F

2020 Telecommunications Industry Roundup

How the COVID-19 Pandemic Shifted Our Ways of Doing Business and Consumer Behavior Across the World

Contents

Executive Summary

Coping with COVID-19

In the beginning of 2020, 5G network was commercially available through 40 mobile operators in 24 countries across the world. Pioneering countries included South Korea, United States, Switzerland, China, and Kuwait. It was forecasted that by the end of 2020, 5G network connections would reach more than 165 million. However, that number was ultimately revised, reduced to approximately 150 million, due to COVID-19.

During the early stages of the global pandemic when many countries closed their borders and enforced movement restrictions, the 5G ecosystem was affected by supply chain and logistics disruptions, as well as reduced customer interactions. Mobile operators had to announce delays to planned 5G launches, postponing them into the latter half of 2020 or into 2021. At the end of Q1 and throughout Q2, revenues in the telecommunications sector had declined as a result of the broader economy being impacted over the course of the pandemic.

On the road to recovery, the sector saw potentially long-term upside gains. As of the second half of 2020, 5G networks became commercially available throughout 39 countries from 87 different mobile operators. This was due to the rise of consumers and households contracting integrated bundle services, and the power of connectivity was recognized across all levels of society. Billions of people around the world were confined to their homes and became reliant on wireless and broadband access. Many aspects of daily routines were maintained through seamless work-from-home activities and social connections via social media. The way people worked and lived had to evolve and the data on network traffic demonstrated this shift, moving from city centers and dense urban areas into suburban areas.

The return to progress post-COVID-19

For 2020 and beyond, the future of the 5G connected world can no longer just be about the newest frontier technologies. The industry needs to take into account the expansion and evolution of existing advanced connectivity technologies to support the broader economy during these uncertain times. As operators continue to improve current services to keep up with the demand for better connectivity and stable internet connection, many have started to deploy core networks dedicated to IoT. This is to allow operators to ensure service quality and meet specific network requirements of enterprise customers, including localized coverage and time-sensitive networking.

Compared to more exposed sectors such as retail and tourism, manufacturers are revisiting strategies and adjusting operational models. Shocks to demand and supply chains associated with the COVID-19 pandemic are likely to accelerate adoption of technologies like cloud, automation, and advanced IoT. These technologies will help with efficiency gains, even if a curtailment in business investment underpins a temporary slowdown in 2020. For the long term, supply-chain visibility and adaptability, increased automation and resilience will be needed to survive in a highly competitive and uncertain environment. 5G and IoT will be the enablers of innovative use cases including massive wireless sensor networks, intelligent robots, and HD video transmission for remote maintenance and control.

Digital transformation is the way forward to alleviate and overcome the pressures of the COVID-19 pandemic. Enterprises are deploying IoT to achieve cost savings and generate new revenue, while consumers aim to simplify living. Those that have already started the digital transformation journey are unlikely to stop. This year's difficulties have only heightened the importance of digital transformation, especially the development of applications and platforms built for scalability and service integrations.

5G developments to keep pace with growing numbers of mobile subscribers

According to GSMA Intelligence, in 2020, 7.9 billion mobile connections are forecasted to increase to 8.6 billion by 2025. There will be 600 million new added connections in which two-thirds of it are coming from Asia Pacific and Sub-Saharan Africa.

To grow revenue and cut costs in a low-growth economic environment, operators are increasingly seeking ways to develop the mobile ecosystem. This development stage is made more complicated by the demanding requirements of 5G services, i.e. high speed, low latency, and ultra-reliability. Mobile operators will need to evolve networks – using innovations such as virtual RAN, edge networking, and network automation – to meet the demands of the 5G era. Operators will also need to diversify revenue streams into areas such as media and entertainment, advertising, and IoT to seek growth beyond providing core telecommunications services.

While speed is the most touted benefit of 5G, other improvements (e.g. network slicing, edge computing, and low-latency services) are beginning to gain traction as the next major steps for 5G services and benefits. For the next five years, 4G networks will still have the majority of connections worldwide in both consumer and enterprise levels, accounting 57.63% of the connections worldwide. However, most of the key benefits of 5G for enterprises will not be unlocked until standalone 5G architecture is deployed and operational, as its advanced capabilities address new markets and make new use cases commercially viable. There are still many considerations for operators as they strive to ensure a successful evolution of the network, while also maintaining a profitable business and increasing future revenues.

01

COVID-19's Impact on the Telecommunications Industry

The COVID-19 pandemic has been an extraordinary test for consumers, businesses, and communities, causing widespread concern and economic hardship across the world. As lockdowns and movement restrictions were imposed in many countries to respond to the growing outbreak, increasing numbers of consumers turned to digital channels for entertainment, information, education, and to stay in touch with family and friends. This led to a whole new emphasis on the importance of network connectivity and services offered by the telecommunications sector.

Due to major COVID-19-related restrictions set by governments, such as stay-at-home orders and quarantine measures, the telecommunications sector saw a massive spike in data traffic and increased use of broadband services as more people relied on connected devices and IoT devices throughout 2020. For example:

- According to KPMG UK, during the peak of isolation, Europe saw a spike in internet traffic, going to as high as 70% in 2-3 weeks. Streaming services observed a jump of approximately 12%, with tech giants such as Facebook, Amazon, and YouTube reportedly having to lower video qualities in Europe to ease network strains.[1]

- For IoT devices, General Electrics (GE) Digital offered free Remote Monitoring and Control licenses to their iFIX and CIMPLICITY consumers to support remote working. On par with GE, Siemens made their Additive Manufacturing (AM) Network and 3D printers available for the global medical community, which aimed to speed up design and production of medical components.[2]

The traffic growth observed by several companies across different industries clearly displayed an increased reliance on connectivity and digital services. In response to this development, mobile operators and digital service providers adapted to changes in demand and demonstrated agility through accelerated channel shifts and enhanced digital capabilities.

To that effect, the telecommunications sector continues to play a critical role in supporting governments, consumers, and businesses as they navigate the following three conditions of adjustment for the uncertain times ahead:

- **The Now**, which emphasizes supporting people, consumers, and suppliers.
- **The Next**, which calls for refocusing the business to withstand new threats and seize new opportunities in a slowly recovering economy.
- **The New Normal**, which will see rapid shifts in cultural norms, values, and behaviors.

[1] **Beech,** *COVID-19 Pushes Up Internet Use 70% And Streaming More Than 12%, First Figures Reveal,* **2020.**
[2] **Lueth,** *The impact of COVID-19 on the Internet of Things – now and beyond the Great Lockdown: Part 2 of 2,* **2020.**

1.1 Developing resilience in the face of a global crisis

The importance of connectivity has never been more emphasized. Over the course of the pandemic, mobile operators delayed 5G rollouts to focus on ensuring people could stay connected to their family, friends, and workplaces. As a huge number of people relied on mobile technologies during lockdowns, work was done in 4 key areas:

Maintaining Stable Internet Connection

With entire populations suddenly confined to homes, networks in domestic areas felt the strain from the surge in online activities related to work and leisure. To maintain the network stability expected by people, operators added capacity or reconfigured capacity profiles accordingly to ensure networks remained robust and secure.

Disseminating Vital Information

Working closely with governments to reach out to urban and rural communities, operators helped to deliver vital information directly to mobile devices. Operators leveraged big data capabilities to monitor and limit the spread of COVID-19 by providing timely health and emergency updates. In countries where the number of confirmed cases was fast-developing, having the resources to keep citizens up to date with the latest advice and prevent the spread of disinformation was of paramount importance.

Better Connectivity for Emergency Services

COVID-19 demonstrated how much of a priority it is to connect health centers and hospitals to enable advanced services such as remote diagnostics and telemedicine. To prevent another global health crisis from overwhelming health centers, regulations may relax in some markets to allow operators to ensure connectivity for emergency services is maintained.

Easier Payment Solutions and Data Incentives

To alleviate some of the hardships experienced during this time, many operators simplified the payment process for postpaid numbers and top-ups for prepaid numbers by enabling easy access for subscribers through payment gateways, with the help of digital service providers. Several operators in developing markets also lifted data caps to encourage increased usage, and introduced the expansion of transaction and mobile account limits.

In summary, 2020 has demonstrated that the telecommunications sector played an integral role in supporting consumers' wellbeing by maintaining ability to keep in touch with family and friends while staying productive in their work. However, to meet future opportunities in this new societal landscape, the Next and New Normal will demand the reinvention of operators' business models to embed further agility and resilience. Today's value optimization strategies need a mindset of intelligent business transformation underpinned by trust through secure people-centric services and enhanced ways of working.

> **"U Mobile responded swiftly to the pandemic outbreak by offering free connectivity to all its subscribers. We provided handsets with free SIM cards to medical frontliners to facilitate their needs during this crisis. As for business operations, online-first was critical and we made sure all our digital channels continued to support our customers' personal, business, and lifestyle needs in the new normal."**

***Eddie Quek**, Head of Digital Consumer Services, U Mobile, Malaysia*

> **"Responding to the pandemic, XL Axiata has made adjustments in strengthening our network in residential areas following customers' shift in lifestyle and work. We applied health protocols across our service centers and provide delivery services for our product purchases. In support of government programs handling COVID-19, we distributed free internet packages to those in education and other social fields to maintain productivity using internet and digital facilities."**

***David Arcelus Oses**, Director & Chief Commercial Officer, XL Axiata, Indonesia*

Figure 1

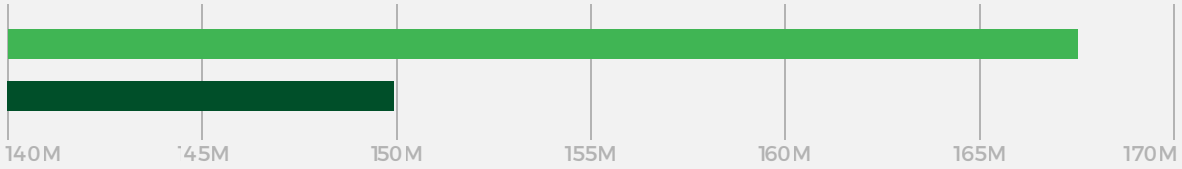
The Impact of COVID-19 on 5G Plans Worldwide

1. **Delayed rollouts of 5G network coverage and availability.**
2. **Productivity slowdown due to factory closures.** Month-on-month smartphone shipments dropped as low as 56% on February.
3. **Population believing COVID-19 will affect personal finances:** Declining consumer interest in 5G.

Implications on MNOs :

- Continue with pro-consumer efforts.
- Strengthen content partnerships.
- Prepare for second half of 2020 onwards as tech adoption wil get back on track.

Forecast Number of 5G Subscriptions:



Forecast number of 5G subscription is **reduced by 27%** due to global economy slowdown.

Data as of April 2020

1.2 The digital ecosystem is the way forward

As the world gradually recovers from the pandemic and the coinciding economic recession, understanding consumer needs to inform long-term strategies will be the key in getting back on track. Enabling new workplace and business practices now will ensure challenges are possible and quicker to overcome. This will require the implementation of the right technology, mobility, and collaboration tools across organizations alongside adaptive security capability. To establish new sustainable ways of working,

these steps will be fundamental to achieve the cultural change required of today's strategies for robust business continuity.

From speaking to our business partners and observing market trends, we can conclude that consumers will be interested in new services as their needs change to reflect their lives, increasing demand for solutions across entertainment, IoT-connected homes, gaming, social activities, and health. Mobile operators must extend the digital ecosystem if they want to be on even footing or stay ahead of platform players who are determined to disrupt the market with innovative digital solutions.

The need to continue investment in 5G will take precedence for operators but the challenges driven across both supply and demand will continue to increase operational pressures including customer demand for robust omnichannel support in service and sales, on top of maintaining network and IT stability. As the human impact of COVID-19 reshapes consumer practices, operators have the unique opportunity to fundamentally reinvent and evolve relationships with consumers by finding new, secure, and sustainable ways of living through reliable, intuitive, and innovative products and services.

Across the world, the COVID-19 pandemic has therefore revealed extensive weaknesses in local economies and re-emphasized the pressure for countries to develop a robust digital ecosystem. To build more resiliency, more companies, particularly those in retail, transport, logistics, manufacturing, and healthcare, will need to potentially increase investment in digital transformation to protect businesses from future force majeure events. Digital service providers, especially those operating across the entire value chain, should leverage their expertise to become key partners to enterprises in realizing digital transformation goals. For mobile operators, 5G network implementation strategies will be more important than ever to support these initiatives.

> **"To keep up-to-date with current pandemic protocols, APT launched a "health section" in "Gt Pubu eBook" with rich content to help consumers learn about the most accurate prevention techniques during the COVID-19 crisis. APT also offers "BOSS ++ Video conferencing" service with multi-function, which allows employees to work remotely from home. Additionally, we offer discounts on anti-epidemic related products and mobile purchase plans too."**

Didy Teng, *Vice President, Marketing, Asia Pacific Telecom Co., Ltd, Taiwan*

How Mobile Operators can take action

Promote greater value on top of speed

The offer of faster upload/download speeds is attractive, but will not be a long-term, sustainable value proposition for 5G pickup. Enterprises that are considering 5G now have goals that extend beyond the demands of past mobile user generations: they are investing to create new ways to interact with consumers, do business, and make money. Productize 5G solutions according to customer segments to establish new revenue streams.

Build an ecosystem of experienced partners

Consider what use cases are suitable and relevant for your business before committing to 5G implementation. The most reliable and informed suppliers can make pragmatic decisions that benefit your organization. Value those that take time to understand your business and strategic goals.

How Technology Vendors and Platform Players can take action

Sell solutions, not technology

Today, there is a lot of clout surrounding the “digital integration” of different hardware and/or software. Operational 5G success will depend on the interplay of technologies across multiple domains and systems. Hyper-collaboration is desirable but do not overestimate your products and services’ strength in this area. It is better to demonstrate excellence and secure your technology’s worth instead by producing pragmatic go-to-market solutions and improving industry best practices with thorough implementation guidance.

Invest in the end-to-end channel

With the 5G lifecycle predicted to see greater digitization along with the network as demand scales up across the world, on-the-ground professional services will be needed to guide consumers for onboarding. Design, build, and implementation partners are the biggest priorities, but those with managed services skills are also an important component to include.

How Enterprises can take action

Seek practical ecosystems with flexible integration skills

To facilitate 5G's success, people, processes, and technologies have to be connected seamlessly. Enterprise data is shifting to the cloud to accommodate this transition but the digital environments are often diverse and could get complicated once operational and information technologies converge. Depending on your industry, finding the right suppliers that can translate between the language of OT and IT will be challenging, but very valuable to know. Given the breadth of 5G's impact, the smartest suppliers will have taken time to map out ecosystems and build partnerships across solution specialists and other market stakeholders.

Evaluate the most appropriate option

The global IoT market has grown tremendously over the years and has demonstrated one crucial fact: it's not possible to do everything under one roof. With enterprise verticals that expect a certain quality and haste in product delivery, it is recommended to leverage partners with deep knowledge and the resources to meet specific project targets.

We've seen how those who failed to digitally adapt have lagged behind those who managed to take great leaps in digitization during this disruptive period. We must take note of consumer sentiments and learn how to maximize options that can convenience them. To broaden reach, we have to adjust our preconceived notions and optimize the evolving data we get from changing consumer journeys.

02

Providing and Developing the 5G Experience

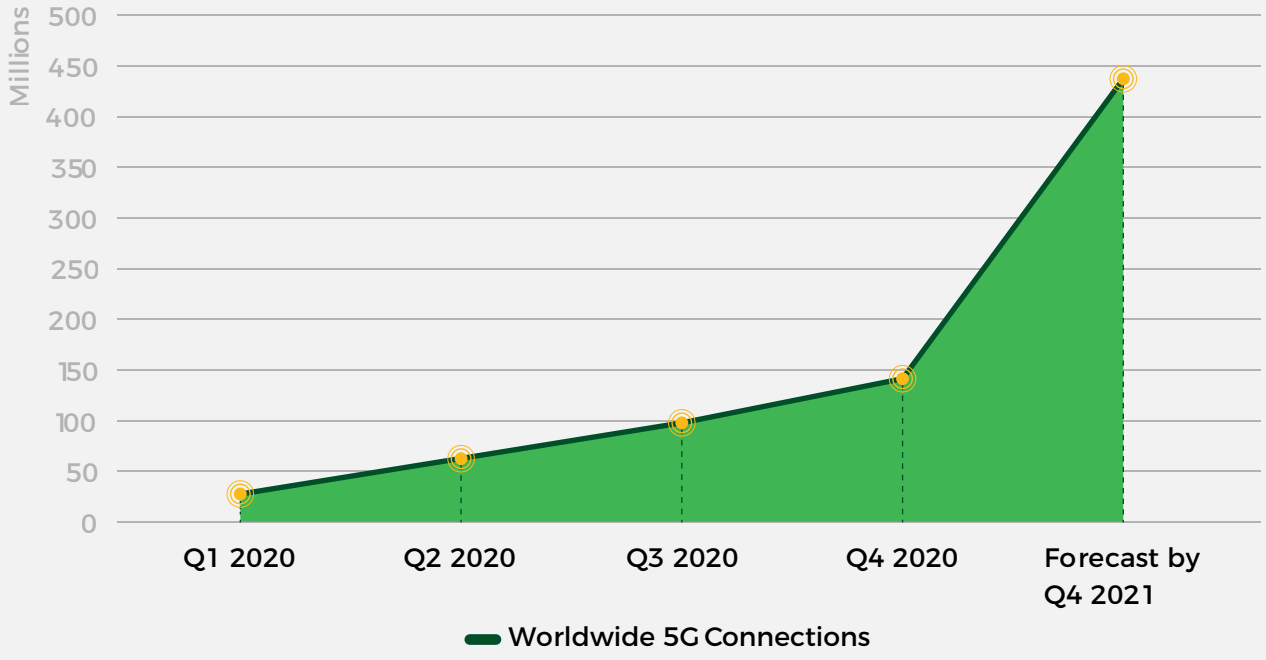
5G is touted as the connectivity fabric that will fundamentally reshape our collective future, promising to bring a new era of advanced business processes and outcomes. The worldwide competition for 5G-first launches began in 2019 and continued in 2020 with mobile operators racing to make it accessible to the consumers.

With technology capable of serving up new applications, consumers and enterprises will benefit from high-quality connectivity that can realize new levels of productivity and efficiency. Building infrastructure for 5G, however, has been quite a challenge for many markets. Adding the pandemic that began a global lockdown early in Q1 2020, many countries have delayed their 5G rollout plans.

The earliest to make 5G commercially available was South Korea. The country's operators first launched 5G services for smartphone users as early as April 2019. Entering 2020, the United States, Switzerland, China, and Kuwait became runners-up to make 5G services available. Since then, the deployment of 5G and the worldwide count for 5G connections continued to soar. In Q2 2020 alone, 19 operators launched 5G networks across 12 markets. These countries include Belgium, Hong Kong, the Netherlands, Poland, and Sweden.

Figure 2

Worlwide 5G Connections



Data as of August 2020

In general, the 5G networks of 2020 were adopted in areas that had already embraced the latest technologies like 4G. That being said, implementing 5G requires more than just upgrading existing networks. As new network infrastructure is expected to support investments, forward-looking enterprises have already planned for digital transformation, OT/IT convergence is seen as the key driver of 5G's pickup across several industries. Requiring a lot of effort from mobile operators, equipment vendors and manufacturers, as well as digital service providers, 5G's success will depend on three coalescing elements:

Network Modernization

Cloud-native, software-defined infrastructure.

Operational Excellence

Automated, real-time data analysis for optimal customer experience.

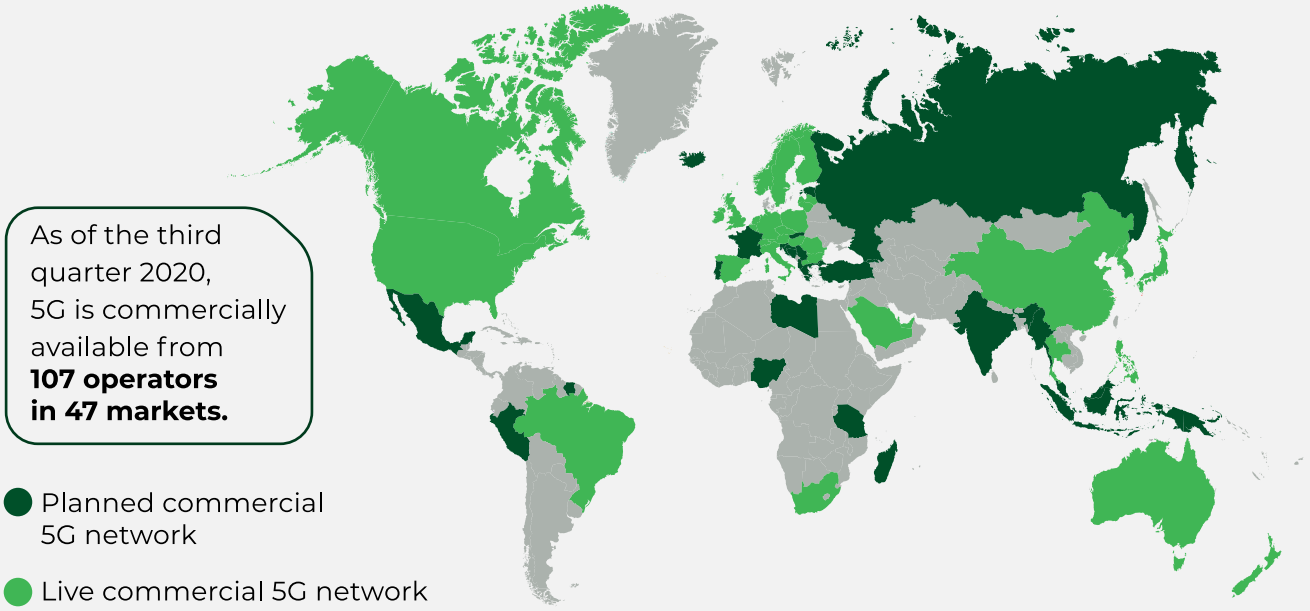
Innovative Services

Flexible and responsive to market demand.

Operational Technology (OT) refers to the systems used to monitor business functions and make adjustments as needed. Information Technology (IT) refers to computing resources – both centralized and distributed – used to run various workloads, i.e. managing internal business applications or analyzing data pools. To enable OT/IT convergence, mobile operators and business partners have to consider the best approach to integrate 5G for various industry use cases.

Figure 3

5G Network World Map



Data as of September 2020

2.1 Configuring 5G network infrastructure for scalability and flexibility

The COVID-19 pandemic has revealed how critical digital transformation is to enterprises and governments. With day-to-day operations affected and factories slowing down production due to government restrictions, IT needs to respond to the demands from OT with particular emphasis on security, integration, visibility, control, and compatibility. Today, more than ever, these factors lead to optimized business continuity and future success.

To deal with a world full of uncertainty, 5G network infrastructure has to be continually developed to be resilient and adaptable to consumers' growing network demands. So far, these are the main features which several operators have promised:

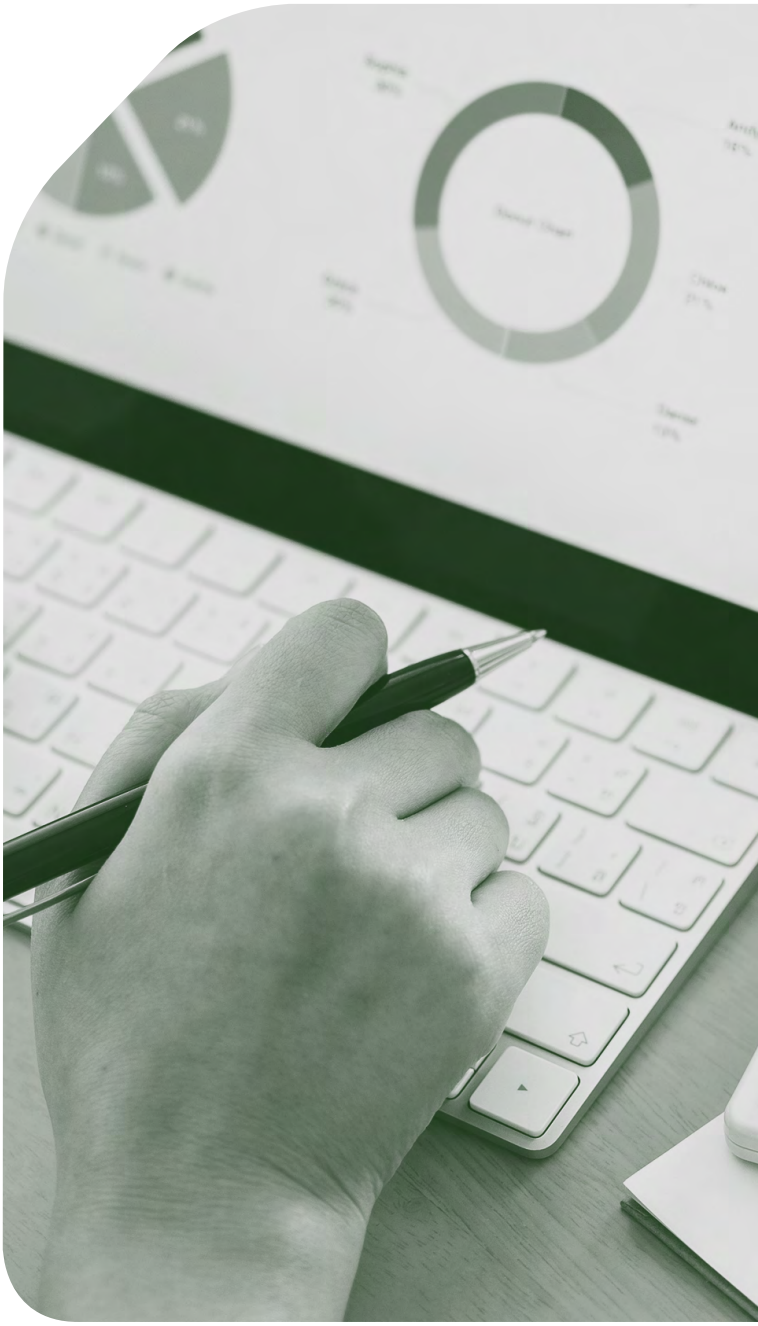
- Higher speeds and greater capacity for consumers and businesses
- Very low latency communications
- Efficient spectrum and network resource management
- Seamless availability and performance for indoor and outdoor environments
- Flexible and programmable access and core networks
- Intelligence-driven, automated decision-making to manage network performance
- A variety of SLAs to fit individual customer or industry use cases

Most commercial 5G networks currently use a non-standalone (NSA) architecture. NSA 5G deployments allow operators to increase mobile broadband capacity for consumers, supporting services such as fixed wireless access, video surveillance, and basic cloud gaming.

The enterprise/vertical markets offer the greatest, newest opportunities that require even higher levels of performance and reliability. To unlock the full feature set of 5G, operators have already begun shifting from NSA to Standalone (SA)[3] architecture to enable low-latency communications and support for massive numbers of connected devices. Envisioned as fully virtualized and capable of automatically provisioning custom data streams for specific applications, SA 5G represents the next stage for data capacity, localized computing, and bespoke services. As the number of connected devices increases exponentially around the world, backhauling the data created from machines that consume and produce data measured in gigabytes per second requires the network infrastructure to adopt a new cloud-native core.

An important distinction associated with this shift to not just SA 5G but fully virtualized networks is that telecommunications networks will become more like IT networks, through software-defined networking. SA introduces network slicing – the further splitting of network functions – and elements such as the Network Exposure Function (NEF) to realize a service-based architecture.

Based on an open framework, it is planned that all 5G core functions will eventually take full advantage of a service-based architecture with application programming interfaces (APIs) to access third-party applications for faster introduction of services. At this stage, there would be even more opportunities to expand into new business models for operators.



[3] **Alexander**, *5G Will Stand Alone as a Necessity for Our Future*, **2020.**

2.2 Slicing the network to create new services and unlock revenue streams for enterprises

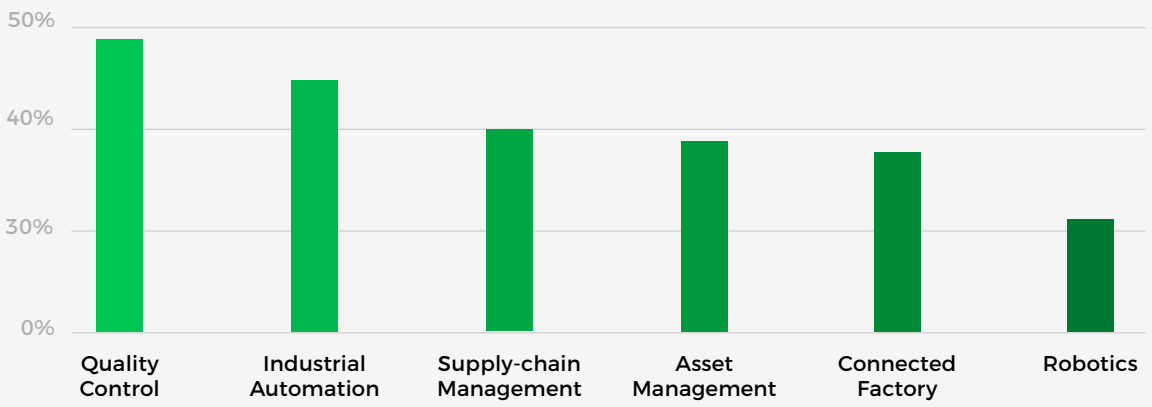
For network slicing to work best, there needs to be an end-to-end, virtualized 5G network spanning the edge, cloud, and core. Network slicing uproots traditional network connectivity by enabling operators to segment or "slice apart" portions of the network to provide specific levels of service autonomously. It will essentially allow devices to connect to any cloud service in a manner that is optimized for both the end-user experience and operator resource allocation. In the design and deployment of 5G networks, this ability to automatically allocate connectivity based on the defined purposes of an enterprise/consumer will be paramount to 5G monetization.

Figure 4

IoT Solutions for the Manufacturing Industry

2 billion **Industry 4.0 connections* in 2025. Tripling between 2020 to 2025.**

Top IoT Solutions Adopted by Manufacturing Companies



When 5G Networks Come Online, IoT Will Be Supported by:

- Lower Latency
- High Bandwidth
- Data Security and Isolation

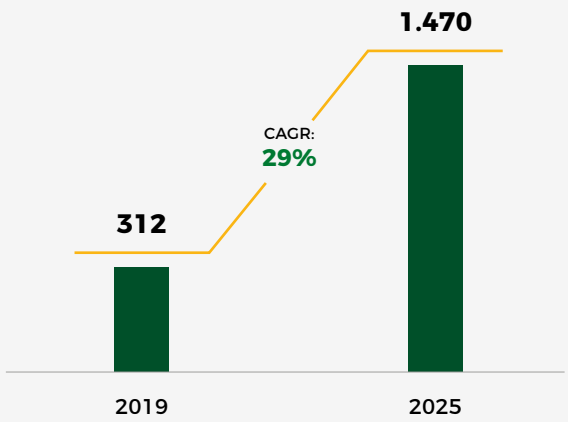
*Includes industrial use cases in inventory tracking, monitoring and diagnostics, and warehouse management.

Data as of September 2020

Figure 5

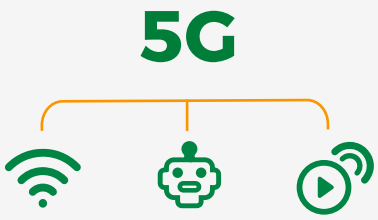
Digital Transformation of the Manufacturing Industry

Smart Manufacturing Connections (million)



Smart manufacturing is expected to be **the fastest growing segment** within enterprise IoT connections in five years.

Using the 5G network, IoT will be the enabler for innovative use cases such as:



Massive wireless sensor networks, intelligent robots, and HD video transmission for remote maintenance and control.

70% of operators cite manufacturing as a top vertical for private wireless network.

21% of operators believe automotive manufacturing will benefit most from 5G network slicing.

Data as of September 2020

Network slices will see the greatest usage in industrial and enterprise IoT-type implementation because they can be designed, configured, and connected end-to-end according to the client's specified requirements. When SA 5G is enabled, an operator can provide an enterprise its own slice capable of flexibly delivering everything – covering specific levels of service in terms of latency, throughput, reliability, and security – from low-power sensor connectivity to real-time data streaming and analysis. Each slice will thus provide a differentiated service, receiving a unique set of optimized network and spectral resources that suit the needs of the application.

New types of utilization models that will be unlocked with network slicing:

Hosting applications

By enabling the hosting of applications (e.g. enterprise, utilities, manufacturing) on the network, operators also gain the capability of collecting relevant data within a network slice. Data collected within the slice along with external sources can be used to enhance the performance and efficiency of the application. Going a step further, the data can even be employed by machine learning (ML) algorithms to predict future trends or to boost analytics.

Capability exposure

Operators can extend to clients the capability to manage own services or slices by utilizing APIs offered by the operators. In line with a contract or SLA, these APIs will provide access to network-specific information, which can allow each business customer to derive insights into the perceived service quality, current network condition, or the environment.

Integration in existing business processes

A communication or computation infrastructure in operation — within an industrial setting, for example — may already exist for some business customers. If it is needed, the network slice can integrate such infrastructure.

In essence, network slicing enables the most economical model to provide service differentiation. By not requiring to deploy full functionality to support devices that will use only a part of that functionality, it enables faster time-to-market with best-of-breed services, but at lower costs and improved network connectivity. This brings the importance of digital transformation to surface, especially to the players in the manufacturing industry. Bringing more intelligence to the edge to enable real-time control loop for things like robotic process automation (RPA) and digital twins – this is where 5G will truly accelerate ROI. As today's machines promise rapid data generation and consumption, the need for agile delivery of network slices will become critical for multiple verticals of digital transformation.

2.3 Use case example: Nokia's 5G "Factory of the Future"

As manufacturers revisit long-term strategies to deal with COVID-19's negative effects, factories are adjusting production to match demands using tools such as cloud, IoT, and analytics. Nokia was one of the earliest adopters of such technology.

In 2019, Nokia began using its own technology at a manufacturing facility in Oulu, Finland. The company was powered by Nokia Digital Automation Cloud, which leveraged a private wireless network for secure and reliable connectivity for all assets in and out of the factory. The company's 4.9G/LTE network ran analytics on sensor data on edge computing infrastructure.[4] This data was then used to help increase productivity up to 30% and reduce time of product delivery to market down to 50%. Other processes in the manufacturing facility were also automated as a result of smooth data flows:

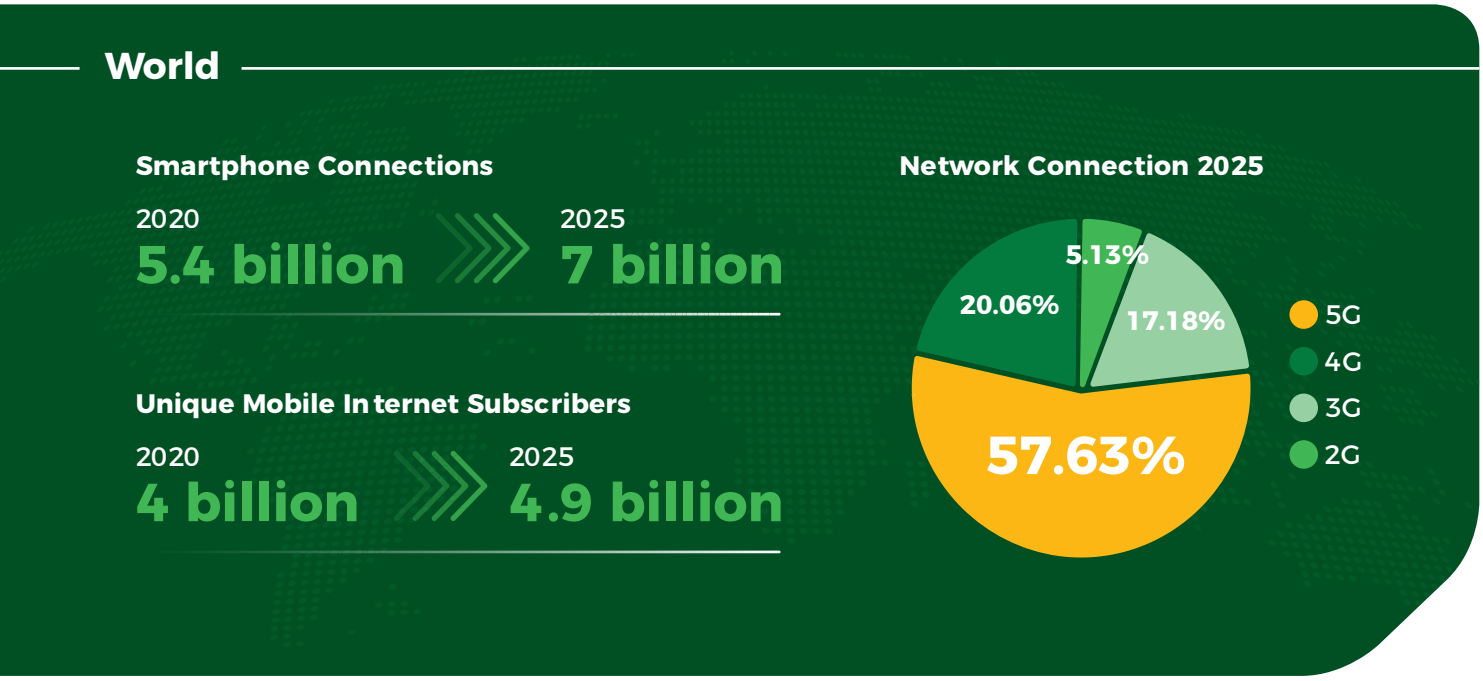
- Temperature and humidity sensors were enabled to help ensure factory assets were kept in optimal conditions.
- Autonomous vehicles inside the factory could be guided by indoor location technology to carry materials and products efficiently.

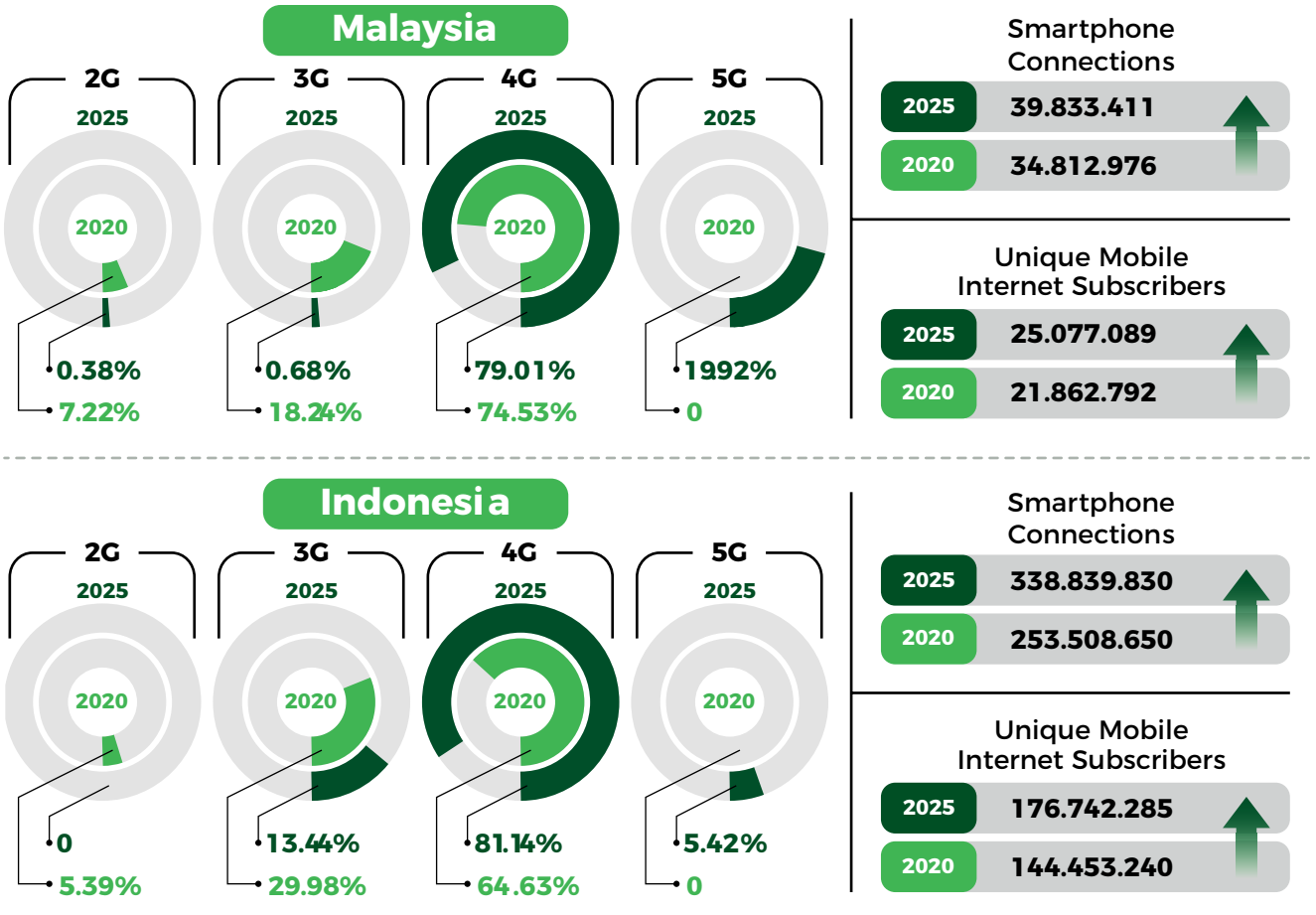
Overall, digital transformation using the 5G network for Nokia helped the company save an annual cost of millions of euros. The factory gained efficiency of over 30% in material feed, 40% increase in overall equipment effectiveness, and 98% decrease in maintenance work time.

[4] **Kinney**, *Nokia Reaping Benefits of Its Own Smart Factory Technologies*, **2020**.

2.4 Mobile Economy Forecast 2025

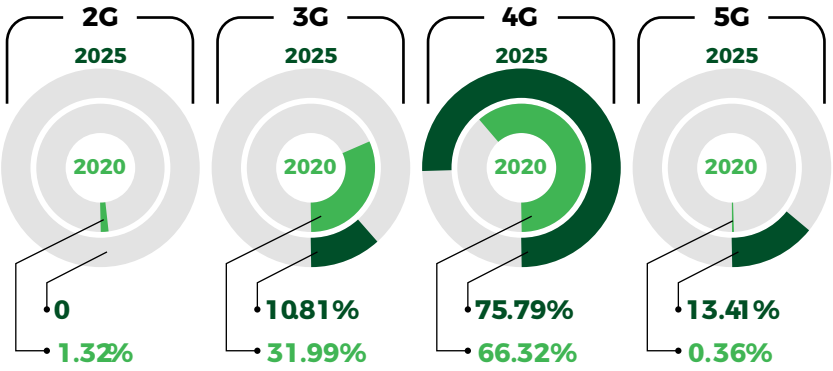
Figure 6





Data as of August 2020

Thailand



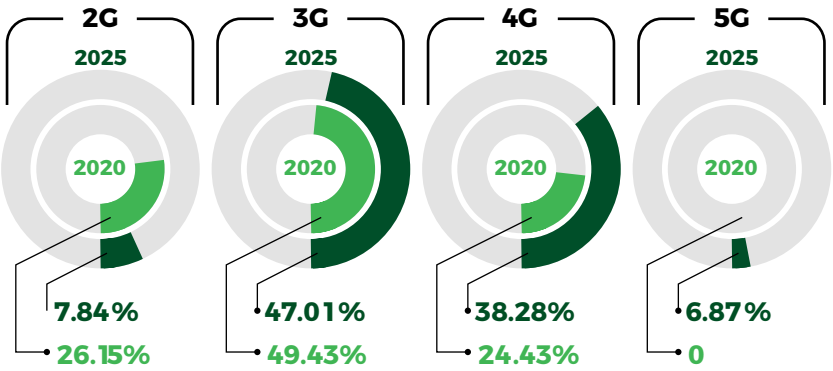
Smartphone Connections

2025	83.250.092
2020	73.972.975

Unique Mobile Internet Subscribers

2025	55.539.567
2020	48.237.108

Cambodia



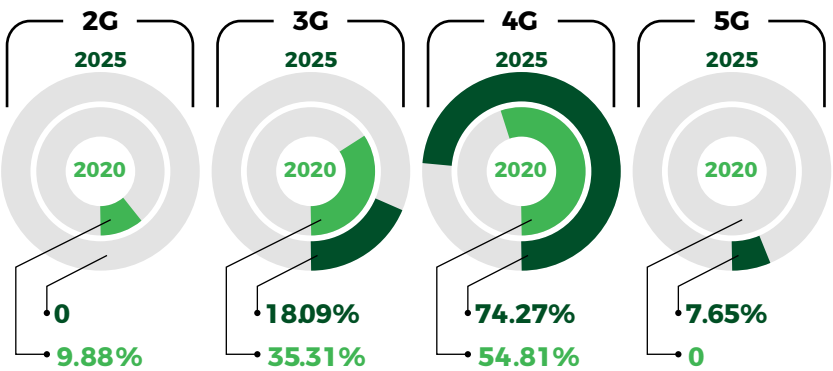
Smartphone Connections

2025	20.170.890
2020	12.869.414

Unique Mobile Internet Subscribers

2025	11.146.747
2020	8.759.562

Myanmar



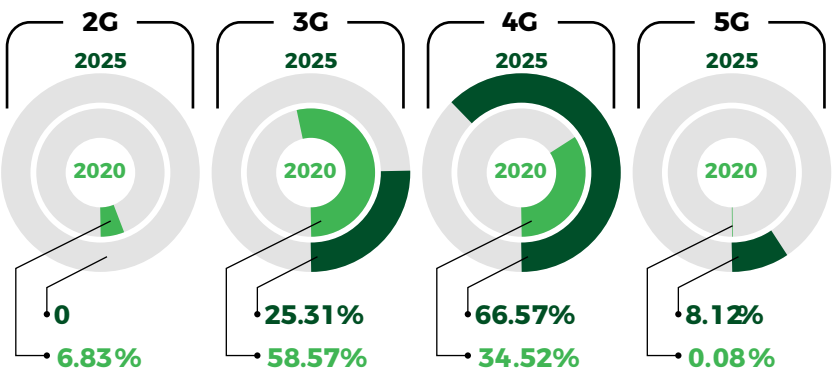
Smartphone Connections

2025	74.909.503
2020	58.833.383

Unique Mobile Internet Subscribers

2025	30.654.113
2020	23.598.489

Philippines



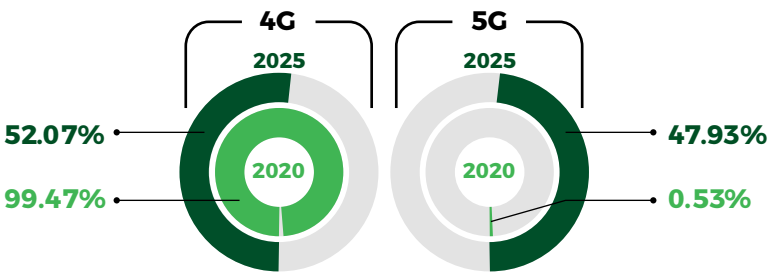
Smartphone Connections

2025	137.862.835
2020	114.270.624

Unique Mobile Internet Subscribers

2025	72.964.970
2020	54.288.588

Taiwan



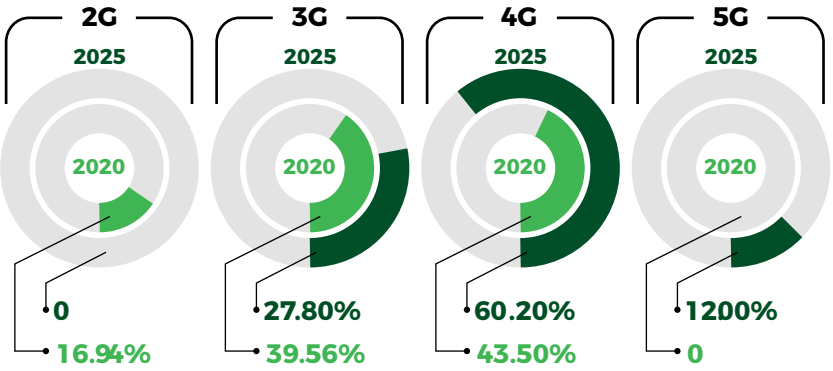
Smartphone Connections

2025	25.684.207
2020	23,316,798

Unique Mobile Internet Subscribers

2025	20.379.082
2020	17.574.745

Kazakhstan



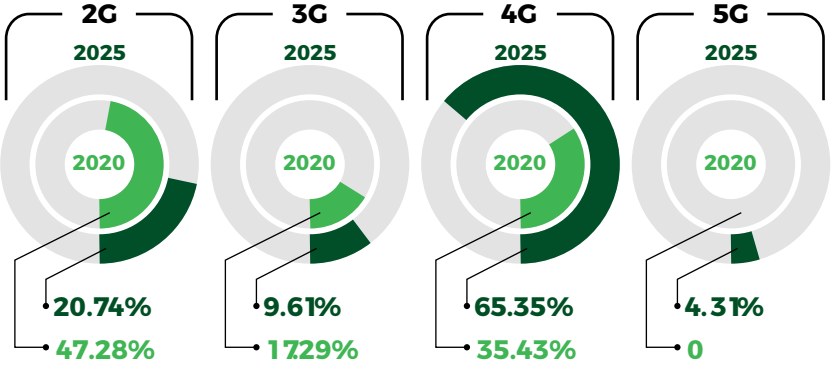
Smartphone Connections

2025	18.733.028
2020	15.146.696

Unique Mobile Internet Subscribers

2025	12.674.810
2020	9.373.046

Pakistan



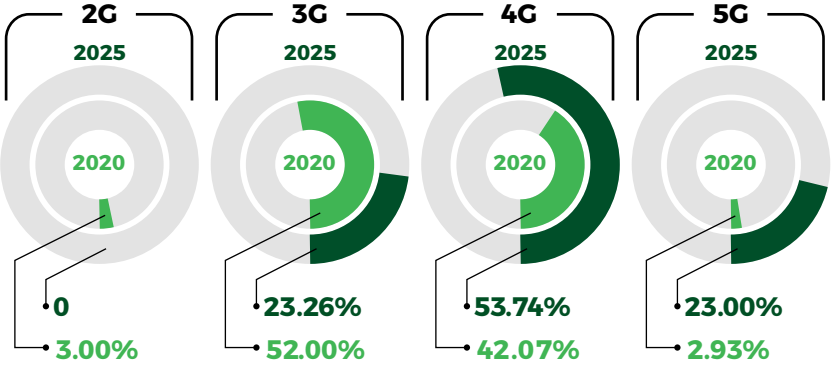
Smartphone Connections

2025	160.359.012
2020	92.686.898

Unique Mobile Internet Subscribers

2025	101.468.690
2020	60.982.057

UAE



Smartphone Connections

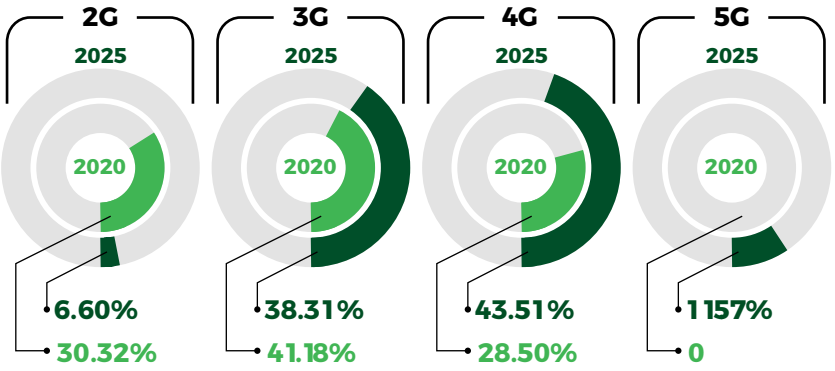
2025	16.939.459
2020	14.266.127

Unique Mobile Internet Subscribers

2025	8.567.491
2020	7.712.651

Data as of August 2020

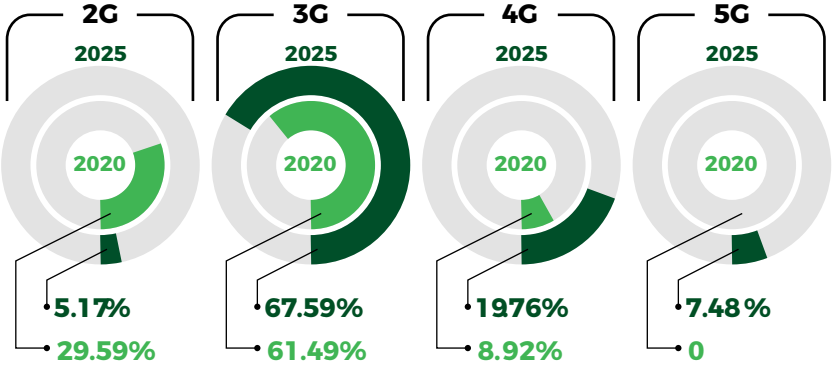
Morocco



Smartphone Connections	
2025	34.986.379
2020	24.039.440

Unique Mobile Internet Subscribers	
2025	23.657.701
2020	17.862.957

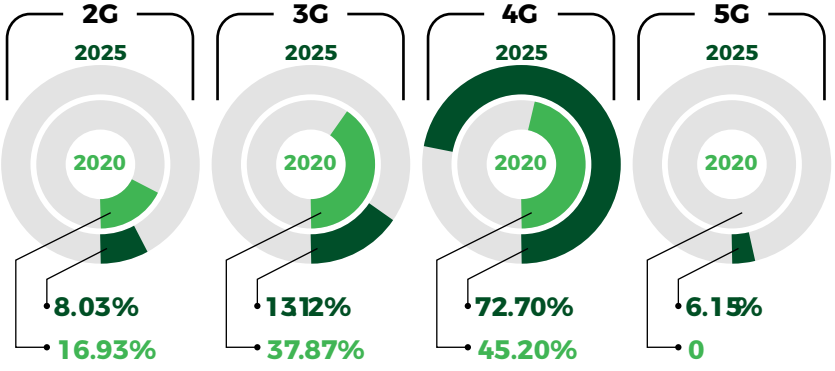
Nigeria



Smartphone Connections	
2025	155.427.412
2020	99.265.640

Unique Mobile Internet Subscribers	
2025	100.814.759
2020	71.040.817

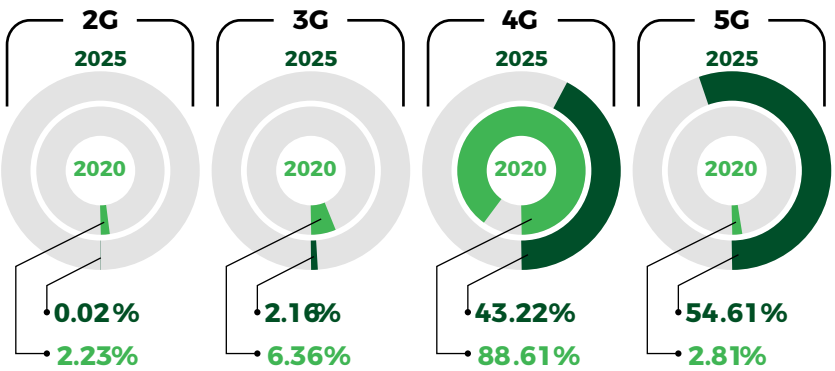
Peru



Smartphone Connections	
2025	25.034.491
2020	22.378.720

Unique Mobile Internet Subscribers	
2025	20.647.433
2020	17.774.916

USA



Smartphone Connections	
2025	340.982.962
2020	303.656.613

Unique Mobile Internet Subscribers	
2025	279.199.015
2020	259.902.323

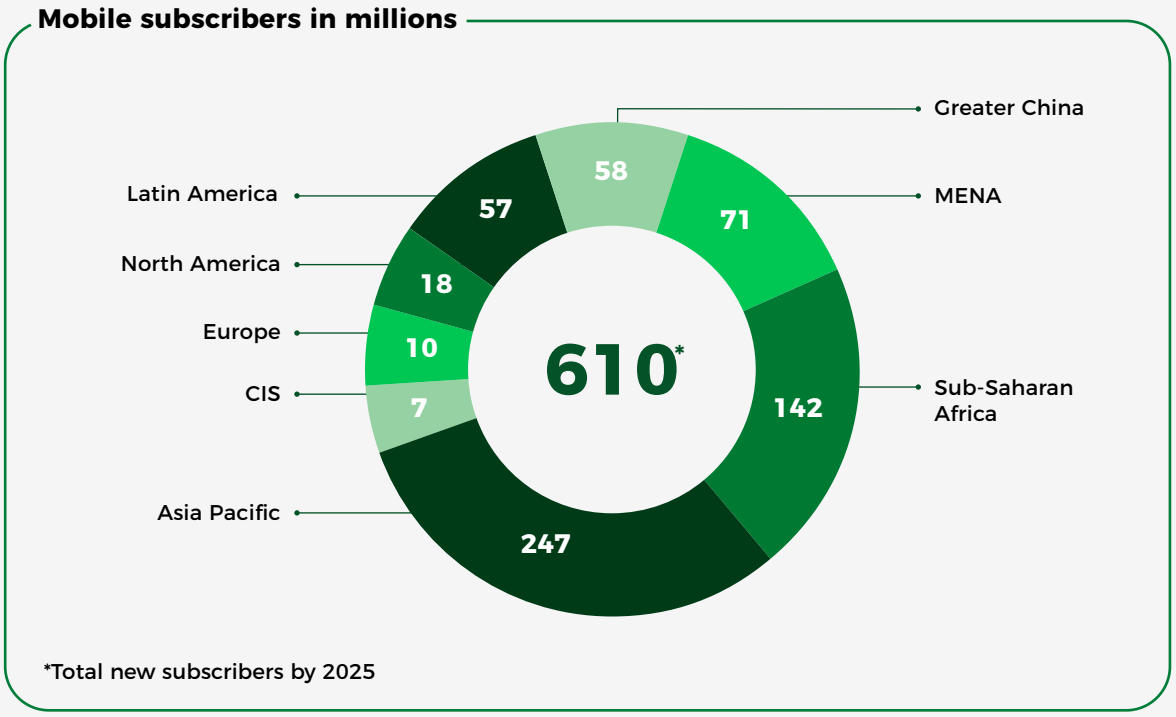
Data as of August 2020

03

The Rise of Mobile Internet Users

Figure 7

Mobile Subscribers Growth by 2025



The total number of mobile subscribers is projected to reach 8.6 billion.

61% of the worldwide population will be internet users.

Data as of September 2020

The pandemic has disrupted and revolutionized the world of telecommunications and digital consumerism in many ways. At the end of 2019, two-thirds of the global population was subscribed to mobile services. Influenced by lockdowns imposed worldwide in Q1 2020, the number of mobile connections increased to approximately 7.9 billion, compared to 5.2 billion at the end of 2019.[5]

Asia-Pacific is one of the fast-growing regions with nearly 500 million new subscribers since 2014, and the region will account for an additional 247 million new subscribers by 2025. On top of that, the number of mobile internet subscribers will increase by 663 million people by 2025. This will bring the total number of mobile internet users in the region to around 2.7 billion, with China and India accounting for two-thirds of the increase.[6]

[5] **GSMA**, *The Mobile Economy 2020*, **2020**.
[6] **GSMA**, *The Mobile Economy - Asia Pacific 2020*, **2020**.

3.1 Drivers of mobile connection growth

Physical distancing measures placed restrictions on domestic and international travel causing businesses to change the way they hold meetings and networking activities, which resulted to a spike in mobile communication such as teleconferencing. Evidently, this has spurred the growth of mobile internet connectivity, leading to a demand for investments in network infrastructure and enhancements in its accessibility worldwide.

Figure 8

Mobile Internet Connectivity 2020

Almost 1/2 of the world population are using mobile internet.

4G connections now account **>50 %** of mobile connections globally.

3.4 billion people live in areas covered by mobile broadband but do not use mobile internet.

1 out of 4 Adults are not aware of mobile internet in low and middle-income countries (LMICs).

It's predicted that there will be more than **4 billion** mobile internet users by the end of 2020.

More than **200 billion** increase since 2019

Data as of September 2020

In the wake of today's global challenges, the digital ecosystem has proved vital in the response to the pandemic. Incentives from the governments and mobile operators in some countries are also a contributing factor to the rise of mobile internet subscribers. During a crisis, it is essential for the citizens to stay informed, educated, and entertained; organizations to stay in operation; and governments to provide essential services and convey developing updates. A study by Ericsson highlights the importance of network resilience and internet connectivity, not only during this crisis but also for future crises.[7]

[7] **Ericsson**, *Keeping Consumers Connected During the COVID-19 Crisis*, **2020**.

According to a report by the International Telecommunication Union (ITU), here are some ways the industry has responded to the pandemic:

Provide Free Access to Consumers

To maintain affordability and connectivity, regulators in approximately 12 countries have provided free data allowance and/or free access to educational websites. Countries with this initiative include Azerbaijan, Egypt, Kuwait, Malaysia, and Paraguay.

New Fixed Wireless Access (FWA) Network

In some countries, 4G or 5G Fixed Wireless Access has been used to deploy wireless broadband infrastructure. Improvements in connectivity were needed to quickly support coverage and capacity near focal points such as healthcare facilities and areas like cities, suburban, and urban areas. For example, China Telecom deployed a 5G network at Wuhan's temporary hospital to help ensure stable Wi-Fi coverage for thousands of users involved in telemedicine, health records, monitoring, and other related fields.

Address Fake COVID-19 News

A number of fake news related to COVID-19 rose as countries went through lockdowns. Some countries including Myanmar, Uganda, the UK, and South Africa have promulgated rules addressing fake news, especially those linking 5G deployment to the spread of coronavirus.

Track Application Development

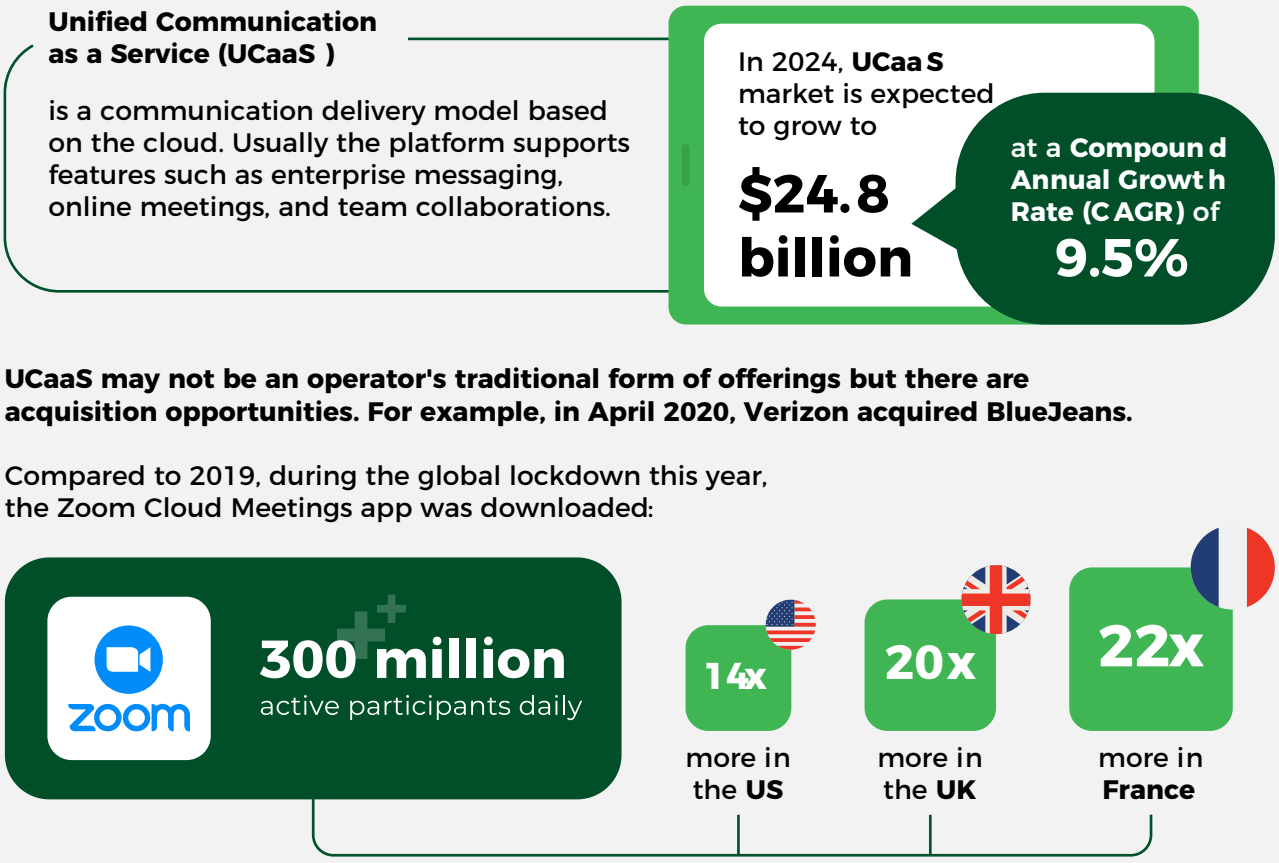
The European Union and some other countries like Australia and Uzbekistan have developed tracking applications in order to track the spread of COVID-19. Tech giants like Google and Apple announced partnerships to develop a contact tracing technology.

3.2 Social media, digital marketing, and streaming services see record boosts

The growth in social media and streaming services usage indicates that a higher proportion of consumers are turning to their mobile phones for ways to cope with the pandemic and the new normal. From online streaming services like Netflix, to social media such as Facebook, as well as online meeting platforms like Zoom, there has been a significant increase of daily and monthly active users.

Figure 9

UCaaS Market Post-COVID-19



Data as of July 2020

Under the new normal, consumers turned to video streaming services like Netflix, Amazon Prime, and Apple TV+ for entertainment, which boosted popularity and revenue. As of Q2 2020, Netflix had a total of 192 million paying subscribers,[8] making

[8] **Heisler,** *This Chart Illustrates Why Netflix is the Most Popular Streaming Service*, **2020.**

it the most popular streaming service to date. More than half of the top 20 most-watched TV shows of June 2020 are hosted on, if not produced by Netflix.[9]

According to Statista,[10] Facebook became the first social media platform to pass the 1 billion registered accounts marker. The surge in new registered Facebook accounts took place in July 2020, amid the global pandemic, totalling to more than 2.6 billion monthly active users then, making it the most popular social network. YouTube and WhatsApp were not far behind, with both platforms registering a total of 2 billion monthly active users each.

Despite Facebook's reign as the most popular social media platform, it was TikTok and Instagram that became the preferred social media go-tos, with TikTok being the most downloaded app on August 2020. TikTok and Instagram's overnight rise to fame made these applications a haven of vast opportunities for both users and brands. More brands are actively testing out digital marketing strategies on TikTok and Instagram as an effort to widen target audience reach and it is working.

One of the many successful branding campaigns is Elf Cosmetics' Eyes Lips Face TikTok challenge. It is viewed as one of the most influential campaigns on TikTok to date. As an effort to execute the campaign properly, Elf Cosmetics hired an agency to create a special song for the campaign and it paid off. The Eyes Lips Face challenge garnered 4 billion views and 3 million user-generated videos, which made the campaign and brand go viral.[11]

> **"To cope with the pandemic, Cellcard developed and launched Cellcard 4U within 5 days, giving customers greater access to data and with the flexibility to roll-over all their unused voice SMS and data. To help with safety, we launched an ultra-high speed 5G network for a high definition telemedicine services across the nation. During these times, we were also able to launch PlayGame, Cambodia's first virtual games platform that quickly attracted young gamers with tournaments, peer-to-peer interactions and digital content."**

***Ian Watson**, CEO, Cellcard, Cambodia*

[9] **Watson**, *Netflix Statistics and Facts*, **2020**.
[10] **Clement**, *Global Social networks Ranked by Number of Users*, **2020**.
[11] **Gilliland**, *Eight Effective Examples of Brand Marketing on TikTok*, **2020**.

3.3 Lockdowns escalated mobile gaming consumption

The self-isolation period during the pandemic also resulted in spikes in the gaming industry, which has become more appealing given that people are spending their time mostly staying at home and using more entertainment services. In times of crisis and anxiety, gaming has been proven to be one of the ways of escaping the uncertainties of reality, as noted by World Health Organization (WHO).[12] With a positive outlook on 5G deployment despite the pandemic, the industry is expecting close to US$160 billion in revenue in 2020, with mobile gaming generating the biggest revenue of US$77.2 billion (+13.3% year on year).[13]

- **Mobile gaming has the lowest barrier to entry** with many mobile titles being free to play. More than two-fifths of the global population owns a smartphone.
- **The unprecedented surge in number of downloads for mobile games** is coming from new users who had never played mobile games before. Mobile games were becoming more of a mainstream pastime, instead of just fringe entertainment.
- **Mobile gaming has become an alternative to PC cafes** since the forced closure of these cafes led many to (temporarily) turn to mobile gaming.
- **The mobile development process is less complex** and, therefore, less likely to suffer delays from COVID-19-related disruption.
- **Demand for broadband communication services has soared** with some operators experiencing as much as a 60% increase in internet traffic compared to before the crisis. To cope with the significant traffic increase, mobile operators across the globe have worked to ensure that connectivity and communication services operate in a reliable, stable, and secure manner.[14]

[12] **WHO**, *Mental Health and Psychosocial Considerations During the Covid-19 Outbreak*, **2020**.
[13] **Wijman**, *The World's 2.7 Billion Gamers Will Spend $159.3 Billion on Games in 2020; The Market Will Surpass $200 Billion by 2023*, **2020**.
[14] **OECD**, *Keeping the Internet Up and Running in Times of Crisis*, **2020**.

3.4 Moving forward: leveraging scalable platforms to simplify service integration

The world has digitally transformed across verticals and continues to evolve. Businesses that made short-term recovery plans by incorporating technology into daily operations are now adopting more future-forward strategies.

The digital economy is here to stay. In its deployment phase, scalable platforms with simplified service integration will help accelerate digitalization through the automation complex and time-consuming tasks, thus improving workflow processes. This is to ensure important documentation is up to date and accurate, reduce time to market, and increase the quality of service deployments.

With 5G deployment still being the top agenda for the players in the telecommunications industry, consumers and industries will see more benefits in ways of living and working.

- Remote workers will benefit from an enhanced experience for virtual meetings and higher network capacities.
- Gamers to engage in a more seamless gaming experience.
- Businesses to leverage scalable platforms to provide digitally-enabled customer experience.
- Governments to improve communications of essential services.

Adaptability to evolving circumstances is thus inevitable. Broadly, the pandemic has proven mobile connectivity to be vital in keeping people informed and entertained, and ultimately to continue connecting the world even during isolation. Today, the full potential of mobile technologies cannot be realized without the active participation of governments, regulatory authorities, and digital solution providers. Working together with the private sector is needed to enable vibrant, competitive markets and to help shape the digital environment the world needs.

Glossary & References

Glossary

Unique mobile internet subscribers

Total unique users who have used internet services on their mobile device(s) at the end of the period. Mobile internet services are defined as any activity that consumes mobile data (i.e. excluding SMS, MMS and cellular voice calls). Subscribers differ from connections such that a unique user can have multiple connections.

Mobile connections

Total unique SIM cards (or phone numbers, where SIM cards are not used), excluding cellular IoT, that have been registered on the mobile network at the end of the period. Connections differ from subscribers in that a unique subscriber can have multiple connections.

Smartphone connections

Unique SIM cards (or phone numbers, where SIM cards are not used) that have been registered on the mobile network and are used in a smartphone device at the end of the period. It refers to a smartphone connections installed base but does not represent the number of smartphone devices sold or shipped.

References

Alexander, S. (2020, July 27). 5G will stand alone as a necessity for our future (Reader Forum). RCR Wireless. https://www.rcrwireless.com/20200727/opinion/5g-will-stand-alone-as-a-necessity-for-our-future-reader-forum

Beech, M. (2020, March 26). COVID-19 Pushes Up Internet Use 70% And Streaming More Than 12%, First Figures Reveal. Forbes. https://www.forbes.com/sites/markbeech/2020/03/25/covid-19-pushes-up-internet-use-70-streaming-more-than-12-first-figures-reveal/?sh=2b5708953104

Clement, J. (2020, August 21). Global social networks ranked by number of users 2020. Statista. https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/

First Overview of Key Initiatives in Response to Covid-19 [PDF]. (2020). International telecommunications Union.

Gilliland, N. (2020, August 27). Eight effective examples of brand marketing on TikTok. Econsultancy. https://econsultancy.com/eight-effective-examples-of-brand-marketing-on-tiktok/

Heisler, Y. (2020, August 06). This chart illustrates why Netflix is the most popular streaming service. BGR. https://bgr.com/2020/08/06/most-popular-tv-shows-netflix-vs-hulu-amazon/

Keeping consumers connected during COVID-19. (2020, August 20). Ericsson. https://www.ericsson.com/en/reports-and-papers/consumerlab/reports/keeping-consumers-connected-during-the-covid-19-crisis

Kinney, S. (2020, September 01). Getting from non-standalone to standalone 5G. RCR Wireless. https://www.rcrwireless.com/20200901/5g/getting-from-non-standalone-to-standalone-5g

Keeping the Internet up and running in times of crisis. (2020, May 4). OECD. https://www.oecd.org/coronavirus/policy-responses/keeping-the-internet-up-and-running-in-times-of-crisis-4017c4c9/

Kinney, S. (2020, January, 29). Nokia Reaping Benefits of Its Own Smart Factory Technologies. Enterprise IoT Insights. https://enterpriseiotinsights.com/20200129/smart-factory/nokia-reaping-benefits-smart-factory

Lueth, K. (2020, April 22). The impact of Covid-19 on the Internet of Things – now and beyond the Great Lockdown: Part 2 of 2. IoT Analytics. https://iot-analytics.com/the-impact-of-covid-19-on-the-internet-of-things-part-2/

Malim, G. (2020, February 02). 5G World Panel: 5G could be an enabler for vertical markets. Light Reading. https://www.lightreading.com/private-networks/5g-world-panel-5g-could-be-enabler-for-vertical-markets/d/d-id/763635

Mental health and psychosocial considerations during the COVID-19 outbreak [PDF]. (2020). World Health Organization.

Skeldon, P. (2020, August 18). 5G mobile subscriptions to reach 2.8bn and 55% coverage rate by 2025. Telemedia Online. https://www.telemediaonline.co.uk/5g-mobile-subscriptions-to-reach-2-8bn/

The Mobile Economy 2020 [PDF]. (2020). London: GSM Association.

The Mobile Economy - Asia Pacific 2020 [PDF]. (2020). London: GSM Association.

Watson, A. (2020, February 06). Netflix - Statistics & Facts. Statista. https://www.statista.com/topics/842/netflix/

Wijman, T. (2020, May, 8) The World's 2.7 billion Gamers Will Spend $159.3 Billion on Games in 2020; The Market will Surpass $200 Billion by 2023. Newzoo. https://newzoo.com/insights/articles/newzoo-games-market-numbers-revenues-and-audience-2020-2023/

About Forest Interactive

About Forest Interactive

14 years of experience

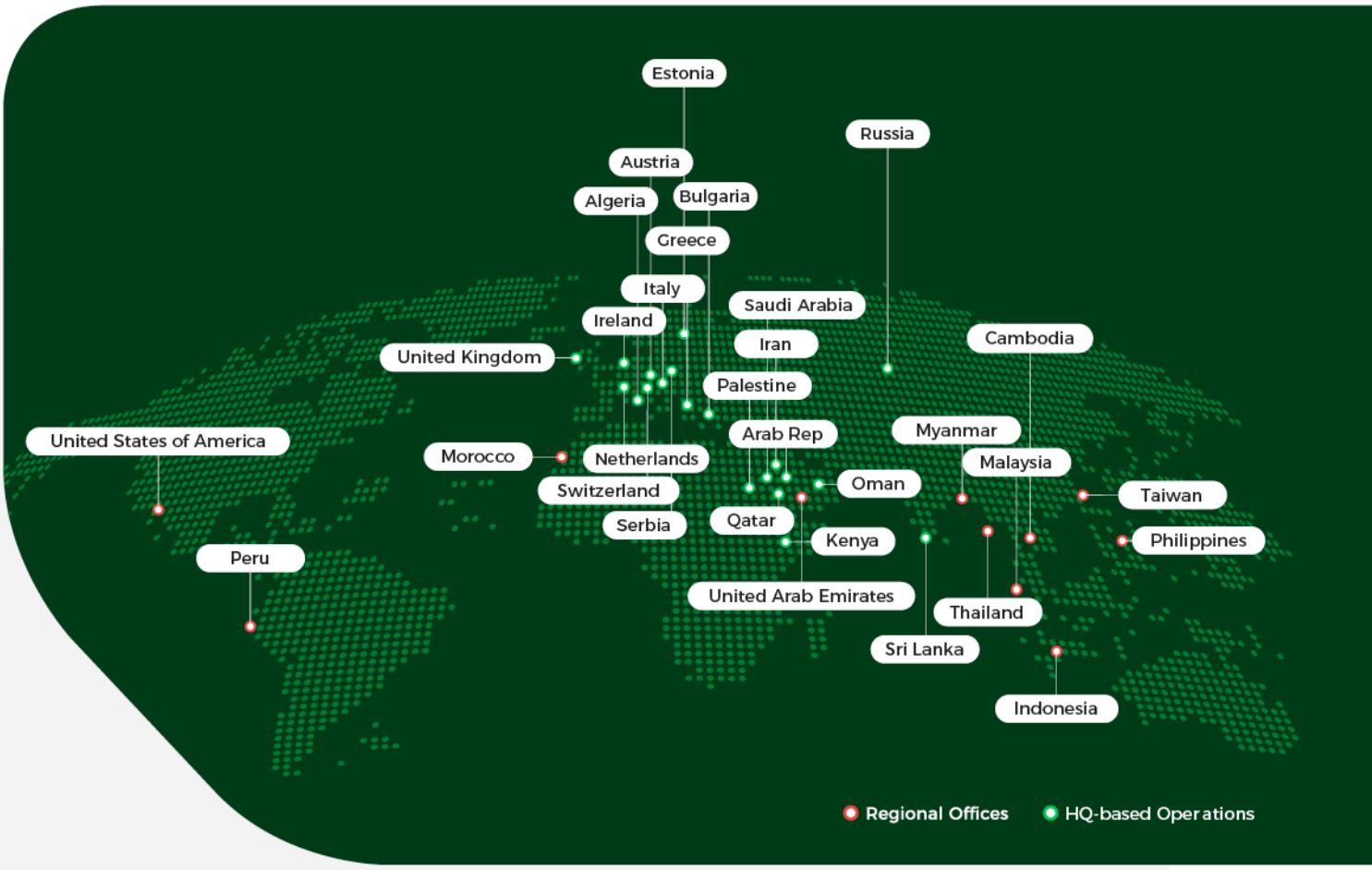
Global HQ: **Kuala Lumpur, Malaysia**

In partnership with **over 90 mobile operators**

Connected to **1.3 billion mobile subscribers**

240+ talents

Workforce of **27 nationalities**



Operating in 39 countries with 17 regional offices

Algeria, Austria, Bahrain, Bolivia, Botswana, Bulgaria, Cambodia, Egypt, Estonia, Greece, Indonesia, Iran, Iraq, Ireland, Italy, Kazakhstan, Kenya, Kuwait, Malaysia, Morocco, Myanmar, Netherlands, Nigeria, Oman, Pakistan, Palestine, Peru, Philippines, Qatar, Russian Federation, Saudi Arabia, Serbia, South Africa, Switzerland, Taiwan, Thailand, United Arab Emirates, and United States of America

About Forest Interactive

Forest Interactive is a scalable mobile platform developer that enables mobile operators to build enriched customer experiences through highly-customizable and easy-to-use platforms. Since 2006, we've been servicing more than 90 mobile operators globally, bringing connectivity to more than 1.3 billion subscribers. We bridge the gap for our partners to maximize the power of mobile technology, delivering content subscription services, digital voucher and e-commerce platforms, as well as mobile apps for all ages.

For more information, please visit **forest-interactive.com** and follow Forest Interactive on LinkedIn, Instagram, Facebook, and YouTube

MEDIA CONTACTS:

Forest Interactive Press Bureau

Kuala Lumpur, Malaysia

newsroom@forest-interactive.com

Published by
Forest Interactive
C-7-2 Megan Avenue 2
No. 12 Jalan Yap Kwan Seng
50450. Kuala Lumpur, Malaysia

www.forest-interactive.com

First Edition 2020

FOREST INTERACTIVE®