** – The exponential innovation potential comes from innovation stacks, where multiple micro innovations generate new use cases.
- **Sustainable growth** – 5G enables sustainable growth by reducing the environmental impact as other industries go through their digital transformations.
- **New business models** – 5G has the potential to introduce new business models beyond data buckets for connectivity, revenue share for mobile applications and ad-based entry services.

## Disruptive technologies delivering value with 5G

- **Edge computing** – Cloud computing that's moved closer to users, with network edges in major metropolitan areas and premises-based edges at enterprise premises, for better user experiences for performance-critical applications
- **Internet of Things (IoT)** – 5G is poised to rapidly advance the evolution of IoT devices – 25% of all IoT devices launched to date are things other than smartphones, fixed wireless terminals and pocket routers, and that 25% consists of 19 different devices that have never been seen before
- **Artificial intelligence (AI)** – Data generated at one side of the network and processed with AI at the other side of 5G networks; AI also plays a key role in simplifying how complex networks are managed
- **Standalone augmented, virtual and extended reality** – Eliminating wires between head-mounted displays and desktop computers, to unlock the potential of the metaverse with XR glasses connected directly to the edge with 5G

<sup>3</sup> "NTS Snapshot: September 2021 – Status Update." GSA. September 2021. <https://gsacom.com/paper/nts-snapshot-september-2021-status-update/>

"5G is more than just an evolutionary step to a new generation of technology; it represents a fundamental transformation of the role that mobile technology plays in society."

– Global System for Mobile Communications Association (GSMA)

Six 5G  
opportunities  
American  
enterprises can  
pursue now

# 01

## 5G-based personal communication for all

Whether provided by an enterprise or through a bring-your-own device policy, smartphones play a central role in the modern workplace. From communication and productivity tools to self-service HR and health and wellness platforms, enterprises are increasingly dependent on their employees' ability to access mobile business apps from their smartphones.

While 4G-powered smartphones currently represent the personal communication platform for the American workforce across all industry sectors, they will soon be considered the second-best option: Half of all 5G devices launched to date are smartphones.<sup>4</sup>

Smartphones, therefore, represent the biggest opportunity for early 5G adoption. By migrating the entire workforce to 5G-powered smartphones, enterprises can take advantage of early access to a powerful communication environment in which to explore new productivity applications.

### Impact



Proliferation of dense, uniform, secure video communication capabilities within post-pandemic offices



Deployment of intra-office health tracking tools such as room bookings, cleaning logs and secure distance tracing



Adoption of own and third-party productivity-enhancing applications, moved from on-premises servers to the edge and accessed anywhere with 5G and 4G as fallback

### Market momentum<sup>4</sup>

# 523

5G smartphones have been announced as of Q3 2021

There will be

# 122<sub>m</sub>

5G subscriptions in North America by 2022<sup>5</sup>

Considering the average lifespan of enterprise phones is 2.52 years, failure to upgrade to 5G smartphones in 2022 will restrict you to older technology until 2025

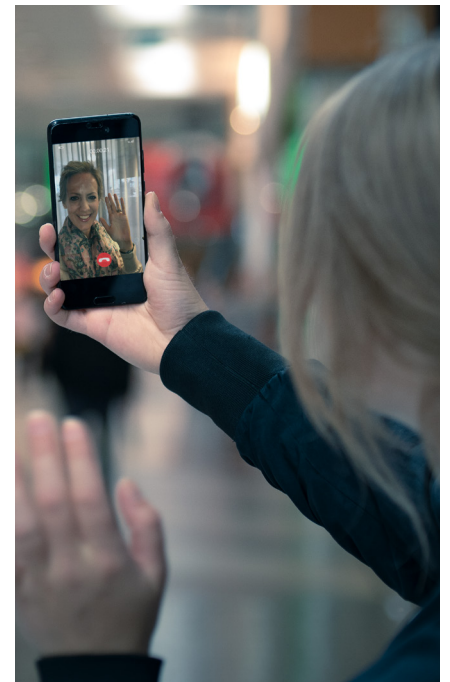
### Take action

A proactive 5G strategy for personal business communication could include:

- adopting 5G smartphones as the norm for all employees' personal communication by the end of 2022
- encouraging employees to become early adopters of new third-party 5G productivity apps
- planning for employees to become digital pioneers of internally developed 5G innovations

### Bottom line

Leveraging 5G smartphones and evolved services for personal communication is a critical foundation for 5G-powered enterprises.



<sup>4</sup> "GSA: 1000th 5G Device Announced." Global mobile Suppliers Association. October 2021. <https://gsacom.com/press-release/gsa-1000th-5g-device-announced/>

<sup>5</sup> "Mobile subscriptions outlook." Ericsson. <https://www.ericsson.com/en/reports-and-papers/mobility-report/dataforecasts/mobile-subscriptions-outlook>

# 02

## Flexible work outside the fiber footprint

Nearly 42% of the American workforce was working remotely nine months into the COVID-19 pandemic, and more than 36 million of these employees will still be fully remote in 2025.<sup>6</sup> Even as some office doors slowly reopen, the majority of U.S. enterprises plan to adopt a hybrid work model permanently. Furthermore, the concept of there being only two acceptable work points – in the office or at home – has been expanded to include co-working spaces, vacation rentals and digital nomad communities.

However, the pandemic also highlighted the large variations enterprises see in broadband access for their staff, in both metropolitan and rural areas. 5G mobile hotspots and 5G fixed wireless access has the power to close these gaps and significantly increase the speed and productivity of the remote workforce outside the fiber footprint – whether they're at home, across the country or around the globe.

Only

# 16.4%

of Americans had fiber-based broadband as of 2020.<sup>7</sup>

### Impact



Access to high-quality, reliable connectivity – anywhere, any device, anytime and in any volume



Ability to recruit and retain top talent from across the globe, while maintaining fewer physical locations



Extra layer of security for remotely accessing data by leveraging 5G network slicing for a private segment of bandwidth



### Take action

A proactive 5G strategy for hybrid work options could include:

- encouraging 5G access for remote/hybrid work in areas beyond the fiber footprint
- tailoring remote/hybrid work solutions for static, nomadic and mobile needs
- ensuring consistent security policies for all employees' remote work locations

### Bottom line

5G plays a pivotal role for remote workers outside the fiber footprint.

<sup>6</sup>“Economist Report: Future Workforce.” UpWork. <https://www.upwork.com/press/releases/economist-report-future-workforce>

<sup>7</sup>“OECD Broadband Statistics Update.” Table 1.1. OECD. July 2021. <https://www.oecd.org/digital/broadband/broadband-statistics/>

# 03

## Ultra-mobile workforce connected by 5G

The U.S. is ramping up the availability of tools and tech support for the ultra-flexible workforce – employees who rarely visit a primary office. This includes professionals with a high level of mobility, such as sales representatives, business consultants or hospitality executives, as well as those who depend on personal computers (PCs) and mobile devices as their only IT tools.

Prior to the pandemic, laptops and tablets integrated with 4G technology were uncommon and expensive. In 2020,

however, sales of cellular-enabled PCs increased by 70% to 10.1 million, with 4G accounting for 97% of the market.<sup>9</sup> Now, 5G tablet, notebook and laptop launches in 2021 are showing greater diversity in price points, form factors and vendor participation. By 2025, sales of 5G-enabled PCs are expected to reach 14.3 million and represent 69% of the market.<sup>9</sup> This will likely result in 5G becoming the default access technology for the ultra-flexible workforce, directly to their devices or via their vehicle.

# 60%

of the total U.S. workforce (93.5 million Americans) is expected to be deskless by 2024.<sup>10</sup>

### Impact



Transformation of any location – from an airport to a construction site to a conference center – into a high-performing work environment



Buildout of 5G mmWave in zones with a high concentration of ultra-flexible workers, eliminating their need to hunt down reliable wireless connections



Movement of performance-critical applications off premises to network edge-based clouds for fast, secure remote access



### Take action

A proactive 5G strategy for the ultra-flexible workforce could include:

- defining 5G as the primary wireless access for the ultra-mobile workforce
- negotiating 5G service bundles covering smartphones, laptops and tablets
- leveraging edge computing, network slicing and 5G mmWave for optimal performance

### Bottom line

5G offers a quantum leap in performance, with cellular reliability, availability and security for the ultra-mobile workforce.

<sup>9</sup> "Preliminary Global Notebook PC Shipments and Market Share: Q3 2021 Results." Strategy Analytics. November 2021. <https://www.strategyanalytics.com/access-services/devices/tablets-and-pcs/connected-computing-devices/market-data/report-detail/preliminary-global-notebook-pc-shipments-and-market-share-q3-2021-results>

<sup>9</sup> "Preliminary Global Notebook PC Shipments and Market Share: Q3 2021 Results."  
<sup>10</sup> "Mobile Workers Will Be 60% of the Total U.S. Workforce by 2024, According to IDC." IDC. September 2020. <https://www.idc.com/getdoc.jsp?containerId=prUS46809920>

# 04

## 5G for wireless branch office connectivity

It's often easy for enterprises to procure primary fiber-based WAN connectivity, but harder to find a fully redundant fiber path for the fail-over connectivity. As such, it's a common practice for today's multi-branch enterprises to rely on fiber for primary data access and 4G-powered fixed wireless access as backup (39% of enterprises report doing so).<sup>11</sup> SD-WAN is a key enabler of using 4G as failover as it can quickly detect

an outage and move traffic.

However, fiber availability varies widely depending on building size: Only 14% of buildings with fewer than 20 employees are fiber lit, compared to 69% of buildings with more than 20 employees.<sup>12</sup> The improvements in 5G performance allow small and mid-size branch offices to leverage two redundant wireless paths for both primary and backup branch office

access. Increasing 5G capacity, allowed by greater spectrum allocations (mid and high band) and technological advancements, is driving higher network efficiency for wireless branch office connectivity for early adopters across all sectors.

The result? Lower costs, better bandwidth efficiency and a seamless on-ramp to the cloud for critical applications, without sacrificing security or data privacy.

### Impact



Reduce the performance gap between primary and failover access



Use 5G wireless WAN for both primary and failover access to buildings without fiber



Set up, move and take down branch locations much faster, even where fiber exists



### Real-world early adopters

The following case studies illustrate how three enterprises in three different industries are using [Cradlepoint's NetCloud Service](#) for branch connectivity.

- [Henley Enterprises](#) uses Cradlepoint's all-in-one routers for centrally managed connection reliability at its hundreds of Valvoline Instant Oil Change locations, reducing network downtime and streamlining IT operations.
- [T-Mobile](#) enabled cellular-based automatic failover to prevent network disruptions at its more than 5,000 retail locations that depend on connected devices and business-critical applications, including point-of-sale (POS) systems and digital signs.
- [Life Storage](#) replaced its third-party-managed, USB-based modems – which they had been plugging into routers – with a cloud-managed router with integrated LTE to achieve improved reliability and agile connectivity that is easy to deploy and manage remotely.

### Take action

A proactive 5G strategy for branch office could include:

- providing a wireless option when refreshing WAN edge infrastructure that is 100% dependent on a wired connection
- leveraging 5G wireless WAN to accelerate opening of new branch offices
- upgrading wireless WAN failover links from 4G to 5G capabilities where possible
- introducing 5G for primary and failover WAN connectivity access to small and medium-sized branch offices

### Bottom line

Branch office locations can dramatically improve productivity and security regardless of fiber availability.

<sup>11</sup> The state of wireless WAN 2020, Cradlepoint and Network World, <https://newcomglobal.com/wp-content/uploads/2021/05/state-of-wireless-wan-report-2020.pdf>

<sup>12</sup> "STATFlash: 2020 U.S. Business Fiber Availability." Vertical Systems Group. April 2021. <https://www.verticalsystems.com/2021/04/21/statflash-fiber-lit-buildings-2020/>

# 05

## Unleash 5G innovations at major campuses

The creation of 5G innovation labs is a quickly growing trend across universities, large enterprises and business development accelerator centers, such as incubators and business consulting firms. This surge is driven by several major advancements in 5G technology and business models, including 5G network solutions optimized for private and hybrid network realizations,

5G indoor radio solutions in mid-and high-band spectrum and neutral host solutions allowing multiple mobile service providers over one campus-wide infrastructure.

With early access to broader 5G networks, organizations can transform these proof-of-concept labs into full-scale validation applications, supercharging the innovation potential. All students or employees can

be innovators and digital pioneers (early adopters), setting the stage for substantial competitive advantages.

Considering there are 121 American-owned Fortune 500 enterprises and 66 of the world's top 100 research universities are located in the U.S., there is a massive opportunity for America to lead the way in 5G-enabled campus innovations.

### Impact



- early evaluation of 5G applications for own use before enterprise-wide rollout
- co-creation of 5G applications with ecosystem partners and customers
- showcasing 5G innovation to customers and partners



- opportunity to develop 5G innovations for own use or for sales to customers
- early evaluations of applications in real-life networks and with friendly users



- interdisciplinary, cross-college research courses to explore new 5G use cases
- collaboration among students, faculty and enterprises to develop and test 5G-enabled solutions



### Slalom element lab 212 NYC

- Leading global consulting firm Slalom recently teamed up with Ericsson to create [Slalom element lab212](#), an innovation hub designed for organizations across all industries to harness the power of 5G and discover innovation breakthroughs that challenge convention and accelerate business. Half of the lab is a dedicated playground for clients to test-drive the latest tech and find answers to forecast the future; the other half is dedicated to business applications using Slalom's rapid-iteration process to advance new technology innovation and adoption.

### Take action

A proactive 5G strategy for 5G innovation infrastructure could include:

- deploying 5G at enterprise headquarters and R&D centers
- extending 5G networks from labs to campus-wide coverage
- using employees or students as digital pioneers

### Bottom line

Access to campus-wide 5G networks is essential for large enterprises and universities shaping the broader 5G ecosystem.

# 06

## Introduce 5G for industrial applications

Wi-Fi is widely available in the carpeted area of American enterprises as part of the local IT infrastructure, but the uncarpeted areas – the industrial environments – typically lack wireless local networks. Industrial applications require flexibility beyond wires and need wireless connectivity with security, availability, reliability and performance that is

synonymous with the cellular DNA.

Cellular wireless connectivity is now gaining traction as an essential infrastructure for industrial use places where increased agility for advanced applications is a priority. From mining operations to logistical hubs and materials handling to assembly lines, 5G-enabled automation is advancing Industry 4.0.

### Impact



- remote operation of trucks and drills in open-pit and underground mines
- smart bolts and environmental tracking in mine shafts
- proactive maintenance for the oil and gas industry with digital twins



- new build of large warehouses in major metropolitan markets for delivery in hours
- new build of distributed warehouses for late-stage configurations and customizations
- an evolution blurring the border line between factories and warehouses



- airports – rationalizing all outdoor activities and inside handling of goods
- sea ports – automating container handling from inbound ships to outbound trucks
- rail and road transition points – automating individual package handling



### Ericsson USA 5G Smart Factory

[Ericsson's USA 5G Smart Factory](#) in Lewisville, Texas, has been recognized by the World Economic Forum as a global front runner in the Fourth Industrial Revolution (Industry 4.0). The Forum has awarded the site with its prestigious "Global Lighthouse" designation – one of the first seven in the U.S. – in recognition of Ericsson's deployment of next-generation technology at the site and its subsequent impact.

### Take action

A proactive 5G strategy for industrial 5G use places could include:

- piloting private cellular connectivity at new and large factories, warehouses and logistical hubs
- scaling successful pilots to all new buildings, existing buildings and smaller buildings
- leveraging successful use cases from across industry sectors

### Bottom line

Moving from wired to wireless cellular connectivity brings greater flexibility to Industry 4.0 operations.

# Supporting the deployment of 5G opportunities in 2022

5G opens new doors for enterprises to secure their connectivity needs for the opportunities described in this paper. The following technology and business model innovations we can expect to see in 2022 collectively represent what we refer to as the 5G innovation platform.

## Public mobile networks

U.S. mobile service providers are entering the fourth year of network expansions. The nationwide 5G coverage in the low-band spectrum gets a necessary mid-band spectrum complement to secure a consistent 5G user experience with increased performance.

## Wireless WAN

Enterprises are familiar with 4G for failover connectivity in hybrid solutions with fiber for the primary WAN link. This application improves with 5G additions to the portfolio – an excellent example of how 5G can improve proven 4G applications.

## Private networks

Private networks based on cellular technology have been proven with 4G, and private 5G networks are beginning a long deployment cycle. Enterprises apply private 5G for the most demanding applications.

## Fixed wireless access

The rapid growth of remote and hybrid work makes fixed wireless access to employees' homes exciting for enterprises' strategy for future employee experiences. This provides a fast way to close gaps before fiber is available everywhere your team wants to work.

## Indoor cellular networks

The cellular network options indoors continue to grow. Ericsson launched small cells for mmWave spectrum, 5G (NR) for CBRS spectrum and C-band spectrum earlier this year. This is all brought together with multi-operator support in sub-6GHz bands.

## Network slicing

Network slicing is a powerful tool for both public and private cellular networks – an end-to-end capability to secure the performance of the most demanding applications. Its use continues to grow.

## Business model innovation

Two wireless business models have dominated so far: an as-a-service model for cellular traffic and a location-based model for wireless IT networks. 5G opens up for more variety with spectrum, asset ownership, network operation and network slices for new business model innovations.



# The time to act is now

There is strong reason to believe that 2022 will be a pivotal time for American enterprises to take advantage of 5G opportunities as part of a horizontal business foundation. All six opportunities outlined in this paper are mature and ready for implementation at scale across a variety of industries

Large American enterprises will be instrumental in setting the standard for other U.S. enterprises and the rest of the world and should consider exploring all available opportunities in parallel. Ericsson predicts that enterprises that are early 5G adopters in America will pursue at least three of these opportunities by the end of 2022, and that enterprises with Fortune 500 aspirations will implement all applicable opportunities by the end of 2025.

In short, American enterprises cannot expect years of time-to-market advantages compared to other defining markets that we experienced for 4G. Seizing these opportunities today will help avoid being left behind tomorrow.

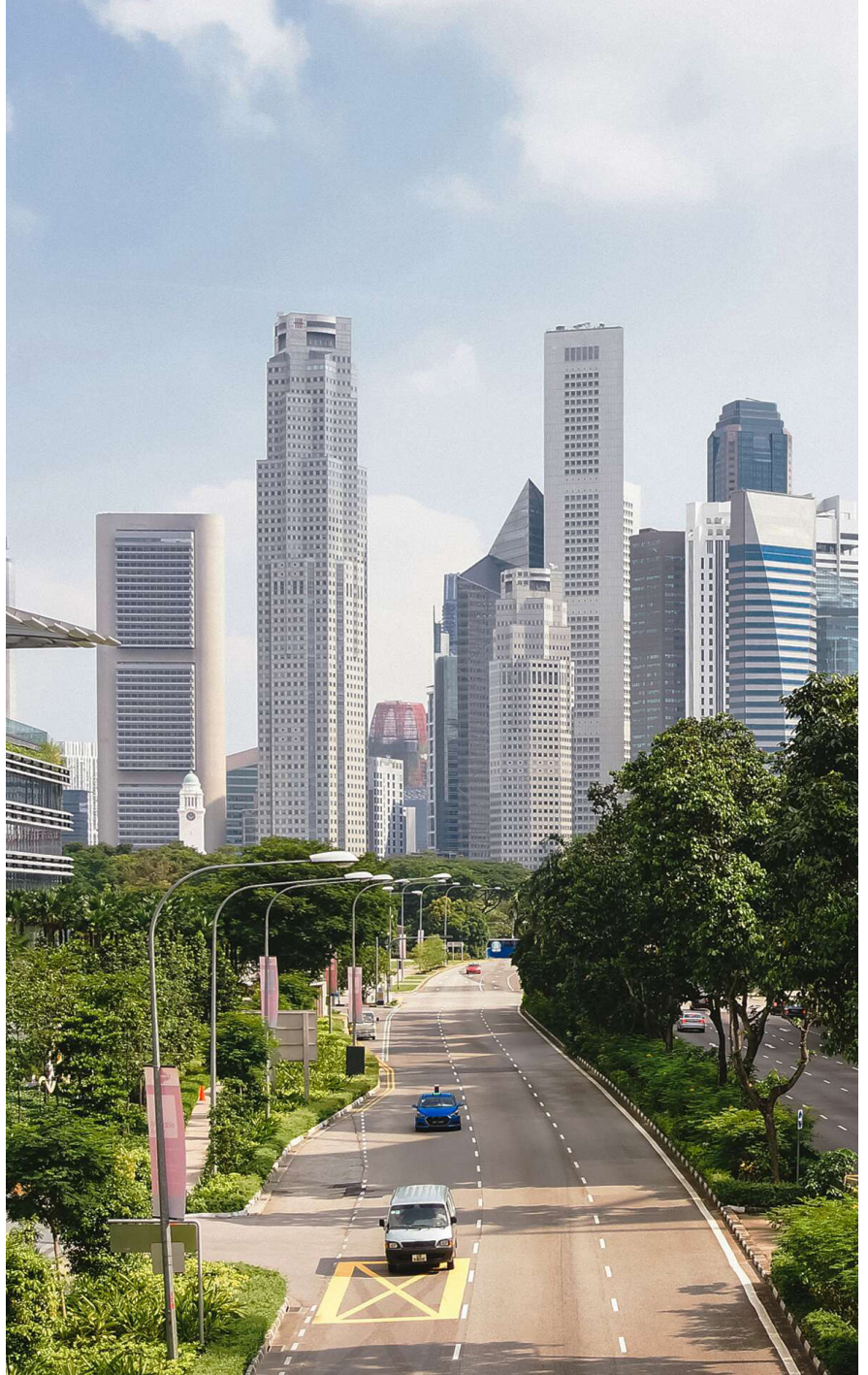
American service providers are investing

# \$30<sub>bn</sub>

annually in cellular infrastructure and currently reach more than 300 million people in low band, will reach

# 200<sub>m</sub>

by the year's end in mid band, and parts of more than 100 city/operator combinations with mmWave technology.<sup>16</sup>



<sup>13</sup> "U.S. Wireless Investment Hits Five Year High, CTIA Annual Survey Finds." CTIA. July 2021. <https://www.ctia.org/news/u-s-wireless-investment-hits-five-year-high-ctia-annual-survey-finds>

<sup>14</sup> "T-Mobile Delivers Industry-Leading Growth in Postpaid Service Revenues, Postpaid Customers and Cash Flow in Q3." T-Mobile. November 2021. <https://www.t-mobile.com/news/business/t-mobile-q3-2021-earnings>

<sup>15</sup> "T-Mobile Delivers Industry-Leading Growth in Postpaid Service Revenues, Postpaid Customers and Cash Flow in Q3."

<sup>16</sup> AT&T, T-Mobile and Verizon earnings calls

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step toward the future?**

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