



The Role of 5G in Limiting the Impact of the COVID-19 Pandemic

Telecom Industry Forecasts

Ericsson expects the global number of 5G subscriptions to exceed 190 million by the end of 2020 and 2.8 billion by the end of 2025. The forecast is included in the June 2020 edition of the *Ericsson Mobility Report* [1], along with projections for data traffic growth and regional 5G subscriptions.

The report also takes a sharp look at the role of networks and digital infrastructure in keeping societies running and families connected during the COVID-19 pandemic. The spread of COVID-19 has prompted people around the world to change their daily lives and, in many cases, work or study from home. This has led to a rapid shift of network traffic from business to residential areas. The latest *Ericsson Mobility Report* shows that mobile and fixed networks are increasingly an even bigger part of critical national infrastructure.

Although the growth of 5G subscriptions has slowed in some markets due to the pandemic, this has been offset in other markets, where it is accelerating. Changes in behavior due to lockdown restrictions have caused measurable growth in the use of both fixed and mobile networks. The largest share of this traffic increase has been absorbed

by fixed residential networks, which have experienced a 20–100% growth. But many service providers also noticed a spike in demand on their mobile network.

In a recent study [2] conducted by Ericsson Consumer Lab, 83% of respondents from 11 countries claim that information and communication technology (ICT) “helped them a lot” to cope with the lockdown. The results show an increased adoption and use of ICT services, such as e-learning and wellness applications, that have helped consumers adapt to new realities, supported by connectivity.

Looking ahead, 57% say they will save money for financial security, while one third plan to invest in 5G and an improved broadband at home to be better prepared for a possible second wave of COVID-19.

Fixed wireless access (FWA) connections are forecast to reach nearly 160 million by the end of 2025, totaling roughly 25% of global mobile network data traffic. At the end of 2019, global FWA data traffic was estimated to represent approximately 15% of total global traffic. It is now projected to grow nearly eightfold to reach 53 exabytes in 2025, representing 25% of total global mobile network data traffic. FWA delivered over 4G or 5G is an increasingly cost-efficient alternative for providing broadband services, and several factors are driving the FWA market:

demand from consumers and businesses for digital services along with government-sponsored programs and subsidies.

The report also includes forecasts on data traffic growth and regional subscriptions plus insights into cloud-based gaming as well as in-depth articles on private dedicated networks and Verizon’s millimeter-wave (mm-wave) strategy for targeted metropolitan areas.

5G Consumer Market Research

On 10 June 2020, Nokia released a new research study [3] highlighting 5G FWA as the most desirable 5G use case among consumers globally. The study was conducted by Parks Associates, an international market research and consulting company specializing in emerging consumer technology products and services. The company surveyed 3,000 people in the United Kingdom, the United States, and South Korea and examined consumer understanding and demand for 5G services across six different use cases including autonomous vehicles, video surveillance, and immersive technologies. The research confirms that there is an opportunity for mobile operators to compete with broadband providers by offering FWA to homes and businesses.

The research study highlights that 76% of all respondents regard FWA as the most appealing use case

overall, with 66% claiming that they would subscribe to 5G FWA if it cost the same as their current broadband service and delivered the same or better performance. Indeed, more would subscribe if it cost less. Currently, 41% of respondents had only the option of a single broadband provider, with many resenting this lack of choice. This highlights the opportunity mobile operators have to offer FWA as an alternative to traditional broadband services.

The research was conducted prior to the global COVID-19 pandemic, which has driven the world to work and learn from home. However, this has coincided with consumer demand for better quality video calls. Indeed, 90% rated high-quality, uninterrupted video streams a “very valuable” aspect of 5G. Additionally, a majority of consumers find 5G video use cases attractive, with 66% rating video capture and streaming applications as appealing and 69% rating video detection and alerting as appealing. More than one third of consumers found augmented reality (AR) experiences for remote commerce appealing even before the COVID-19 crisis. The need and appeal have likely increased with social distancing.

More broadly, the outlook for 5G is positive based on the findings. Although current familiarity with 5G remains quite low, with just half of consumers claiming any level of familiarity, the appeal of 5G increases with education. Eighty percent of those very familiar with 5G find it appealing compared to 23% of those who are unfamiliar. Further, more than 50% of smartphone owners said they were likely to switch operators if their current provider does not offer them 5G in the next 12 months.

For more details on the analysis of consumer demand for 5G services, visit Nokia’s website [3].

5G in the United States

Verizon was the first recipient of a U.S.-manufactured commercial 5G base station from Ericsson’s new

state-of-the-art smart factory in Texas. The equipment, the first 5G base station produced by Ericsson in the United States, marks another significant milestone as Ericsson continues to strengthen its U.S. capabilities in 5G research, design, manufacturing, and service delivery.

The 5G base station delivered to Verizon is the mm-wave Street Macro solution, part of Ericsson’s Radio System portfolio. All of the radio access components are housed in one lightweight enclosure, allowing for the rapid growth of 5G coverage in complex city environments.

The delivery, captured in a short video [4], was made in adherence with Centers for Disease Control and Prevention guidelines for social distancing due to COVID-19, ensuring a contract-free exchange.

The 300,000-ft² factory, the first of its kind in the United States, began commercial operations in March 2020 and will be fully operational by the end of this year. It produces 5G and advanced antenna system radios to boost network capacity. The facility is outfitted with fast and secure 5G connectivity to enable agile operations and flexible production.

The low latency, high data speed, and high bandwidth of 5G will help create factories of the future, enhancing capabilities like machine learning, AR, and virtual reality (VR). Factories powered by 5G offer significant benefits to data collection by providing real-time monitoring of inventory, maintenance needs, increased flexibility, and shorter lead times for factory floor reconfiguration of production, layout changes, and other alterations.

5G in Hong Kong

On 26 May 2020, SmarTone, a telecommunications company headquartered in Hong Kong, announced that it has launched its 5G service in Hong Kong, offering super-fast 5G connectivity with the widest network coverage both indoors and outdoors. SmarTone is also introducing a range of innovative 5G services

and applications for different customer segments and enterprises.

SmarTone’s 5G network, which is based on its powerful long-term evolution (LTE) network and Ericsson’s dynamic spectrum-sharing technology, features a speedy rollout with the largest coverage in Hong Kong and a seamless transition between 4G and 5G. This will ensure a stable and smooth user experience and longer battery life for smartphones.

SmarTone takes an integrated approach, combining high-, medium-, and low-frequency bands to build a robust and industry-leading 5G network in Hong Kong. The 3.5-GHz frequency spectrum will gradually be deployed throughout the territory. In popular locations and high-traffic sites, the 3.5-GHz frequency band can provide sufficient capacity and support to 5G applications. In the initial phase, SmarTone’s 5G network will cover most outdoor locations, popular indoor locations, and major roads and highways for commuting customers.

SmarTone’s 5G network offers a wide range of innovative applications with an enhanced experience for seamless video conferencing, immersive AR and VR, superior gaming experience, and premium entertainment.

SmarTone has worked closely with enterprises in construction, health care, hospitality, property management, retail, and transportation on 5G digital transformation. With the integration of 5G and its award-winning SmartWorks technology, construction managers and architects will be able to use building information modeling to view 3D models with rich digital content, virtual desktop infrastructure to access data-intensive edge and cloud applications, and computer-aided designs to monitor and manage construction site operations in real time. AR, which combines virtual architectural designs with the physical reality of a job site, can also increase accuracy and efficiency.

SmarTone’s cybersecurity team also offers enterprises a total solution

for preventing and detecting cyberthreats in the 5G era with a three-pronged approach: people, process, and technology.

5G in Latin America

Taking advantage of existing spectrum assets, Claro Brasil, a mobile, satellite television, fixed, and broadband telecommunications operator serving Brazil, has teamed up with Ericsson to deploy the first 5G network in Latin America to use Ericsson's dynamic spectrum-sharing technology. The 5G services are being rolled out initially across 12 areas in São Paulo and Rio de Janeiro.

Ericsson spectrum sharing is part of Ericsson's 5G platform, which enables lower latency and faster connections than those offered by 4G. In Claro Brasil's case, this means data speeds reaching 400 Mb/s, signaling massive new opportunities for Brazil, including in agriculture, smart cities, and health care. With Ericsson spectrum sharing, 5G can be activated through a software update on any of the five million 5G-ready radios that Ericsson has delivered to the world market since 2015, with more than 400,000 in Brazil.

Ericsson's dynamic spectrum-sharing solution gives Claro Brasil a head start in rolling out initial 5G services while waiting for the 3.5- and 26-GHz frequency bands. In addition to these bands, Brazil's National Telecommunications Agency is expected to award frequencies in the 700-MHz and 2.3-GHz frequency bands during the 5G auction expected to take place in 2021.

Ericsson welcomes the auction of 5G frequencies in Brazil, which will allow industries and consumers alike to unlock the world of opportunity that 5G offers.

5G Mobile Platforms

On 8 July 2020, Qualcomm Technologies unveiled the Qualcomm Snapdragon 865 Plus 5G mobile platform, a follow-on to the flagship Snapdragon 865 that has powered more than 140 devices (announced or in develop-

ment). The new Snapdragon 865 Plus is designed to deliver increased performance across the board for superior gameplay and fast gaming experiences, truly global 5G, and ultra-intuitive artificial intelligence (AI).

Snapdragon 865 Plus, with the Qualcomm Snapdragon X55 5G Modem-RF System, enables truly global 5G, world-class gaming, and the latest 5G Qualcomm AI engine for seamless camera, audio, and gaming experiences. With a full set of Snapdragon Elite Gaming premium features, Snapdragon 865 Plus delivers desktop-quality gaming with first-to-mobile enhancements like updateable GPU drivers and desktop forward rendering, smooth 5G gameplay at speeds of up to 144 frames per second, and true 10-bit high-dynamic-range gaming to provide cinematic detail in more than a billion shades of color. Snapdragon 865 Plus also offers the following enhancements over Snapdragon 865:

- a Qualcomm Kryo 585 CPU prime core clock speed at up to 3.1 GHz (a 10% increase)
- the Qualcomm Adreno 650 GPU, offering 10% faster graphics rendering
- Qualcomm FastConnect 6900 compatibility, boasting Wi-Fi speeds for up to 3.6 Gb/s, delivering performance fit for premium devices and experiences.

For a complete list of features and specifications of the Snapdragon 865 Plus 5G mobile platform, see [5].

5G Compute Platforms

On 3 September 2020, Qualcomm Technologies announced the Qualcomm Snapdragon 8cx Gen 2 5G compute platform at Internationale Funkausstellung Berlin, Germany.

The Snapdragon 8cx Gen 2 is the company's most advanced and efficient compute platform. Users will benefit from superior performance and multiday battery life, 5G connectivity, enterprise-grade security, and AI acceleration as well as advanced camera and audio technology. These features will enable and

support digital transformation and mobility needs for remote productivity and learning experiences. The Snapdragon 8cx Gen 2 is designed to provide industry-leading 5G PC experiences and build on the innovative first-generation Snapdragon 8cx 5G compute platform, which powered the world's first 5G PC.

Qualcomm's new 5G compute platform will transform the PC user experience with high-speed connectivity, enhanced audio and camera technology, AI acceleration, and enterprise-grade security features. With more performance and higher efficiency compared to the previous generation, the Snapdragon 8cx Gen 2 5G compute platform is setting a new standard for consumer, small business, and enterprise PCs.

The Snapdragon 8cx Gen 2 5G compute platform is expected to be in commercial devices in late 2020.

5G for the Railway Sector

The Association of the European Rail Supply Industry (UNIFE) is a major industry association that represents European train builders and rail equipment suppliers.

On 29 June 2020, Ericsson announced that it has joined UNIFE to show how 5G and mission-critical networks can help the rail industry meet the challenge of rail digitalization. By joining UNIFE, Ericsson strengthens its commitment to developing critical network capabilities for the rail industry. Its membership will make an important contribution to accelerating the modernization of railway communications with 5G for future railway mobile communication systems.

As a UNIFE member, Ericsson will support the railway sector in tapping the potential of digitalization to improve the quality and efficiency of operation, passenger experience, and network and data security.

According to Ericsson, fundamental changes in the technology associated with 5G and mission-critical networks will enable the rail industry to meet the challenge of digitalization and business transformation.

Previously in 2018, Ericsson and Swisscom demonstrated end-to-end network slicing to meet the needs of the railway sector. Ericsson is currently testing connectivity together with national railway companies.

As a UNIFE member, Ericsson will also be able to participate in European Union-funded innovation and research projects. Built on its 4G and 5G technology, Ericsson's mission-critical networks and applications deliver next-generation, secure, resilient, and high-performance mission-critical mobile broadband communication services.

5G Indoor Networks

On 18 August 2020, ZTE Corporation published the *5G Indoor White Paper* [6] report, in which the company elaborates on various 5G development strategies and solutions for 5G network coverage inside buildings and enclosed spaces.

According to ZTE's white paper, the deployment of 5G indoor networks should focus on a flexible and powerful network infrastructure together with highly efficient operation and maintenance (O&M) and the support of diverse and demanding new services. To meet the requirements of diversified 5G indoor coverage services, varied deployment scenarios, and differentiated network capabilities, existing indoor coverage solutions must be evolved and optimized toward 5G.

The white paper proposes various solutions for this purpose. First, if the signals from outdoor radio masts are to be used for better indoor coverage, then it is advisable, for example, to specifically supplement them with small innovative 5G cells. Second, as far as the traditional distributed antenna system (DAS) is concerned, common multichannel DAS technology can improve system capacity. In addition, an enhanced digital indoor distribution solution can further improve network performance. This will also reduce deployment costs, improve O&M efficiency and service capabilities, and sim-

plify the process of building a more efficient network. In addition, the efficient management of indoor and outdoor networks can also improve network performance.

Finally, the white paper reports that future indoor 5G technologies will offer more network capabilities to better support a wide variety of 5G terminals, increasingly personalized services, multiband and higher-band deployment, and heterogeneous network convergence.

Ground-Breaking 5G Milestones

On 31 August 2020, Qualcomm Technologies, Casa Systems, and Ericsson announced that they have successfully completed the world's first extended-range 5G New Radio data call over mm-wave.

The extended-range data call was completed in Regional Victoria, Australia, on 20 June 2020, achieving a farthest-ever connection of 3.8 km, demonstrating the impressive range capabilities of mm-wave technology and its suitability for FWA. This ground-breaking milestone provides enhanced fixed broadband services and additional opportunities to utilize 5G network infrastructure for broad coverage in urban, suburban, and rural environments.

This breakthrough provides global operators with the reach and performance to offer fixed wireless as a widespread "last-mile" broadband option. Network operators will have the potential to use their existing mobile network assets to deliver fixed wireless services and expand their service with ease to new areas—from urban to rural—while delivering 5G's multigigabit speeds and ultralow latency to a wider customer base within their coverage footprint. Additionally, this milestone will increase the rollout of FWA customer-premises equipment (CPE) devices to areas that are often too difficult to reach with traditional broadband, including rural and suburban areas, empowering more customers across the globe to access superior connectivity at fiber-like data speeds.

The extended-range data call was achieved by applying extended-range software to commercial Ericsson hardware, including Air5121 and Baseband 6630, and a 5G CPE device powered by the Qualcomm Snapdragon X55 5G Modem-RF System with the Qualcomm QTM527 mm-wave antenna module.

5G Pilots

On 20 August 2020, Huawei and China Telecom in Shenzhen, China, jointly launched the first pilot facility that connects 5G Super Uplink with downlink carrier aggregation. The pilot project innovatively uses Super Uplink to maximize uplink coverage and experience and downlink dual-carrier aggregation to fully leverage the downlink to provide an optimal user experience.

This is a new breakthrough, following the joint commercial launch of Super Uplink by China Telecom and Huawei. The success of this pilot project shows that the benefits of 5G network sharing between China Telecom and China Unicom, once seen in only technical solutions, are already available in commercial networks. The pilot project is also an important milestone in the development of 5G networks and a great success for China Telecom Shenzhen's 5G city initiative.

The coordination of time-division duplex (TDD) and frequency-division duplex (FDD) reflects a new trend in the development of 5G networks. By combining Super Uplink and downlink carrier aggregation, 5G networks take advantage of the complementary benefits of 5G's high- and low-frequency bands and aggregation in both the time and frequency domains. This will provide 5G networks with higher bandwidth, broader coverage, and lower latency, which are urgently needed to expand 5G applications in the vertical 5G industries. This also makes it possible to support 5G cells with a bandwidth of up to 200 MHz, ensuring a superior downlink experience for network sharing.

This pilot site uses a 200-MHz bandwidth of the 3.5-GHz TDD spectrum and a 20-MHz bandwidth of the 2.1-GHz FDD spectrum in the uplink. Simultaneous single-user tests were conducted in stand-alone (SA) network mode. The results of the test showed that the average uplink rate reached 470 Mb/s and the average downlink rate reached 2.43 Gb/s, which is roughly 1.3 and two times, respectively, the value that would be possible with a single bandwidth of 100 MHz.

The 5G Super Uplink and downlink carrier aggregation pilot is of enormous importance for maximizing 5G capabilities through the converged deployment of the 5G FDD and TDD frequency bands, especially when it comes to network sharing and extending 5G applications to vertical industries.

New Carrier Aggregation for 5G

On 28 August 2020, Qualcomm Technologies and Ericsson jointly announced that they have successfully completed the world's first interoperability tests for 5G SA carrier aggregation across both FDD/TDD and TDD/TDD bands.

5G carrier aggregation allows operators to use multiple sub-6-GHz spectrum channels simultaneously to transfer data between base stations and a 5G mobile device. The implementation of 5G carrier aggregation delivers enhanced network capacity, along with improved 5G speeds and reliability in challenging wireless conditions, allowing consumers to experience smoother video streaming and enjoy faster downloads. This key 5G capability is expected to be widely deployed by operators around the world in 2021.

The partners completed a 5G SA carrier aggregation test at Ericsson's labs in Beijing, China. The connection reached 2.5-Gb/s peak data speeds by aggregating 100 MHz plus 60 MHz within the 2.5-GHz TDD band in a 70% downlink configuration and using 4x4 multiple-input, multiple-output technology.

In addition, in Sweden, the two companies established a successful 5G SA carrier aggregation data call by combining 20 MHz in the 600-MHz FDD band with 100 MHz of the spectrum in the 2.5-GHz TDD band.

Both achievements used 5G infrastructure equipment from the Ericsson Radio System portfolio and a 5G smartphone form-factor test device powered by a Qualcomm Snapdragon X60 5G Modem-RF System.

Qualcomm Technologies is already shipping samples of Snapdragon X60, with commercial premium smartphones using the new Modem-RF System expected in early 2021. Ericsson expects to see the first deployments of 5G carrier aggregation in late 2020 with a ramp-up in 2021.

News From 5G Americas

On 22 July 2020, 5G Americas, the wireless industry trade association and voice of 5G and LTE for the Americas, published the white paper *Security Considerations for the 5G Era*, [7] highlighting enhanced security protocols for 5G as it evolves and matures to address emerging security threats in the wireless cellular landscape.

The white paper identifies how 5G wireless technology significantly differs from previous generations, as the entire wireless cellular network has been rearchitected to use new capabilities, such as software-defined networking (SDN), network function virtualization (NFV) for new services, and cloud-native architectures for scalability. The implementation of these elements requires additional encryption, extra defense in edge networks, and sophisticated new protocols to handle the demands of network slicing, multiaccess edge computing, and a disaggregated radio access network (RAN).

The 5G Americas white paper delves into 5G architectures that are designed to close possible security gaps from previous generations of cellular networks as well as manage new security challenges outside the

traditional framework. It covers important aspects such as

- how 5G differs from other wireless architectures and the threats, vulnerabilities, and attacks that are therefore possible
- how security is handled in 5G non-SA versus 5G SA networks
- additional security considerations that examine various aspects of software, virtualization, automation, and orchestration in the RAN and core networks
- zero-trust security and several other new recommended techniques that mitigate threats.

Industry 4.0 for the Mining Sector

On 27 July 2020, Nokia reported that it has partnered with Vivo to provide private wireless services for Vale's Carajás mine in Brazil. The service will be part of an Industry 4.0 project by Vale to deploy autonomous drill platforms and trucks. The project will increase productivity at the mine and improve worker safety. The wireless network will also be used for mine-wide communications among workers. Vale plans to expand the technology to other mines currently using older technologies, such as Worldwide Interoperability for Microwave Access (WiMax).

Nokia is currently working with several mining operators worldwide to deploy private wireless networks based on LTE, with plans to migrate to 5G in the future. Autonomous ore trucks have been shown to increase productivity by 15% and reduce fuel and maintenance costs by 10%. Nokia's LTE and 5G technologies provide more reliable support than WiMax or Wi-Fi for operating and controlling trucks and drills on the move. Nokia's private, industrial-grade wireless technologies are enabling many new applications in the mining field, including support for environmental monitoring, video-assisted remote operations, and improved worker monitoring and safety. Nokia is partnering with key solution providers in the mining industry, including Komatsu and Sandvik.

Vale is also currently operating 13 autonomous trucks based on a WiMax network at its Brucutu mine in Minas Gerais, Brazil, with the intention to replace it with a private LTE network for improved performance and reliability. Other applications being considered include an Internet of Things (IoT) application connecting dam-monitoring instruments using LTE. The advantage of LTE is its ability to adjust performance characteristics to each individual application and provide a single mine-wide wireless platform that can support any kind of critical communication requirement.

Private Broadband Networks

On 16 June 2020, Motorola Solutions announced its Private Broadband for Critical Infrastructure product, making it the only technology provider with an end-to-end communications offering spanning voice, data, video, and the IoT across interoperable land mobile radio (LMR) and LTE networks. The new offering combines LTE service in the 900-MHz and Citizens Broadband Radio Service (CBRS) spectrums to provide utilities, oil, gas, and other enterprises with the bandwidth, data speeds, and technical flexibility they need across congested campuses or in remote areas. The announcement follows the recent U.S. Federal Communications Commission (FCC) ruling to realign the 900-MHz frequency band to increase its capacity for broadband use.

The components of the Private Broadband for Critical Infrastructure offering include the following:

- *The new LXM 7900 product, which includes an RAN and core network.* This product will soon provide LTE service in the 900-MHz spectrum for critical wide-area coverage and long-range data communications. The RAN exceeds industry standards for adjacent-channel leakage and greatly reduces the risk of interference with neighboring narrow-band license holders.

- *The Nitro ecosystem, which provides CBRS connectivity, delivering high-speed broadband for campus-size environments with indoor and outdoor access points.* Nitro is an immediate option for enterprises that need to migrate from WiMax to an alternative data service, now that the FCC has set 17 October 2020 as the deadline for exiting the spectrum.

- *The new EDG 4200 Smart Gateway modem, which aids in the seamless exchange of intelligence across 900-MHz, CBRS, and carrier LTE networks via connected technologies.* It is a secure IoT gateway, providing backhaul to several IoT devices as well as robust remote device capabilities to enable scalable fleet management.

The Private Broadband for Critical Infrastructure offering allows for rich interoperability with existing LMR and carrier LTE networks via Motorola Solutions' Critical Connect platform.

Internet Protocol Version 6

On 26 August 2020, the European Telecommunications Standards Institute (ETSI) IP6 Industry Specification Group has released the white paper *IPv6 Best Practices, Benefits, Transition Challenges and the Way Forward* [8]. The work is based on the lessons learned from the Internet Protocol version 6 (IPv6) best practices, use cases, benefits, and deployment challenges. This white paper puts forward recommendations to ease the adoption of IPv6 and to motivate industry toward the upcoming large-scale deployment of the IoT, 4G/5G, and cloud computing benefiting from the restoration of the end-to-end model.

More than 1.2 billion Internet citizens are using IPv6 today without even knowing it. India has in excess of 358 million IPv6 users with 60% penetration, and China has more than 200 million, while the United States in excess of 143 million. Brazil reached 50 million, Japan has 43 million, and Germany has more than

30 million users. Some countries are topping 60% IPv6 penetration. The remaining 40% lies in the hands of industry, enabling the ultimate switch to IPv6-only Internet. This will allow the deprecation of the IPv4 Internet, as recommended recently by the U.S. government, thereby reducing the maintenance of two Internets.

The major findings of the ETSI white paper are

- why IPv6 is becoming a priority with technologies such as 5G, the cloud, or the IoT
- why IPv6 is growing faster than IPv4 in all measurables, including the number of users, percentage of content, and amount of traffic
- how a large number of cloud service providers and operators have successfully deployed and used IPv6, with practical guidelines for deployment and use cases
- why applications such as autonomous vehicles, smart grid, industrial factory automation, process control, and building automation will greatly benefit from IPv6-enabled machine-to-machine communications
- why IPv6-enhanced innovations for future technologies like 5G, low-power radios, SDN/NFV, deterministic networking, and cloud computing will benefit the entire industry.

Global Internet Connectivity for Schools

According to the International Telecommunication Union (ITU), 360 million young people do not currently have access to the Internet. This results in exclusion, fewer resources for learning, and limited opportunities for the most vulnerable children and youth to fulfill their potential. Improved connectivity will increase access to information, opportunity, and choice, enabling generations of school children to take part in shaping their own futures.

On 26 August 2020, Ericsson and the United Nations Children's Fund (UNICEF) announced a global

partnership to help map school connectivity in 35 countries by the end of 2023. Mapping the Internet-connectivity landscape for schools and their surrounding communities is a critical first step toward providing every child with access to digital learning opportunities.

This joint effort is part of the Giga initiative. Launched last year and led by UNICEF and the ITU, Giga aims to connect every school to the Internet. Ericsson is the first private sector partner to make a multimillion-dollar commitment to the initiative and does so as a global UNICEF partner for school-connectivity mapping.

In addition to funding, Ericsson will commit resources for data engi-

neering and data science capacities to accelerate school-connectivity mapping. Specifically, Ericsson will assist with the collection, validation, analysis, monitoring, and visual representation of real-time school-connectivity data. The data generated through the mapping will enable governments and the private sector to design and deploy digital solutions that provide learning for children and young people.

The UNICEF-Ericsson partnership also contributes to the Generation Unlimited Global Breakthrough on Digital Connectivity, which aims to give young people the skills necessary to meaningfully participate in the digital economy. Generation Unlimited is a global, multisector

partnership formed to meet the urgent need for expanded education, training, and employment opportunities for young people. Additionally, the partnership supports UNICEF's recent COVID-19 Agenda for Action, in which the organization called for global action to keep children learning, thereby requiring the prioritization of Internet connectivity in rural and remote areas.

For additional information on the Giga initiative and how to get involved, visit Giga's website [9].

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