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# WinWin

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## All industries will strike gold with 5G

In 2019, 5G and AI entered the global spotlight as two technologies that will underpin the smart digital world of tomorrow.

2019 marked the first year of commercial 5G adoption, with South Korea becoming the world's rollout pioneer in April. The Asian nation was closely followed by large-scale 5G rollout in China, where plans are in motion for deploying up to 800,000 base stations by the end of 2020. Globally, 56 operators launched commercial 5G services in 2019. And Huawei has signed more than 60 commercial 5G contracts, shipping over 400,000 5G AAU modules.

What has 5G meant for industries so far? In Inner Mongolia, driverless 5G mining vehicles are boosting the efficiency of vehicle scheduling, monitoring, and maintenance for Baogang Group, with the company planning to expand 5G coverage to more mines and leverage the technology's capabilities to increase the use of robotics and AI.

Logistics is benefiting from real-time response and visualized management capabilities in 5G transportation networks, which in turn better supports fleet management, cargo transportation, and smart ports.

In the oil and gas sector, the Shell Pernis refinery in the Netherlands became Europe's largest industrial 5G lab in 2018, complete with 5G-powered mobile inspection robots and smart helmets. These technologies have revolutionized the early detection of pipe leaks, enabled preventive maintenance with machine learning on more than 100 km of pipelines, and made real-time HD video calls to off-site experts possible.

5G and UHD video are transforming livestreaming by slashing equipment requirements and costs. And in policing, 5G is enabling a faster response than ever before.

Huawei's 2019 Global Industry Vision (GIV) forecasts that 5G will be adopted far faster than any other previous wireless technology. GIV predicts that by 2025, 58 percent of the global population will be covered by 5G networks and that 2.8 billion people will use 5G services.

5G is not just faster than 4G, it's a key part of tomorrow's digital infrastructure – the advantages of 5G's high speed, massive connectivity, and low latency will lead to faster, better, and smarter applications, driving up efficiency in every industry and helping to create a better connected, intelligent world.

Sally Gao, Editor-in-Chief



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# LG Uplus builds on early 5G lead

LG Uplus is one of the first operators in the world to launch 5G and has attracted nearly a million 5G subscribers, reaching 6 percent customer penetration in just 6 months, exceeding its 4G market share. The LG Uplus CTO Choi Taek-Jin reveals the secret of the telco's success: an excellent network and diverse 5G services.

By Liu Rengui

In April 2020, LG Uplus became one of the first operators in the world to launch 5G, with the country's three carriers switching on consumer services for the next-generation technology on the same day.

Just months later and LG Uplus has already signed up 875,000 5G subscribers at the end of September, exceeding its 22-percent market share in 4G. Already, 5G subscriptions accounted for 6 percent of its total customer base.

## An excellent network is the foundation

With a focus on covering outdoors and subways, 85 cities are connected to 5G networks in the 3.5 GHz band. And early tests on 5G performance in South Korea have found that LG Uplus has an edge over its rivals – research by RootMetrics showed a peak download rate of 903 Mb/s. The operator also demonstrated a significant lead in median download speeds at 426 Mbps, compared with 287 Mbps from SK





“

AR/VR as a killer application for 5G, but the ecosystem is not fully ready, as the industry needs to develop more content and provide better AR/VR devices. We're actively working with other players and operators to speed up the ecosystem. ”

— Choi Taek-Jin, CTO, LG Uplus



LG Uplus is targeting increasing the number of 5G active antenna units (AAUs) from the current 60,000 to 80,000 by the end of the year to cover 93 percent of the population.



Telecom and 163 Mbps from KT.

RootMetrics reported that LG Uplus has the fastest 5G speeds as well as low latency and strong reliability, stating that these three features give the operator an edge over the competition in the early phases of 5G deployment. As its 5G download availability rate of 44.6 percent continues to grow, the end-user experience should get even faster and more reliable.

Meanwhile data usage per customer on LG Uplus's 5G network is 30 GB per month, compared to 10 GB on 4G, generating an increase in ARPU for the operator.

### **Pioneering diverse 5G services**

In a recent report, Strategy Analytics (SA) stated that LG Uplus enjoys a much higher 5G market share than its overall retail market share. SA notes that South Korea is a highly competitive market where differentiation in network quality and pricing is difficult. LG Uplus has succeeded in 5G thanks to a strong focus on AR and VR content, both of which provide a compelling use case for B2C 5G services and also create a source of exclusive content.

Indeed, VR and AR services, which require download

speeds that are at least 10 times faster than required by conventional video, offer an opportunity to demonstrate the power of the new network to consumers and give them a reason to upgrade. To seed the market with VR hardware, LG Uplus has been bundling VR headsets with selected plans. And the telco has launched other forms of video such as multi-view sports broadcasting, which takes advantage of the higher speeds of 5G networks.

### **Network expansion**

Following this success, the operator is now focused on expanding coverage and its service offerings.

It expects to start 5G standalone (SA) tests in the fourth quarter and aims to be ready for commercial use in the first half of 2020.

Speaking at Huawei's Global Mobile Broadband Forum in Zurich in October, LG Uplus CTO Choi Taek-Jin said the telco plans to upgrade its gNodeB to support SA and deploy a next-generation core network.

He noted, however, there are a number of technical issues around the design of an SA migration path, with the key technical factor for SA being the deployment



of a 5G core network “In parallel to our own work, LG Uplus is closely monitoring China’s SA strategy and progress.”

LG Uplus is aiming to increase the number of 5G active antenna units (AAUs) from 60,000 to 80,000 by the end of the year.

## mmWave trials

In addition to migrating to SA, the company is trialing the 5G service in the 28 GHz band and looking at how to use the mmWave band to deploy hotspots for B2B services such as smart factory applications. Choi said that 28 GHz trials will continue in 2020, with possible rollout using the band in 2021, adding that it’s evaluating the capabilities of both public and private solutions for delivering 5G services to factories.

Choi said that network slicing trials are at an early stage across a number of industry verticals, with a short-term focus on smart factory applications. “We’re conducting 5G verticals pilots and evaluating use cases and impacts on the network such as uplink traffic load and reliability.”

LG Uplus is analyzing the possible use of 5G with other LG industrial units in the chemical and industrial processing sectors, with Choi adding that for smart factory applications, it’s important to prepare and evaluate the 5G network using SA and the 28 GHz band.

He believes the biggest deployment challenge is precise 5G planning for deployment on legacy sites and cooperation with user equipment suppliers.

## Indoor challenges

According to VR/AR service requirements, the

standard for LG Uplus’s 5G Network planning is a minimum outdoor data rate of 100 Mbps and a minimum indoor rate of 30 Mbps. He noted that C-band delivers worse indoor coverage than LTE, but requires up to twice the investment.

While admitting that for indoor coverage there are some sites where 4G performance is better than 5G, he said that the telco is taking steps to optimize and improve 5G indoor coverage by 2020.

The company highlighted the use of three key technologies: EN DC (E-UTRAN/NR Dual Connectivity), beamforming, and multiuser-MIMO.

## Paying a premium

Seventy percent of its 5G subscribers have opted for top-tier data plans, with 100 percent using smartphones.

Choi said customers are willing to pay a premium for 5G packages because of the higher speeds and larger data allowance. He sees AR/VR as a killer application for 5G, but acknowledges the overall ecosystem of AR/VR, “is not fully ready as the industry needs to develop more content and provide better AR/VR devices. We’re actively working with other players and operators to speed up the ecosystem.”

In September, LG Uplus announced its partnership with China Unicom to offer a roaming service for 5G customers travelling in China. The two operators began roaming trials in China in June and completed network integration tests in mid-August.

South Korea surpassed the 3 million 5G subscriber mark in early September, with coverage expected to reach 93 percent of the population by the end of the year. The country – and LG Uplus in particular – are pioneers in global 5G deployment. [www](#)

# Sunrise prioritizes new applications after launching Europe's first 5G network

Sunrise may have been first past the post in Europe with 5G rollout, but the Swiss telco knows that its work isn't yet done. Sunrise former CEO Olaf Swantee explains that the company's current areas of focus are developing the applications to drive the uptake of 5G, while overcoming coverage challenges due to Switzerland's diverse geography.

By Linda Xu



## Gearing up for 5G

At Huawei's 2019 Mobile Broadband Forum in Zurich, Olaf Swantee declared that now's the right time for the industry to "gear up" for 5G and push rollout forward.

"Let's not wait until 2025. Let's drive this thing forward," he told the audience. "Let's treat 5G as a true moonshot and make sure that we implement it as quickly and efficiently and effectively as possible, with a multitude of applications that are good for society, business, and consumers."

However, Swantee also noted a major challenge in its 5G rollout was public sentiment, pointing to a huge amount of fake news generated in social media highlighting 5G's perceived health risks. "Because we were first, we probably attracted more attention from abroad and within the country," he says. "That was hard because it had a ripple effect on the issuing of permits," which he adds are notoriously difficult to secure in Switzerland. In a country as mountainous as Switzerland, Swantee said there were many

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The Sunrise 5G network is the biggest in the country and sets a benchmark in terms of coverage quality.

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challenges as well as successes, like being the first operator in the world to deploy a 5G-capable network in a ski resort.

Sunrise customers are benefiting from an Internet connection that's up to ten times faster with 5G, he says, adding: "It's like fiber optics through the air. We launched a world first with the Sunrise Internet Box 5G. For the first time it's possible to combine internet, TV, and landline for homes and businesses, all via 5G."

Looking ahead, its goal is to move as quickly as possible with further rollouts and extend the number of applications. The launch of a joint 5G innovation lab in Zurich with Huawei – the first of its type in Europe – will help expedite success by enabling enterprises to test and verify applications.

## 5G in 3D

Using Huawei equipment, Sunrise deployed the first commercial 5G three-dimensional network in Europe, comprising a simplified platform combining macro station, micro station, and the digital indoor system.

The three-layer network architecture allowed Sunrise to quickly rollout its 5G infrastructure across the country.

The vendor's simplified macro station, the Super BladeSite, was added to each of Sunrise's existing 4G macro sites to deliver basic 5G coverage and capacity. Huawei's portable 5G micro stations (Book RRUs) were installed on readily available lampposts in cities and towns, supplementing macro station deployments in places with poor coverage or heavy-traffic areas. The third layer used the vendor's LampSite to deliver indoor coverage in hotels and pavilions in Zurich and in more than 20 Sunrise shops.

Between now and the end of 2019, Sunrise plans to launch 5G indoor coverage as a service for business-critical applications such as automation and monitoring production processes.

## 5G for all

The operator has taken a different approach to the rollout than most other 5G deployments

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Let's treat 5G as a true moonshot and make sure that we implement it as quickly and efficiently and effectively as possible, with a multitude of applications that are good for society, business, and consumers.

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around the world, focusing on rural areas where FTTH isn't available. Swantee believes that 5G can meaningfully reduce the digital divide between urban and rural areas and improve sustainability by improving efficiency. "The most important immediate benefit of 5G is the ability to connect cities with rural areas," he says, noting that while 22 percent of the population still has "generally terrible" Internet service, most countries have the same problem as Switzerland.

Connecting rural areas with 5G can also have a positive impact on the environment, Swantee says, as people can turn to online shopping rather than

driving to cities.

Its 5G network now covers more than 300 towns and cities across Switzerland, counting only places where coverage reaches at least 80 percent of the local population. "Easing deployment was the fact 4G coverage is 96 percent geographically," he says. "We were ready with 4G, while a lot of countries still have a lot of homework to do on 4G."

### 5G: A broad array of applications

Sunrise and Huawei are also jointly conducting

**Next-Gen**  
Smartphone Gaming

**Sunrise**  
GAME CLOUD

The advertisement features a black background with white text. At the top, it says "Next-Gen Smartphone Gaming". Below this is a logo consisting of a yellow cloud shape containing a white plus sign and three white dots, with the text "Sunrise GAME CLOUD" underneath.

**90% LESS HERBICIDE USED**

REDUCE YOUR COSTS AND YOUR ENVIRONMENTAL IMPACT

The image shows an aerial view of a green agricultural field with a white path or road cutting through it. A white text box is overlaid on the image, containing the text "90% LESS HERBICIDE USED" and "REDUCE YOUR COSTS AND YOUR ENVIRONMENTAL IMPACT".

“

It’s like fiber optics through the air. We launched a world first with the Sunrise Internet Box 5G. For the first time it’s possible to combine Internet, TV, and landline for homes and businesses, all via 5G.

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tests involving gaming, farming, live streaming, and manufacturing.

**Gaming:** Swantee points out that cloud gaming is ideally suited for 5G due to its lower latency compared with 4G and ability to deliver high-end graphics. In collaboration with its platform partner Gamestream, the operator launched the Sunrise Game Cloud 5G app in November.

**Agriculture:** He also sees a huge opportunity for 5G to make farming even more effective and efficient, reducing its environmental impact and optimizing areas like milk production. In fact, agriculture is ripe for

transformation. At MBBF, Dr.Thomas Anken, Head of Digital Production for Switzerland’s Federal Department of Economic Affairs, Education and Research, notes that “agriculture today is still an analogue business and not very digitalized. But the potential is huge. 5G will mean we don’t need intelligence in the machine, all the intelligence will be in the cloud. Then the service and maintenance of farming machines will be much easier – all updates of the machine can be done in the cloud. It will be much easier to collect all the data and improve the systems.”

The sun is rising on 5G in Europe and now’s the time to start realizing its potential. [www](#)



# 5G supercharges user experience



## 5G, Gear Up

Adapted from Ken Hu's speech at Mobile Broadband Forum

To make the most of 5G, we need to work together to deal with the real challenges that lie ahead: spectrum, site resources, and cross-sector collaboration.

By Ken Hu, Deputy Chairman, Huawei

**W**e've been holding Mobile Broadband Forum for 10 years now. Our first event was in Oslo back in 2010. In those days, our industry was rolling out 4G, and Huawei had just started exploring 5G. A lot has changed since then. Let's take a look at the exciting progress our

industry has made in 10 years.

From 4G to 5G, we have made incredible progress. But I want to talk about the next steps. Where do we go from here, and how can we really make the most of 5G? For me, it's about a shift in mindset. Not just for carriers, but for governments and

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5G arrived faster than expected – in just one year after the standards were completed, 40 carriers from 20 markets had launched commercial 5G networks around the world.

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vendors, too. 5G is a revolutionary technology, and we need to think about it in a different way. First, let's take a look at what's happening in the industry. 5G came much faster than we expected.

## 5G's fast arrival

In just one year after the standards were completed, 40 carriers from 20 markets had launched commercial 5G networks around the world. We anticipate that, by the end of this year, there will be more than 60 commercial 5G networks. At the same time, there has been great progress on the device side. By September 2019, there were already more than 130 5G devices on the market, including CPEs and smartphones.

## Consumers really love it

South Korea was the first market to launch commercial 5G. Let's take a look at what's happening there. In just six months after commercial launch, there were more than 3.5 million people using 5G services.

Data consumption is increasing significantly as well. It is impressive that data traffic has increased threefold – to 1.3 gigabytes per person per day. The reason is

that new VR/AR applications are boosting data usage. Just 10 minutes of VR consumes 4 gigabytes of data. One minute of AR takes 600 megabytes. With VR/AR becoming more popular in gaming, entertainment, and education, we anticipate that traffic will reach 100 gigabytes per person, per month very soon.

## 5G supercharges user experience

5G is helping to create an amazing user experience. People love the speed. In Switzerland, we've already achieved speeds of up to 1.5 Gbps. This is around 20 times faster than the 4G speeds available on the market right now. People love the applications too.

In South Korea, you can enjoy a truly immersive experience in sports with 5G-powered, high-definition broadcasting. You can use your 5G smartphone to watch a live game from any angle you want – 360 degrees. You can even make the camera follow your favorite player throughout the entire game. This is a truly personalized experience.

New services like VR/AR are attracting more users. 5G-powered VR alone has attracted more than 1 million users in less than 6 months. At the same time, VR/AR services are encouraging more users

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Take LG UPlus as an example: After launching VR/AR services as part of the 5G premium plan, premium subscribers grew to 5.3 percent in just three months. That’s a big jump.

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to upgrade to premium data plans.

Let’s take LG UPlus as an example: In 2018, only 3.1 percent of its subscribers were on premium plans. After launching VR/AR services as part of the 5G premium plan, premium subscribers grew to 5.3 percent in just three months. That’s a big jump.

## 5G for safer mines in China

5G is not just changing our lives. It’s changing the

world, and it’s bringing exciting new applications for all industries.

Here’s an example from a mine in Inner Mongolia, China. It’s a large mine that uses 30 trucks to transport materials, but has been facing challenges in terms of safety, efficiency, and cost for many years. The working environment in the mine is very dangerous. For safety reasons, drivers are only allowed to drive at up to 10 km/h. Efficiency is low. They need four drivers for each truck, so costs are quite high.





We hope governments can provide more reasonable cost structures for 5G. 5G will be critical infrastructure for all society.



Now we can help with 5G technology. In May, Huawei and China Mobile developed a driverless truck solution using 5G. With driverless trucks, the mine can save a lot on labor costs - US\$160,000 per truck, per year. With 30 trucks, that's big money. Now they can travel up to 35 km/h, not just 10. Most importantly, because the trucks are driverless, people are no longer exposed to the dangerous working environment.

This is an impressive use case for 5G technology. And it's just the beginning. We can expand this kind of solution to revolutionize all vertical industries.

## Real challenges

We've made good progress in a short time, but to make the most of 5G, we need to work together to deal with some real challenges.

I'd like to talk about three:

- Spectrum
- Site resources
- Cross-sector cooperation

## Better, affordable spectrum

Our industry is facing challenges in terms of

supply and cost. These are serious bottlenecks for 5G deployment, so I would like to make some recommendations.

First, we hope governments can provide more spectrum resources. We need continuous bands, large bandwidth, and at least 80 - 100 MHz for each carrier. Governments can start actively planning to meet new spectrum demand for the next 5 to 10 years. It's good to learn that some countries are already exploring 6 GHz. I believe that planning ahead will guide industry development and help countries gain advantages as first movers.

Second, cost. Our industry needs more support in this area. We hope governments can provide more reasonable cost structures for 5G. 5G will be critical infrastructure for all society. And spectrum resources are a fundamental part of this infrastructure. Governments shouldn't make spectrum too expensive, otherwise carriers will be less willing to invest.

In many countries, we're seeing positive examples where governments have helped lower costs and provide more flexible pricing models. In China, for example, carriers are allowed to pay in installments, not just make huge upfront payments.

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For site resources, regulators should step up and improve the situation by taking different measures, including opening up more public infrastructure for sharing and providing guidance on site construction.

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This reduces their burden on initial CAPEX. Saudi Arabia is another good example. The government cut spectrum costs by 25 percent. In return, they raised requirements for carriers in terms of user experience and coverage. This is a win-win for both sides – carriers pay less for spectrum resources and the country can enjoy earlier and better 5G services.

## Regulatory support for site resources

Our industry needs more support for on site resources. The cost of site resources is still high and site availability always falls short of demand. Regulators should step up and improve the situation by taking different measures, including opening up more public infrastructure for sharing and providing guidance on site construction.

We have seen many good references across Asia and Europe. In Shanghai, the city government has set standards for multi-functional utility poles. By the end of 2020, they will install these poles along 500 kilometers of road, which can be used to support another 30,000 extra sites. That's 75 percent more sites than they have right now. This will help carriers to build a strong 5G network in a big city like

Shanghai. In Germany, carriers worked with seven different ministries to identify public resources that can also be used for 5G sites, such as traffic lights, signs, and bus stops. Together, they defined standards and released the guidelines in August. This will make co-use easier and more efficient. In the UK, the government is working on legislation for more flexible planning regulations. These include allowing taller towers for antennas in rural areas, so carriers can deploy less sites for better coverage. We can all learn from these practices.

We hope to see more governments taking proactive regulatory measures to help carriers build 5G networks more efficiently and cost effectively.

## Cross-sector cooperation

Finally, as an industry, we need to make cross-sector collaboration a priority. Because, in addition to people and households, 5G will also support applications for different industries. This will open up many new market opportunities for our industry.

But we still have some challenges in terms of vertical industry knowledge, use cases, and business case development. We can solve these challenges through more active cross-sector innovation. If we can have

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At the 5G Joint Innovation Center in Zurich, Huawei and Sunrise are working with local partners on pilot projects for smart farming, smart manufacturing, and smart resorts.

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an open mind, work together with industry partners to identify real problems, and explore what works and what doesn't, that will make it easier for us to unleash the power of 5G.

Huawei is building out platforms to support cross-sector innovation in 5G. We call them 5G Joint Innovation Centers. In Zurich, we opened the first 5G Joint Innovation Center in Europe together with Sunrise. Now Huawei and Sunrise are working with local partners on pilot projects for smart farming, smart manufacturing, and smart resorts. All powered by 5G. These are some of the domains where Switzerland is leading.

Obviously every country has its own economic strengths. These are the areas we can focus on and combine 5G technology with industry-specific solutions to enhance their competitiveness. We hope that these Joint Innovation Centers will help us foster a stronger 5G ecosystem for everyone. We look forward to building more 5G Joint Innovation Centers in Europe.

### All for one, and one for all


5G is not just faster 4G. It will play a completely different role in our lives. It's core digital



infrastructure and a key enabler for digital transformation in many different industries.

As an industry, we all need to have a fresh mindset to drive its further development. That includes a more long-term view from governments to create a more investment friendly environment for carriers. It also includes a fresh mindset for carriers to build 5G success on innovation and collaboration.

As people say in Switzerland: All for one, and one for all!

This is Switzerland's call to action, a way of thinking and a way of life that is built on collaboration. With this mindset, let's gear up for better 5G. 



## Making 5G a commercial success

Carriers need to develop cloud VR, cloud gaming, and FWA into basic 5G services and create new business models. For the B2B market, carriers need to redefine their network and operational capabilities to tap into the huge opportunities brought by 5G.

By Ryan Ding, Executive Director of the Board & President of Carrier Business Group, Huawei

**H**ow can we accelerate the commercial success of 5G? Underpinned by technologies and devices at which Huawei is at the forefront, the maturity of standards and continued spectrum allocation are setting the stage for 5G to flourish. The evolving 5G ecosystem and current use cases are laying the groundwork for carriers to innovate B2B and B2C services and packages that create strong business cases for

ongoing 5G investment. At the heart of success, though, is collaboration.

### 3 ways the industry is gearing up for 5G

It's not just devices. I'm happy to say that in just one year, standards, spectrum, and networks have all become 5G-ready. This marks a first – it has never



As of August 2019, 56 carriers around the world had built 5G networks, and 40 carriers have launched 5G services.



happened in our industry.

- More than 130 5G devices and modules have been launched, and they're becoming more affordable, with 5G smartphones costing around US\$500 already available. We estimate that 5G smartphones at less than US\$350 dollars will hit the market in the second half of 2020.
- Release 16 will be completed in Q2 2020. This standard will deliver better performance and better support for the use of 5G in vertical industries.
- More than 70 countries will allocate spectrum for 5G by the end of 2021, laying a foundation for 5G rollout worldwide.

5G is gathering in momentum around the world, with South Korea emerging as an early leader. By the end of 2019, about 90 percent of the nation's population will be covered by 5G networks. There will be more than 5 million 5G users, marking a penetration rate of 10 percent. Large-scale 5G rollout has also begun in China, with plans in motion for deploying 800,000 5G base stations by the end of 2020. In Shenzhen, 45,000 5G base stations will be built in just 10 months, compared with 46 months in the 4G era. Equally, European carriers are also racing to deploy 5G networks, with 11 carriers already having launched 5G services.

### 3 major areas of value

As of August 2019, 56 carriers around the world had built 5G networks, and 40 carriers have launched 5G services. Huawei is playing a leading role in this process. We have won more than 60 5G contracts and shipped over 400,000 5G AAUs. I'd like to thank our customers for their trust in Huawei.

5G promises to bring more value to carriers in three areas. First, in the B2C market, 5G will offer a transformative mobile broadband experience, prompting more users to subscribe to 5G. According to a GSMA report, there will be 1.6 billion 5G users by 2025. Second, 5G will provide an easier option for home broadband access. According to Huawei's Global Industry Vision forecast, 480 million households will use FWA services by 2025. Third, ultra-reliable 5G networks will enable many industries to go digital. According to a report by STL Partners, industrial applications of 5G will add US\$289 billion to global GDP by 2025.

### B2C & B2B market potential

In the B2C market, 5G will offer an experience that users could hardly imagine before, for example, in services like video and gaming.

- With the large bandwidth of 5G, a user watching

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To better monetize 5G, carriers need to redefine their B2C business model. To start with, they can optimize the way they monetize traffic and connections.

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4K video online can skip through the timeline and never have to wait for buffering.

- 5G's low latency makes mobile gaming smoother. With 5G, an online game can recognize 200 to 300 clicks per minute. The extra clicks could mean the difference between victory and defeat.

One exciting example of this is LG UPlus in South Korea. They provide a superior experience in VR, AR, and live streaming, and users are willing to pay a premium for this. For a 36-percent higher price, users get 16 times more data. In the first quarter after deploying their 5G network, LG UPlus saw a 2 percent increase in revenue, and a 4 percent increase in market share – a win-win result for the carrier and users.

To better monetize 5G, carriers need to redefine their B2C business models. To start with, they can optimize the way they monetize traffic and connections. For example, consumers often have multiple devices, so carriers can offer multi-connection packages and introduce new metrics to monetize, like charging different prices for different data rates. They can also explore how to monetize 5G's low latency in services like online gaming and cloud AR. Leading carriers are designing attractive 5G offerings that flexibly combine different metrics and offer value-added local content. For example, LG UPlus upgraded its unlimited data plan by offering new services,

encouraging many users to upgrade to 5G.

In the home market, 5G will play an important role in bridging the digital divide and increasing broadband speeds. The EU, for example, has set its broadband targets for 2020. Right now, about 70 million households are still unconnected or underserved. To bridge this huge gap, carriers can deploy fixed fiber, or FWA, also known as Wireless Fiber, depending on the specific scenario and expected ROI. Wireless Fiber can offer a combination of 4G and 5G data rates, helping to quickly increase home broadband penetration.

Leading carriers are already addressing home broadband demand with 5G and we've seen many success stories. For example, 65 percent of Globe's home broadband users are already using 4G WTTx. Now, Globe has launched a new 5G FWA service, offering data speeds of up to 100 Mbps. BT has just launched its Superfast Broadband strategy, which offers 4G and 5G broadband as an option. In Switzerland, Sunrise is delivering broadband for households and SMEs in 150 towns using 5G FWA as part of its "5G for people" strategy.

In addition to serving consumers and households, 5G promises to bring many benefits to industries in the B2B market.

Many industries are embracing 5G, because it will bring

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5G will play an important role in bridging the digital divide and increasing broadband speeds. To enable industry digital transformation, carriers should start to develop their capabilities to serve industries now.

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them productivity gains. Industrial applications of 5G will add US\$289 billion to global GDP by 2025. However, different industry applications have different requirements for network bandwidth, latency, and reliability. B2B services are very different from B2C services. For B2C, carriers provide services on a best-effort basis, but for B2B, carriers need to provide guaranteed service performance as defined in SLAs. How can they do this? They can add additional network resources in particular areas to provide modular 5G capabilities such as uplink and downlink bandwidth, reliability, and end-to-end latency, to serve different industry needs.

To enable industry digital transformation, carriers should start to develop their capabilities to serve industries now. There's a big difference between services for people and services for things, including network planning, service management, device management, service provisioning, and billing. So carriers first need to change their mindset. Their 2B operations must be SLA-oriented. For that, they need to build new capabilities for the B2B market, to understand the needs of different industries, and how to assign the right resources to meet these needs. Then they can deliver on the SLAs, with predictable performance, guaranteed QoS, and measurable billing.

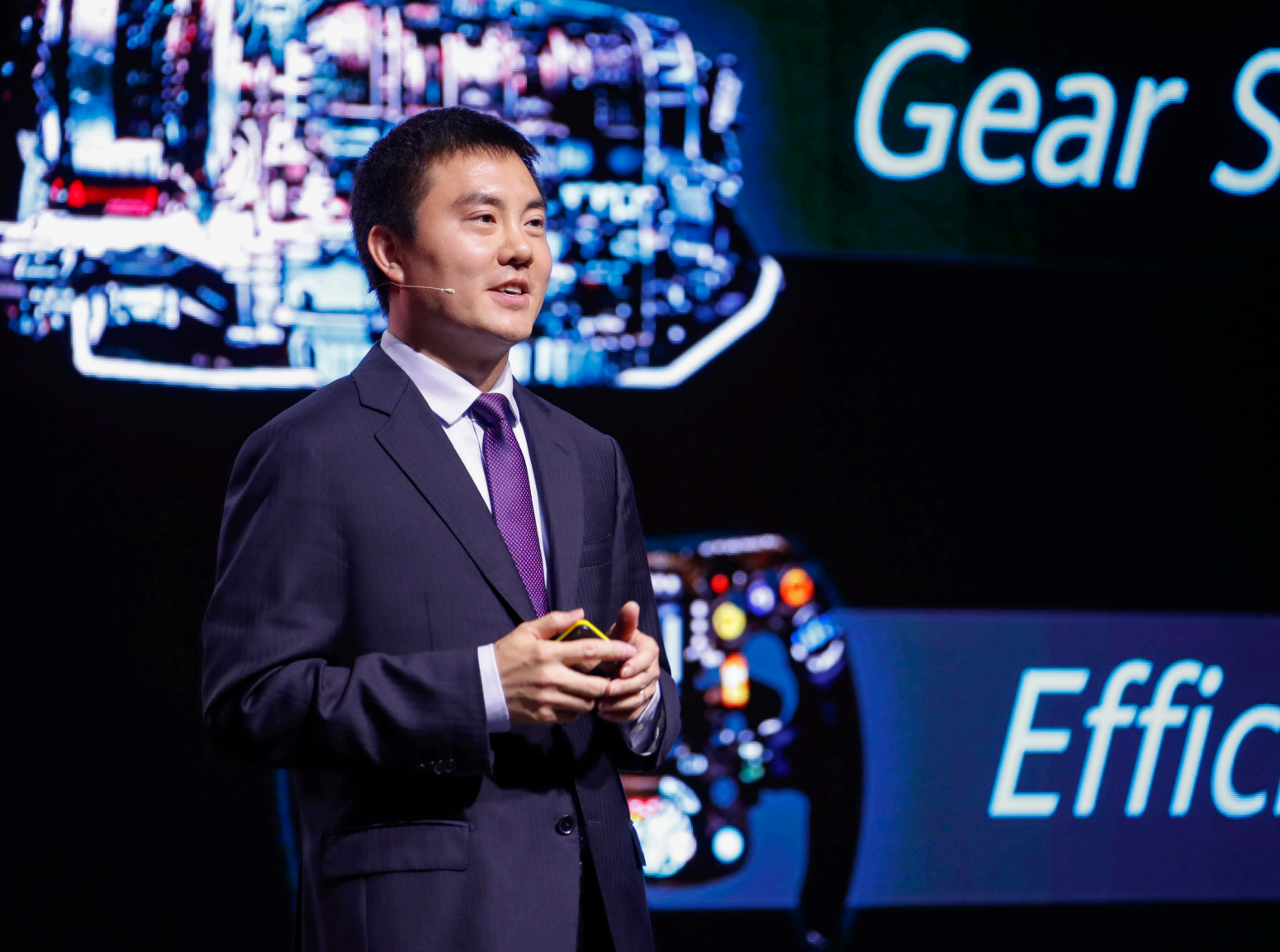
Carriers can adopt flexible business models. They can combine modular 5G capabilities to meet different

industry needs. They can provide private lines with guaranteed service levels, including guaranteed uplink and downlink bandwidth and service availability. Business private lines with an SLA guarantee creates much higher value than consumer broadband connections. In Germany, for example, a 100-Mbps private line costs about €3,500 per month, but a home broadband connection is around €35 per month. Businesses can also benefit from 5G. The Worcester Bosch factory uses low-latency sensors for preventive maintenance, helping the company boost productivity by 1 percent and saving tens of millions of pounds.

## 5G requires close collaboration

Of course, carriers cannot enable industry digital transformation alone. They need to work together with regulators, verticals, equipment vendors, and systems integrators to develop policies, industry alliances, standards, and business models. We're happy to see that cross-sector collaboration is happening. Carriers like Vodafone, China Mobile, and China Telecom are working with ports, energy, and healthcare organizations to produce white papers on 5G applications and industry standards.

We believe the best way to predict the future is to create it. We believe that together, we can build a thriving 5G industry. [www](#)



## 5G network benchmarks: Fast, efficient, intelligent

By Edward Deng, President of Wireless Solution, Huawei

**5**G is rolling out faster than any previous generation of wireless technology. To make this possible, overcome existing deployment challenges, and power the development of the 5G ecosystem, Huawei's end-to-end product portfolio spans solutions for spectrum sharing, network performance, site optimization, power-saving, automation, and more.

### **Banding together**

Currently, C-Band is the most important band for capacity and coverage, so most 5G commercial networks and devices are C-Band and 2.6G. C-Band and sub-3G FDD bands will migrate to FDD NR in the near future.

CloudAIR enables LTE&NR dynamic spectrum sharing, so FDD NR can be easily deployed on low band to provide nationwide 5G coverage, enhance uplink capabilities, and shorten latency. mmWave



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Now, Massive MIMO has been broadly recognized as a standard configuration for 5G mobile networks. Its performance directly determines the quality of 5G networks.

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will be used for hotspot and indoor scenarios in the future in light of its coverage limitations.

Massive MIMO (MM) is the mainstream product for C-Band and the performance of MM determines the quality of 5G networks. Huawei's global 5G shipments already exceed 400,000 units. This number will exceed 600,000 by the end of this year.

But there are still three major challenges for MM deployment.

- Larger bandwidth needs to be supported to match the requirements of discrete spectrum and RAN sharing scenarios.
- The solution needs to be lighter for ease of deployment.
- Power consumption must be further reduced to lower OPEX.

We've now released our third-generation MM, which will solve all three challenges and enable 5G MM's large-scale deployment, just like 2T2R and 4T4R did for 4G.

## Four steps ahead with Massive MIMO

Our third-generation MM solution has four major advantages:

- **Sharing:** The industry's largest bandwidth of up to 400 MHz, which flexibly meets the needs of discrete spectrum and RAN-sharing scenarios.
- **Coverage:** The industry's highest transmission power, which greatly enhances coverage.
- **Weight:** The industry's lightest weight at typically 25 kg. This means it can be operated by one person, solving the biggest problem in MM commissioning.
- **Power:** The industry's lowest power consumption. Our current 5G MM leads the industry in terms of power efficiency, achieving similar levels to the 4G RRU with 16x the channels.

Although MM is powerful, many carriers only have one pole in some sites, which is already occupied

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It isn't enough to build a leading 5G network with powerful hardware capabilities only, it's necessary to build new capabilities with software algorithms.

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by a sub-3G passive antenna, making it difficult to add an MM module. To address this issue, we provide the innovative Blade AAU, which integrates all sub-3G passive bands and 5G MM band into one band. As we're a leader in both the wireless radio and antenna fields, we're a unique player in being able to provide the most integrated Sub-6G all-in-one product.

### Four leading site solutions

In the 4G era, pole sites were an important way of improving capacity and coverage. In some Chinese cities like Shenzhen, the number of pole sites exceeds macro sites. For 5G, we provide the simplified pole-site solutions 5G EasyMacro with 8T8R and 5G BookRRU with 4T4R, which will help pole sites and small cells become more popular in the 5G era.

As 5G frequency is higher, penetration loss is also higher. To ensure indoor 5G user experience, DIS is the go-to solution. For high-capacity scenarios, we've released LampSite Pro, which supports up to 400 MHz bandwidth. For cost-sensitive coverage scenarios, we've released Lampsite Grid, which can

extend RRU coverage by three times delivering a similar overall cost to DAS, but bringing a DIS experience.

The above four solutions – MM, BladeAAU, pole site, DIS – are solutions for enabling 5G C-Band's massive deployment for various scenarios.

Sub-3G bands will eventually move to 5G. To reduce the number of boxes required and better support evolution to FDD NR, the super wideband module has become the preferred choice.

Huawei has achieved another industry first when it comes to providing sub-1G triple bands with 2T4R and 4T4R, delivering the highest Tx power of dualband 4T4R: 1.8GHz and 2.1GHz.

With long-term experience in TDD MM combined with special innovations for FDD differentiation, we're also rolling out the industry's first dual-band 32T32R FDD MM and the only FDD MM viable for commercial use in terms of performance, engineering, and cost. So now with legacy spectrum, we can significantly increase 4G capacity and, at the same time, provide another choice for 5G for markets without enough C-Band.

Finally, mmWave can solve the coverage problem. Huawei provides the industry's highest Tx power 8T8R module, which supports up to 70 dBm and guarantees the best coverage.

## A softer approach

It isn't enough to build a leading 5G network with powerful hardware capabilities only.

As legacy networks become larger, improving network value with software is crucial.

Moreover, due to the slowdown of Moore's law for hardware, it's necessary to build new capabilities with software algorithms.

In another industry first, we proposed the overall architecture of wireless algorithms at MBBF 2019. In the past, we prioritized hardware specifications. Hardware capabilities are dominant, while software capabilities are implicit. And these hidden capabilities are crucial to delivering leading network performance and quality.

The key to wireless performance is algorithms and the key to algorithms is mathematics.

Huawei utilizes the expertise of global mathematicians to reshape the classic theories by combining mobile network requirements. For example:

- **Capacity gains:** For 5G M-MIMO scenarios, we've extended the classic Shannon theorem of the single channel to multi channels to maximize network capacity.
- **Experience gains:** For latency-sensitive services, such as 5G cloud VR and cloud gaming, we've extended the traditional rate-first utility function

to the optimal combination of rate and latency to provide the best user experience.

- **Energy-efficiency gains:** We've extended the water-filling principle of single band power allocation to multi-bands to achieve highest network-wide energy efficiency.

## Algorithms in action

Having built an E2E system of algorithms, Huawei's algorithm workflow runs from innovation to verification to implementation.

First, we identify the future direction of innovation, based on the first-principle theory, and then define the theoretical upper limits to guide innovation. Second, comes verification. Huawei's global commercial experience with massive road-tests of channels and beams has resulted in our experimental Omega platform to accelerate algorithm verification and optimization. Last, with our strong in-house chipset capabilities coupled with fast algorithm-to-chip conversion and dedicated algorithm accelerators in chipsets, we can greatly enhance algorithm capabilities.

## Shannon Theorem in wireless

MM expands the Shannon Theorem to match multi-channel characteristics, thus achieving more capacity based on the optimization we've made to the MM algorithm.

The thousands of channels formed by 64TRx MIMO can be rapidly processed with dedicated algorithm accelerators in the chipset to form the most accurate beams. These can minimize interference among users and select the most suitable pairing of the target user to maximize the network capacity. For high-speed mobility scenarios,

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Introducing AI to implement autonomous operation and maintenance represents a convenient way to address the challenge associated with constantly growing 5G OPEX.

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advanced channel predictions and compensation algorithms enables resistance to Doppler shifts. Even in a 300 km/h mobility scenario, we can achieve the best MIMO user experience with a performance decrease of less than 10 percent. In deep coverage scenarios, Huawei provides the Super BF solution to support beamforming in control channels, giving users MM capacity gains in service channels and coverage gains in the control channel.

### 5G in 2C & 2B scenarios

In 5G 2C scenarios, our VR Turbo solution bases air traffic resource scheduling on bit stream, and enables intelligent scheduling and intelligent acceleration based on the VR frame, reducing the latency of each frame and significantly improving the 5G VR experience.

5G 2B scenarios have higher requirements in uplink. Jointly with our customers, we've achieved further innovations in uplink and downlink decoupling, providing a super uplink solution. By combining high frequency and low frequency synergy, TDD and

FDD complementary coexistence, and time domain and frequency domain aggregation, UL all-timeslot scheduling in TDD mode can be realized, increasing the uplink rate by up to 500 percent in the cell edge, and improving latency in the air interface by more than 30 percent. We've already worked with leading operators to promote it in R16, and Huawei will provide an E2E solution, including network features and devices, in 2020.

### Green 5G

Our PowerStar solution improves power-saving algorithms across multi-modes and multi-bands, improving power-saving without impacting KPI. At last year's MBBF, we released PowerStar 1.0 which could save 10-15 percent in power across mobile networks – 2.0 increases that by 10 percent, realizing our “sleep deeper, sleep longer” target.

### Wireless intelligence

Increased OPEX in the mobile industry is now a common challenge that requires future mobile networks to be more intelligent in terms of O&M.

At MBBF 2018, we released our 5-level architecture for mobile network automation.

In 2019, we defined specific requirements for L1-L5 in four major network scenarios: planning, deployment, maintenance, and optimization.

Our autonomous driving network is recognized in the mobile industry and is being gradually defined in the 3GPP standard. GSMA will release its intelligent autonomous network report this month.

### 3-layer ADN mobile solution

We've also released the industry's first ADN mobile solution, which includes:

**iMaster NAIE:** Our AI model training platform, which provides AI training services, spanning data lakes, network knowledge databases, and AI.

**iMaster AUTIN:** Our cross-domain AI unit, which provides autonomous services for multiple domains, including MBB/FBB/IT/IP/multi-vendor.

**iMaster MAE:** our MBB network AI unit, which enables network autonomous driving in MBB scenarios.

This three-layer architecture are hierarchically autonomous. Each layer can work independently as a minimal closed loop or vertically coordinate if required. Based on the ADN Mobile solution, Huawei will launch several L3 apps next year.

### Two examples of apps

#### Site Express

Designed for auto-deployment, Site Express supports self-awareness in base station hardware to automatically realize self-detection. It performs

aggregation and classification on the initial configuration parameters and, based on AI training, seeks the optimal configuration parameter sets in different scenarios. Configuration can be done automatically, with higher accuracy than manual operations.


According to our test result with China Mobile, site deployment efficiency is three times higher than was previously possible. Huawei's delivery capability leads the industry, which will expand with Site Express, providing faster TTM for customers.

#### Alarm Turbo

Traditional alarm processing has always been labor intensive. Alarm Turbo aggregates the original alarms and merges similar items, significantly reducing the number of alarms. The knowledge map of the Bayesian algorithm coupled with the root cause analysis of associated alarms can significantly reduce alarm analysis time. Only one work order is required for associated alarms, greatly reducing the number of work orders and slashing fault handling time.

As well as built in apps that provide E2E autonomous network capabilities, we also provide open platform third parties; not just the data source, but also open API interface and IDE (integrated development environment) to enable our operators to develop self-defined apps or introduce third-party apps to meet various requirements.

We're always thinking of the next step, from passive processing to active prevention and building in AI-based fault prediction and prevention capabilities.

The 5G era has arrived with a full-speed engine that enables powerful 5G networks, a shift up in gears with advanced algorithms, and smart control with leading intelligence. 

# Four key takeaways from Global Connectivity Index 2019

By Kevin Zhang, CMO, Huawei ICT Infrastructure

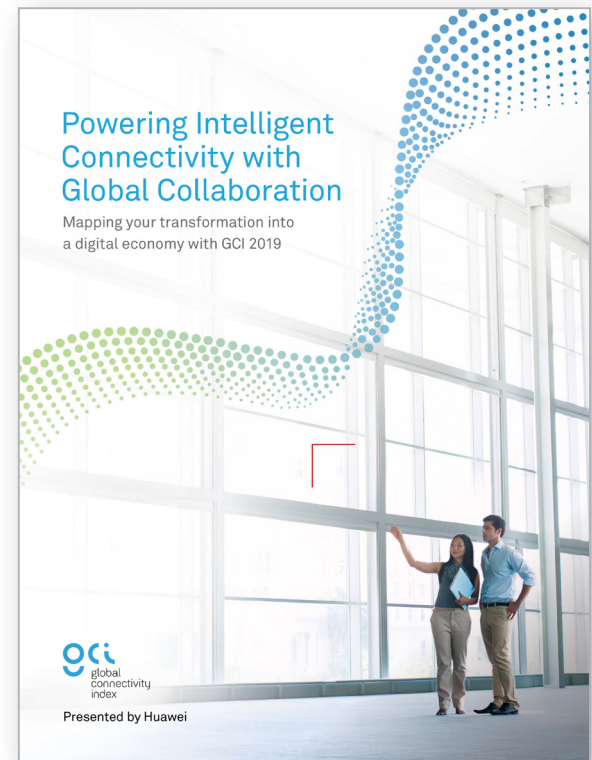
**O**ur Global Connectivity Index 2019 (GCI 2019) report has landed rich with insights into the latest global ICT trends and how individual countries performed over the last year in terms of ICT maturity and build out.

Having already defined its value as a reference point for helping nations plan their digital journeys, GCI 2019 continues to track the worldwide evolution towards a global digital economy – an economy that in 2018 we predicted will double in value thanks to AI to hit US\$23 trillion by 2025.

And we believe that every nation – and every individual, home, and organization – should benefit from the goldmine of productivity and socioeconomic benefits that ICT will deliver.

## What is the Huawei GCI?

Now in its fifth year, the GCI measures the ICT maturity of 79 nations, which account for 95 percent of global GDP and 84 percent of the world's population. Its



methodology attributes each nation a GCI score and rank based on its performance in ICT 40 indicators spanning four tech enablers: broadband, cloud, IoT, and AI.

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This year’s report evolves the concept of Intelligent Connectivity, the powerful convergence of broadband and 5G, cloud, IoT, and AI – a convergence that represents the next stage of digital transformation.

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GCI 2019 incorporates historical data from all GCI reports since 2015, giving a historical context that continues to consolidate the insights the report delivers.

## So Why is ICT Maturity Important?

The economic success and productivity gains made possible by digital transformation depend on investment in ICT infrastructure, a fact that’s not lost on policymakers or industry leaders. Nevertheless, we’re still seeing uneven ICT development throughout the world and an increase in the ICT version of the Matthew Effect: advanced nations are pulling further ahead and widening the digital divide – a trend that we’re helping to address head on with our digital inclusion initiative TECH4ALL.

But, it isn’t just a case of flexing financial muscle and throwing investment at ICT projects – guided investment is necessary to forge a strong digital economy that reflects current economic and

technological realities. And investing effectively requires an understanding of how ICT maturity influences productivity, a knowledge of where the tipping points for growth sit, and an insight into national ICT development in the context of an evolving global ecosystem that’s increasingly collaborative.

## Major Themes in GCI 2019

This year’s report evolves the concept of Intelligent Connectivity (Figure 1), the powerful convergence of broadband and 5G, cloud, IoT, and AI – a convergence that represents the next stage of digital transformation.

Underpinned by the emergence of AI, Intelligent Connectivity is shaping a future where everything is beginning to act, react, and collaborate wirelessly and seamlessly with human preferences, commands, and intentions. In this future, we believe that everything will be sensing, connected, and intelligent.

GCI 2019 introduces what we call AI’s Upside

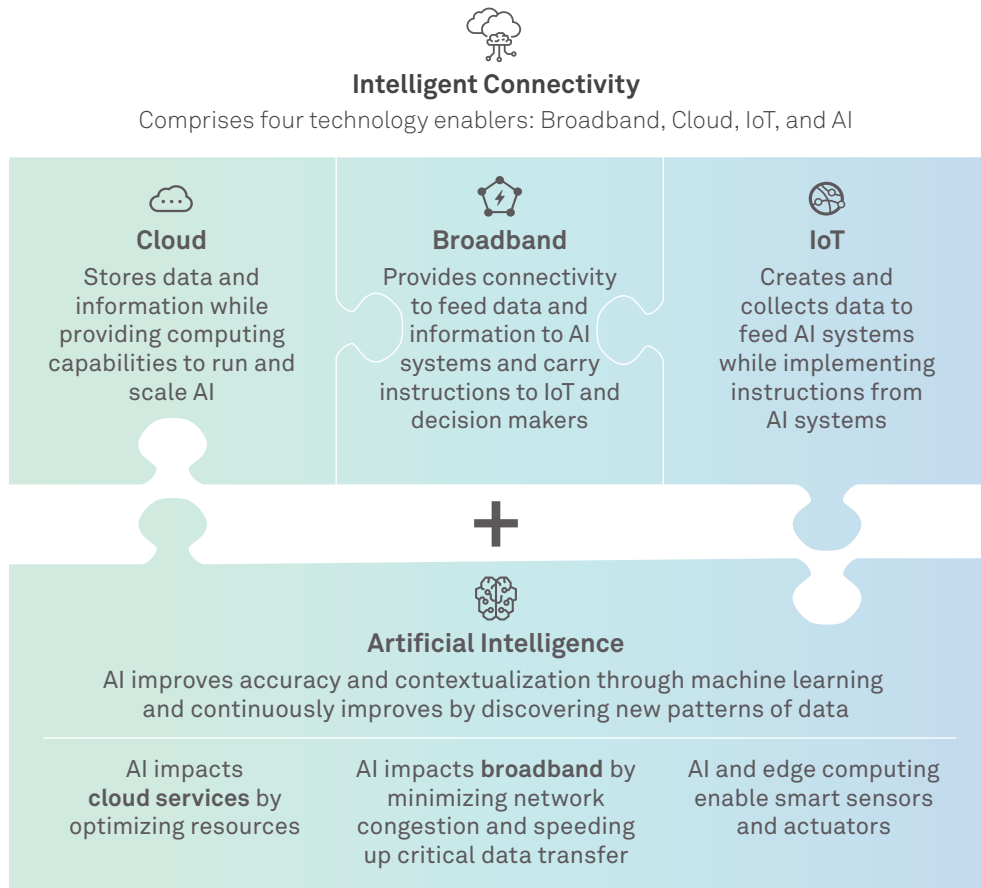


Figure 1 AI transforms connectivity into Intelligent Connectivity

Potential (Figure 2) – the potential growth that AI can realize for GDP when it’s deployed industry-wide. We’ve already predicted the value we believe AI will have on the digital economy (a doubling to US\$23 trillion), but for Intelligent Connectivity to flourish, collaboration needs to go deeper and wider.

Reflecting the rise of the cross-border collaboration that’s shaping the global economic ecosystem, we’ve identified five Ecosystem Stakeholders that underpin the digital economy, which we explore fully in GCI 2019.

## Four Key Findings & Takeaways

To draw the above themes together, I’ve summarized a few of this year’s key findings:

### Collaboration

Global collaboration will emerge as the new business paradigm, as enterprises, industries, and nations increasingly find they cannot go it alone. Protectionism will become an economic constraint, unable to yield the economic potential of Intelligent Connectivity operating within global business ecosystems.



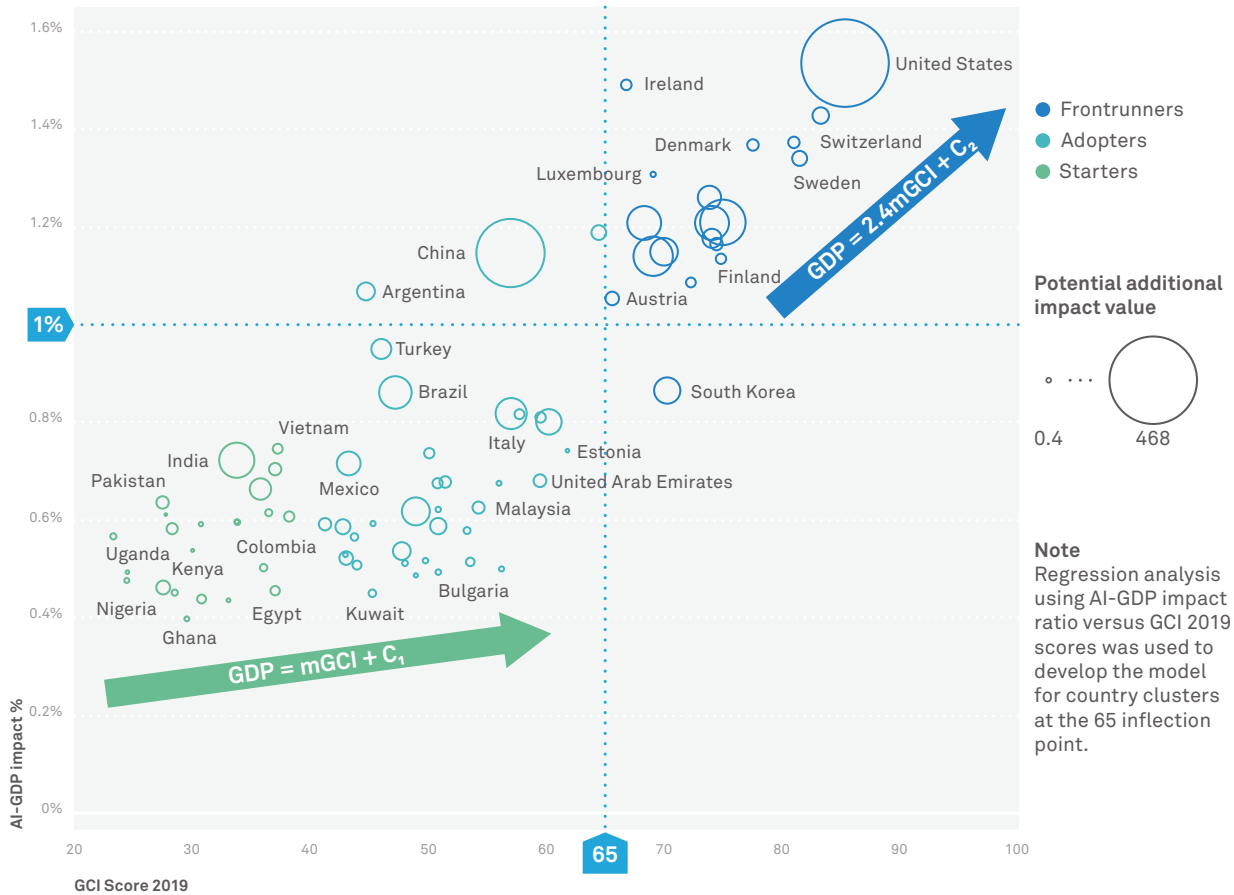


Figure 2 AI's upside potential

## 5G

Each new wireless generation typically starts boosting productivity and thus GDP at around 10 percent penetration. 5G's rapid rollout will hit this tipping point in four years, faster than any other previous generation.

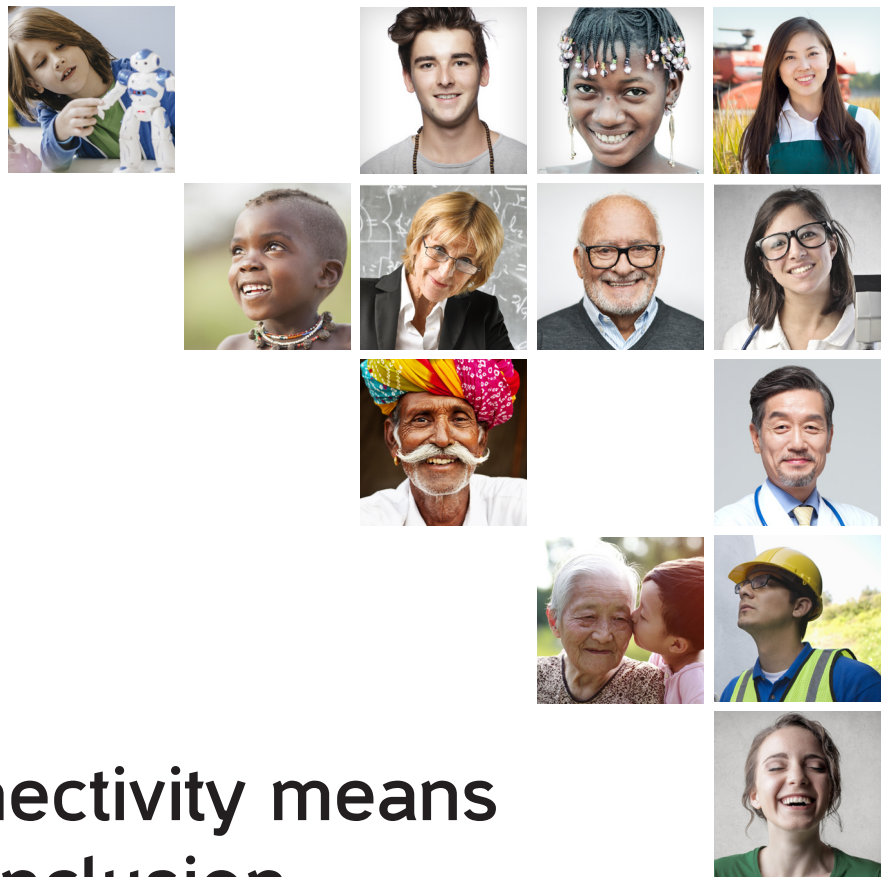
### AI & GDP growth

All nations – even ICT leaders – are beginners at artificial intelligence. Powered by IoT and cloud, AI will create a new tipping point of economic growth for advanced nations who've maxed out gains from existing ICT

infrastructure, and act as a potential catalyst for emerging nations to accelerate economic development. We expect that nations crossing the GCI tipping point score of 65 will see more than 1 percent added to their GDP growth in 2019.

### Top movers in four years

Four nations have made standout gains in their GCI scores since 2015: Ukraine (up 4 places in the GCI rankings from last year and up 12 GCI points since 2015); Bulgaria (up 10 GCI points since 2015); Algeria (up 8 points since 2015); and Bangladesh (up 7 GCI points since 2015). [www](#)



## What connectivity means for digital inclusion

A key message from this year's Global Mobile Broadband Forum (MBBF) was the need for operators, regulators, and ecosystem partners to collaborate on digital inclusion efforts, highlighting the potential of such campaigns to increase access to critical services that enable environmental protection, healthcare, and education.

By Zhu Wenjie, Xu Boxin

Operators are racing toward 5G, yet GSMA data shows half the world's population – some 4 billion people – lack online access. Of those, 1 billion aren't covered by 3G or 4G.

In a Mobile World Live TV panel discussion at

MBBF, Huawei ICT Infrastructure CMO Kevin Zhang encouraged policymakers, communities, developers, vendors, and NGOs to work together to define a plan to change those statistics. "When we talk about digital inclusion, nobody can do it by themselves. We need to work together," said Zhang.

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TECH4ALL targets advancements in four dimensions: healthcare, education, development, and the environment. It aims to provide the technology, applications, and skills necessary to move the development needle in local communities.

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## Societal uplift

Akinwale Goodluck, GSMA's Head of Sub-Saharan Africa noted there are major social benefits to digital inclusion, pointing to a “significant correlation” between Internet adoption and increases in GDP, living standards, and access to education and financial services.

Indeed, economic modelling by the International Telecommunication Union (ITU) reports that a 10 percent increase in mobile broadband penetration produces a 1.5 percent increase in GDP. The data showed a heightened impact in developing regions such as Africa, where the same increase in penetration was estimated to yield a 2.5 percent uplift in GDP.

“This unlocks a lot of very vulnerable communities. It unlocks a lot of opportunities for women, for our farmers, and for people in rural communities,” Goodluck said.

## Huawei initiatives

Zhang highlighted Huawei's new TECH4ALL initiative, which focuses on delivering the benefits of digital

inclusion to an additional 500 million people over the course of five years. The program targets advancements in four dimensions: healthcare, education, development, and the environment. It aims to provide the technology, applications, and skills necessary to move the development needle in local communities.

Zhang gave the example of the healthcare campaign TrackAI, which Huawei launched in collaboration with DIVE Medical. The goal, he said, is to develop a smartphone-based AI solution that can be used by non-professionals to identify visual disorders in babies as young as 6 months old, as 70 percent of visual disorders are in fact preventable or curable if detected early enough.

He also talked about an environmental project in partnership with the NGO Rainforest Connection that uses old Huawei mobile phones to collect data in a Costa Rican rainforest to stop illegal logging and poaching and protect the habitat of species such as spider monkeys, and the education campaign DigiTruck, which uses solar-powered converted shipping containers to function as mobile classrooms to teach digital skills to remote communities in Kenya.

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An enabling policy and regulatory environment requires several prerequisites. These include political will and vision at the national level. Then it can come under a policy, strategy, roadmap, and regulatory framework.

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Zhang cited Huawei’s capabilities at providing connectivity to enable digital education and technical know-how to teach individuals and enterprises how to develop applications. But he stressed the need for collaboration and partnerships, adding “we cannot do everything alone.”

### Next steps

In addition to the 1 billion people who fall outside network coverage areas, GSMA data indicates that there are 3 billion people who are covered by 3G and 4G networks but who don’t subscribe to the service.

Goodluck said there are a number of factors preventing more people from going online, including a lack of digital literacy, affordable devices, content, and user concerns about privacy and security.

“We must address this misconception that everybody’s online, everybody’s connected...We need to be able to get people to come online, stay online and pay to be online. The content has to be relevant, it has to be in local languages...It has to move from an infrastructural based approach to doing all the other things to stimulate demand and get the right people online.”

He added more must be done to address issues relating to the economics of rural deployments, which typically come at a high cost with “very, very diminished revenue” returns. Goodluck pointed to Huawei’s recent work in Ghana as an example of how to solve that problem, hailing its collaboration with government officials and the use of lightweight, low-cost infrastructure to create a sustainable rural coverage solution.

### ITU pushes for action

Dr. Eun-Ju Kim, Chief of Digital Knowledge Hub at the ITU’s BDT unit, agreed with Zhang that collaboration is key and stressed the need for policy alignment or collaborative policy and regulation in digital ecosystem.

“An enabling policy and regulatory environment requires several prerequisites. These include political will and vision at the national level, which can be ensured by policy, strategy, roadmap, and regulatory frameworks with actions customized to each country.”

Ultimately, Kim believes that it is critical for all involved to follow through on whatever goals are set and states “We can have lots of good strategy, but without action it doesn’t work.” [www](#)



# Painting networks green with an end-to-end 5G portfolio

The arrival of 5G networks is happening at a time when debate around climate change is dominating global headlines. With more than 50 operators already having launched mobile and fixed 5G networks, one of the key messages at this year's Global Mobile Broadband Forum (MBBF) was how the 5G-powered digital economy should be green.

By Kang Yu, Wang Yun

**W**e believe that the heart of this green economy is the efficient use of resources by society based on low-carbon policies and green innovation. We can then promote well-being and inclusivity while protecting the sustainability of natural systems.

Highlighting the work the operator community has undertaken, GSMA Chief Technology Officer Alex Sinclair noted in his keynote speech at MBBF how more than 50 operators have signed up to reduce the industry's greenhouse gas emissions and combat climate change. The initiative aims to develop a climate action roadmap and identify ways for

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It's absurd to believe that 5G cannot bring benefits for the environment, making our grids more efficient, making our telecommunication systems more efficient. We have an opportunity to make a positive impact on the environment.

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the industry to reduce the amount of carbon gas compounds it releases.

Many operators have thus agreed to start disclosing the environmental impact of their business activities, including China Mobile, China Telecom, China Unicom, Deutsche Telekom, LG

Uplus, MTN Group, Spark New Zealand, Sunrise, Telus, Vodafone, and Zain.

The GSMA-led roadmap will also include development of an industry-wide plan to achieve net-zero greenhouse gas emissions by 2050, a target outlined by the UN's Paris Agreement.

GSMA CTO Sinclair believes that operators can also “do a lot for other verticals to help make them more efficient by enabling new use cases that allow companies to monitor their consumption of resources.”

## Environmental benefits

The CEO of Europe's first 5G operator Sunrise, Olaf Swantee, highlighted multiple use cases in his keynote speech at MBBF. Swantee sees a huge opportunity for 5G to make farming even more effective and efficient and reduce its environmental impact, giving the example of how 5G's real-time capabilities will revolutionize milk production.

And the utility sector will benefit too from 5G, with Swantee noting how the technology will offer “the ability to make water consumption and electricity



5G has come. Powerful networks deliver optimal user experiences. Advanced algorithms ensure optimal performance. Autonomous driving networks empower the most efficient operations and maintenance. This is what we aim to help operators achieve with 5G.



more efficient and effectively managed.”

Swantee believes that 5G will provide a major boost to the environment, hitting back at “fake news” that suggests the technology is in any way dangerous, “It’s absurd to believe that 5G cannot bring benefits for the environment, making our grids more efficient, making our telecommunication systems more efficient. We have an opportunity to make a positive impact on the environment.”

## Green innovation for our future

However, these benefits are only being realized thanks to innovation from companies like Huawei. As demonstrated at MBBF, Huawei is strongly committed to utilizing advanced technologies to help operators continuously reduce carbon emissions and improve energy efficiency.

With the move to 5G potentially causing network power consumption to increase, Huawei and its partners are helping drive the industry forward in offering solutions that overcome this challenge. The company is making the most of advanced technologies, such as chipsets, advanced materials, artificial intelligence (AI), and beamforming, to help

carriers reduce CO<sup>2</sup> emissions and to apply these to the wider ICT sector.

## E2E 5G

At MBBF, Edward Deng, President of Huawei’s Wireless Solution, unveiled Huawei’s latest 5G Full-Series Solution, including the focus on energy efficiency.

“5G has come. Powerful networks deliver optimal user experiences. Advanced algorithms ensure optimal performance. Autonomous driving networks empower the most efficient operations and maintenance. This is what we aim to help operators achieve with 5G,” said Deng.

Huawei uses a series of innovative technologies to reduce the power consumption of 5G. In terms of chip technology, Huawei improves device integration by using higher performance chip algorithms, reduces the number of on-board components, improves overall device efficiency, and reduces the overall power consumption of the device. In the engineering process of 5G devices, Huawei introduces new materials and innovative algorithms to improve energy conversion efficiency, improve heat dissipation efficiency by using more scientific



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The energy consumption of 5G is similar to 4G, but 5G can bring so many more benefits with the same amount of energy, which means that 5G can actually contribute to the environment through digital technology.

– Dr Eun-Ju Kim, Chief of Digital Knowledge Hub, BDT, ITU

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bionic heat dissipation technologies, and achieving miniaturization and lightweight features. In terms of the 5G site architecture, Huawei’s 5G simplified site solution – Super Blade Site all-outdoor solution – saves air conditioners for base stations and greatly reduces power consumption. In terms of network-level energy efficiency management, Huawei uses AI technology to implement network synergy and energy conservation, reducing the energy consumption of the entire network based on the stability of KPIs.

Huawei not only understands 5G but also understands energy. Last year, Huawei launched the 5G power solution, helping mobile base stations to save energy for all links. Based on the three concepts of simplicity, intelligence, and green, the 5G power solution provides a power supply of up to 98 percent, renewable energy (site stack, and oil dehydrator), and system synergy.

“We’re continuously innovating to promote a 5G power solution that’s simple, green, and intelligent and helps carriers to reduce CAPEX, OPEX, CO<sup>2</sup> emissions, and enable clean and green networks,” said Huawei President of Telecom Energy Peng Jianhua.

## ITU is driving change

As well as operators and vendors, the UN’s communication technology agency ITU is playing a leading role in the development of energy efficiency standards.

Dr. Eun-Ju Kim, Chief of Digital Knowledge Hub at the agency’s BDT unit, highlighted at MBBF how the industry can contribute to all 17 of the UN’s Sustainable Development Goals, with a particular focus on Goals 7 and 13: Affordable and Clean Energy and Climate Action.

“There’s a link between the digital economy and the green economy,” said Kim. “The energy consumption of 5G is similar to 4G, but 5G can bring so many more benefits with the same amount of energy, which means that 5G can actually contribute to the environment through digital technology.”

With green technology as an integral facet of our complete 5G product and solution portfolio, Huawei is committed to working towards a sustainable future with its partners, customers, and industry organizations. [www.huawei.com](#)





# Shaping the future with 5G rollout

5G rollout is driving a massive digital revolution and boosting the global economy. For telcos, gearing up with 5G is the key to succeeding in the future digital society.

By Zhu Bing

**T**he world is preparing for the mass rollout of 5G networks. Together with artificial intelligence (AI), the Internet of Things, cloud, and immersive realities, 5G is driving digital transformation. 5G is set to change societies, economies, and industries by disrupting how we connect in the future. It has the potential to connect people to things, as well as connect individuals to families, businesses, and the public sector. To maintain their market position and economic performance, telcos must start preparing

for a 5G future.

## The 5G roadmap

Building on the legacy of its predecessors, 5G is transforming the world digitally. While 4G transformed the “connected consumer” into a “digital consumer”, says Pablo Iacopino, Director of Ecosystem Research at data research firm GSMA Intelligence, 5G is now transforming the “digital consumer” into a “digital society.”

“

Telcos will benefit economically from the successful global launch of 5G. Gearing up with 5G is the key to succeeding in the future digital society.

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The transition to this digital society will be made possible because of the large base of existing digital and mobile users. One of the benefits these users will gain from 5G is enhanced mobile broadband (eMBB), as 5G provides faster download speeds and expanded coverage. As well as offering users an enhanced mobile experience, eMBB also boosts the average revenue per user (ARPU) of telcos, as it enables them to offer diverse services such as real-time augmented and virtual reality, enhanced digital signage, and fixed wireless access (FWA). By providing access to the Internet using FWA, rather than fixed lines, 5G can connect the estimated 1 billion homes worldwide that lack a regular broadband connection.

One country already enjoying the benefits of 5G is South Korea. As the first country in the world to deploy a 5G commercial network, it has seen astonishing 5G growth rates. In 2019, the number of 5G users grew to 3 million in under a year, and it is estimated that by early 2020, there will be over 5 million users. South Korea holds the world's highest penetration rate of 5G. By 2020, it is estimated that 10 percent of Koreans will be 5G users.

This widespread adoption has been extremely beneficial for Korean telecom operators. Thanks to new, 5G-supported AI and virtual reality services,

Korean carriers saw their average handset data traffic per user increase by 65 percent and their ARPU increase by 75 percent. One Korean telco that adopted 5G, LG Uplus, is expected to increase its revenue by 7 percent by the end of 2019.

In the Philippines also, the rollout of 5G is bringing with it multiple advantages. FWA helps Philippine telco Globe Telecom provide over 1 million home broadband connections. This accounts for 26 percent of the Philippines' total home broadband connections and has increased Globe Telecom's penetration rate from 12 percent to 17 percent. Globe Telecom has also introduced new features like immersive gaming or live sports events. Innovative prepaid broadband plans have also made broadband services more affordable and accessible. After FWA was introduced in 2017, Globe Telecom's broadband revenue increased from 13 percent to 15 percent and ARPU increased by 41 percent in 2018.

## Digital revolution, economic prosperity

Beyond telcos, 5G will drive a massive digital revolution and boost the global economy. 5G is a cross-sector innovation, whose projects encompass 19 sectors, notably automobile, energy, health, media

“

The first-wave 5G markets have resulted in revenue growth and this is forecast to continue growing over the next 15 years.

”

and many others. The deployment of 5G will also fuel sustainable long-term returns on the global economy. Stakeholders such as telecom operators are financially supporting 5G's global implementation. More than US\$83 billion will be invested in radio access networks (RAN) over the next 5 years. Investments are also directed towards transport networks and IT spaces.

While the deployment of 5G requires financial investment, gearing up with this technological innovation will bring profitable long-term returns. Ultimately, 5G makes business faster and cheaper. A 2019 IHS Markit research forecast that 5G will have enabled a US\$13.2 trillion output in the global economy by 2035. That is nearly equivalent to the combined spending of consumers in China, Japan, Germany, the UK, and France in 2018. The economic returns of 5G are also expected to be sustainable. For instance, a study of the 2020-2035 period estimated that 5G's stream of annual contributions to real global GDP should yield a net value of US\$2.1 trillion.

## Gear up for a brighter future

5G is an ecosystem of various products and apps, which involves multiple stakeholders. To lower operating costs and ensure the faster and more

efficient rollout of 5G, collaboration is key. For example, two telecom operators in the UK, Vodafone and O2, are network sharing to optimize investment and network efficiency. “In many parts of the world, we're already seeing operators collaborating and rolling their networks out,” says Shaun Collins, CEO of research and advisory firm CCS Insight.

Indeed, besides benefiting technologically, telecoms operators will benefit economically from the successful global launch of 5G. The first-wave 5G markets have resulted in revenue growth and this is forecast to continue growing over the next 15 years. Gearing up with 5G is likely to be the factor that determines success in the future digital society. [www.ccsinsight.com](#)



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### 5G Investment Report

5G Market Outlook and Investment Opportunity – Building ubiquitous 5G network is vital for a return on 5G investment

# MBBF 2019

## throws spotlight on 5G use cases

With operators across the globe at various stages of 5G rollout, attention is turning to the applications that can provide the most lucrative and inspirational use cases, and 5G networks are already having a transformational impact on several industries.

By Thomas Gere



“5G and cloud gaming are going to totally transform how people play games. Finally we can bring games to this modern world of on-demand entertainment. People are able to find games more easily, share them better, and most importantly start playing instantly.”

– Juhani Honkala, Founder & CEO, Hatch Entertainment



Each company and region has its own priorities for 5G. For some it's about increasing capacity to serve the upsurge in mobile video and gaming; for others the focus is on industry and how enterprises can best utilize the new technology.

During Huawei's Global Mobile Broadband Forum (MBBF) in Zurich in October 2019, operators, enterprises, and representatives from Huawei's extensive partner ecosystem provided compelling examples of use cases at the centre of current 5G deployment and a hint at what lays ahead.

## Gaming

One of the most frequently cited early use cases for 5G in the consumer sector is next-generation gaming, with leading player Hatch already working with operators across the globe, including Vodafone in its European markets, NTT Docomo in Japan, and Sprint in the US.

“5G and cloud gaming are going to totally transform how people play games,” CEO Juhani

Honkala said. “Finally we can bring games to this modern world of on-demand entertainment. People are able to find games more easily, share them better, and most importantly start playing instantly.”

5G is expected to bring a raft of changes to mobile gaming, including expanded multiplayer experiences, seamless play across devices and sessions, and making e-sports accessible to a broader audience.

The technology is also set to make the game development process easier by pushing it to cloud, said Honkala, because it frees developers from on-device storage limits and eliminates the need to tailor to different operating systems.

In his keynote speech, the CEO of Huawei's carrier business group Ryan Ding noted that the operator LG Uplus in South Korea has been able to charge consumers a premium for supplying top-end 5G to support the streaming of VR and AR content.

Research director for ABI Research Dimitris Mavrakis agreed that 5G technology would



“It’s mandatory to create a large ecosystem before launching 5G.”

– Arnaud Vamparys, SVP Radio Network, Orange Group

impact the consumer market but also noted its great prospects for enterprises, citing the automotive sector as one of the most advanced industries in use of the technology.

“The consumer market will develop,” he said. “We’ll watch better video, we’ll watch cloud AR content, cloud VR, use cloud gaming, and we have a series of new devices coming out like foldable devices, which will be the foundation for 5G in a way. The second most important market we’ve found is manufacturing and specifically automotive manufacturing. Companies like Mercedes, BMW, Volkswagen are key adopters of 5G technology and stand to benefit the most from what 5G can enable.”

Other sectors cited by Mavrakis include smart ports, smart mining, teleoperations in medicine, and the remote control of trucks.

He added that it was important for vendors to become a link between operators and enterprise verticals, noting the progress

already made by industrial giants such as Bosch and Siemens through partnerships and the formation of joint innovation labs.

## Industry

One major operator group prioritizing industrial applications in its 5G strategy is Orange. Its SVP of radio networks Arnaud Vamparys said that the telco had already engaged with more than 1,000 companies, with several co-innovation projects in place.

The group has opened trial zones for 5G in 17 urban hubs and plans to focus the first stage of 5G rollout in its home market of France in areas with a heavy proliferation of industry.

Vamparys believes that to drive industrial interest, “it’s mandatory to create a large ecosystem,” before launching 5G.

Many Huawei partners from the industry sector were showcasing these applications and illustrating future proofs of concept at the exhibition.

“To have the best experience in VR or AR you currently need a PC – people need to be connected to the PC, so wireless is very important to drive the market.

– Mohamed Jean-Philippe Sangare, Founder & CEO, Swiss Society of Virtual and Augmented Reality



Highlighting the vast potential of 5G in AR, VR and mixed reality use cases, the founder and CEO of the Swiss Society of Virtual and Augmented Reality, Mohamed Jean-Philippe Sangare, called the new network technology a “game changer.”

“To have the best experience in VR or AR you currently need a PC – people need to be connected to the PC, so wireless is very important to drive the market,” he added, also noting the importance of low latency in driving the adoption of AR and VR technology.

Sangare noted the difference between 4G and 5G was low latency, speed, and the ability to connect thousands of devices at the same time, with benefits including the ability to, “offer more services, connect, have convergence between VR/AR, artificial intelligence and actually every kind of technology that needs speed and low latency.”

Conundrum CEO Konstantin Kiselev said 5G would enable his company to deliver a high quality of industrial IoT AI and open the

company to offering new applications, including providing real-time recommendations to engineers in its core industries.

Enterprises are already working with operators across the world on various industry-specific applications for 5G including sectors such as mining and manufacturing, but there are also a number of future-looking use cases tipped for major future roles including in healthcare and the frequently cited automotive use cases. [UUM](#)



# Leaving no one behind with Fixed wireless access

Connectivity is a basic premise of digital inclusion and the springboard for powering access to the many socioeconomic benefits of digital technology. But with less than 60 percent of the world's population covered by Internet access as of June 2019, there's still some way to go.

By Gary Maidment





“The Philippines is made up of 7,300 islands, so rolling out fiber on every island is going to be very difficult. We’re well on the WTTx journey.

– Ron Ng, Head of Integrated Masterplanning, Globe Telecom



For individuals and communities that lack online access, the impact on quality of life is high in almost every domain. And it’s increasing. For example, it’s harder to apply for jobs, access healthcare, seek financial aid, engage in self-learning, or access government services without an Internet connection. On a community level, it creates a poverty trap that restricts local economic growth.

Realizing “Broadband for All” is a challenge that Huawei and its partners are working hard to overcome, especially in scenarios where laying fiber cable isn’t viable or cost-effective. However, powered by 4G and 5G, WTTx in the shape of Huawei’s Fixed Wireless Access (FWA) technologies is overcoming many of the legacy connectivity challenges.

## Connecting an archipelago

In remote, low-ARPU areas with low-population density, carriers have little incentive to deploy fiber as complex deployment conditions, long

ROI periods, and huge costs don’t create convincing business cases.

Such is the case in the Philippines. With just over 73 percent of its 108 million people connected, the archipelago’s natural geography has created a barrier to connectivity for nearly a third of its population. “The Philippines is made up of 7,300 islands, so rolling out fiber on every island is going to be very difficult,” admits Ron Ng, Globe Telecom’s Head of Integrated Masterplanning.

For unconnected Filipinos, the lack of broadband access has historically affected three particular areas the most: education, information and communications, and finance. The people hit hardest tend to be women, the uneducated, the elderly, and the disabled. For many, access to self-learning and online courses, real-time news that can lead to better-informed life decisions, and mobile financial services are impossible – 65 percent of Filipinos remain unbanked. And despite high smartphone penetration, a sizable number

“Powered by 4G and 5G, WTTx in the shape of Huawei’s Fixed Wireless Access (FWA) technologies is overcoming many of the legacy connectivity challenges.”

have no access to mobile money services that are so valuable to low-income households.

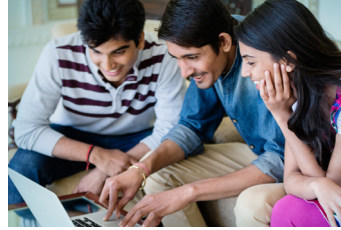
With WTTx the Philippine operator Globe Telecom is starting to make a dent in the digital divide. Globe began rolling out WTTx in 2014 to power its AtHome wireless broadband service. With around 65 percent – or 1.2 million of Globe’s 1.8 million subscriber base – subscribed to WTTx, the telco has developed a very strong foundation in wireless fiber while meeting a clear market need, “We’re well on the WTTx journey,” says Ng. The telco’s early start has also paved the way towards 5G, allowing Globe to sharpen its competitive edge early, “In June, we were the first operator in South East Asia to launch 5G FWA,” he says. “We’re offering 50 Mbps and 100 Mbps plans.”

Due to higher productivity and efficiency coupled with the new business opportunities that faster mobile Internet enables, 5G rollout is expected to boost GDP wherever it’s deployed.

Alongside Huawei CPEs, Huawei’s Massive MIMO antennae system underpins Globe’s WTTx solution and is forging the path to 5G. At the Global Mobile Broadband Forum in October 2019, Huawei launched its third-generation Massive MIMO solution, delivering improved power-efficiency and greater coverage in the mid-band frequencies that many countries have reserved for 5G services.

Ng mentions four points of focus for Globe’s 5G FWA strategy, “We’re prioritizing reaching hard-to-acquire areas, faster deployment, replacing fiber, and enabling smart homes.” To achieve this, the company is adopting an integrated planning approach that combines DSL, fiber, WTTx, and 5G to deliver fast, low-cost home broadband, with Huawei’s 5G CPEs serving as air fiber modems.

Although there’s more work to be done, expanding connectivity and nascent 5G is creating a more equal playing field for digital empowerment, access, and productivity across



the Philippines on the back of already strong economic performance – 6.7 percent GDP growth in 2017 and 6.2 percent in 2018.

## Reaching the rural majority

Much like the Philippines, Sri Lanka is seeing growth in fixed wireless broadband users outstripping fixed wireline services, a trend that's common in emerging economies where prepaid packages are dominant. Starting from a broadband penetration rate of just 2 percent in 2013 and with 80 percent of Sri Lankan million people spread out over low-density rural communities, WTTx has emerged as the engine that has breathed digital life into the isolated island nation in a few short years – a nation where the digital gap is particularly felt based on urban and rural lines, economic class, and gender. For example, a 2018 UNICEF report on 11-18 year old children revealed that 67.6 percent of boys had Internet access compared to just 33.1 percent of girls.

With five operators making for a competitive mobile broadband landscape and fixed broadband unviable in terms of both cost and ROI, the operator Dialog identified Huawei's 4G FWA technology as the best way to leverage its existing networks, spectrum resources, and sites to provide broadband for homes and businesses.

After beginning deployment in 2013, Dialog increased home broadband penetration to 26 percent, lifting 800,000 people out of the digital vacuum and enabling advances in many areas, including remote education, medical diagnosis, women's education, and climate change action. It also powers Dialog's mobile money service eZ Cash, helping expand financial inclusion, an essential tool for alleviating poverty.

## Better business with FWA

With an Internet access penetration rate of just over 77 percent, Trinidad and Tobago has seen three operators competing fiercely

“FWA can ensure that fewer people are left behind when it comes to the socioeconomic benefits of digital technology, while ensuring strong business outcomes for operators.”

for fixed broadband subscribers. The Trinidad and Tobago National ICT Plan ICT Blueprint 2018 – 2022 notes that, “The islands of Trinidad and Tobago are at different stages of ICT readiness, particularly with respect to infrastructure, connectivity, skills, and access. Given the disparity in readiness, Tobago has experienced slower uptake of ICT, particularly among individuals and businesses. Therefore, ICT initiatives are to be tailored to meet the specific needs of Tobago.”

Fixed wireline technology isn't up to the job, however. In the operator landscape, TSTT saw its revenues decline by 21.4 percent in one year and lost 33 percent of its subscribers in 18 months due to the poor user experience and high OPEX caused by copper cables. As in Sri Lanka and the Philippines, WTTx has considerable advantages in this type of scenario where fixed broadband isn't sustainable.

In 2018, TSTT launched its “Zero Copper”

plan with the aim of expanding coverage to 95 percent of the population with a mix of wireline and wireless fiber. Basic coverage was achieved with Huawei's FWA solution, and fiber was deployed in dense urban areas.

Underpinned by Huawei's Massive MIMO and CPEs, TSTT is now able to offer high-quality bundles of voice, Internet, and OTT video services at 30 percent less than the average market price, making online services available to more lower-income households

With high-gain outdoor CPEs achieving a coverage radius of 30 km, FWA is demonstrably the best solution in remote, low-density areas where it's not profitable to lay fiber to connect the unconnected. By eliminating civil works costs, FWA also slashes average per connection costs so that networks with equivalent TCO can serve more families than FTTH.

**More than connectivity**



But connectivity isn't enough. There must also be a commitment to teaching digital skills to ensure that the newly connected are equipped with the skills to benefit from connectivity, including an understanding of why it's beneficial plus the risks.

GSMA reports that 43 percent of people globally are still not connected even though they have network coverage. In Kenya, less than 50 percent of people use the Internet, even though 3G and 4G networks cover 80 percent of the population. The reason is that many people aren't aware of the value of being online.

Equally, everyone – especially children – must be taught about responsible Internet use. In the 2018 UNICEF report on Sri Lanka cited earlier, 53.6 percent of children who used the Internet responded that they were “self-taught”, and just 16.5 percent were taught by their parents. This results in a lack of understanding about both privacy and safety. Of the surveyed Internet users, 15.1 percent reported that they

had divulged true information online, like name, age, and telephone number. More alarmingly, 46.3 percent had communicated with strangers online, with 27.9 percent of those having met a stranger in person.

As well as digital access, Huawei and its partners are committed to expanding digital literacy, with the DigiTruck project in Kenya an example of how digital skills can be brought to remote areas, with a converted shipping container mounted on a truck serving as a mobile classroom.

Underpinned by an availability of digital skills' training, FWA can ensure that fewer people are left behind when it comes to the socioeconomic benefits of digital technology, while ensuring strong business outcomes for operators. The right solutions can also lay the foundation for 5G and the wealth of socioeconomic benefits that gigabit speeds can create, so that Broadband for All means a better life for all. [www](#)

# How China's 5G launch will drive the Global 5G industry

With the launch of the world's biggest 5G networks in China, the 5G era can be said to have truly begun. The big three Chinese operators formally launched services on October 31, 2019, instantly becoming global 5G leaders with nearly 10 million advance orders for 5G.

By Daisy Zhu



“The arrival of the Chinese telcos in the market will turbo-charge 5G development, and not just in China.”

– Daisy Zhu, Head of Marketing Operations, Huawei Wireless Network



China already dominates the world 5G scene in terms of network scale. The operators have already deployed 86,000 5G base stations, and expect to roll out 130,000 base stations by the end of 2019 and 600,000 by the end of 2020. The arrival of the Chinese telcos in the market will turbo-charge 5G development, and not just in China.

With 1.27 billion LTE users and 817 million existing mobile Internet users, the Chinese players have the scale and expertise to drive 5G growth. They are offering some of the world's most affordable 5G services.

Prices start at 128 yuan (US\$18.30) per month for 30 GB of data – consumer-friendly rates that will drive adoption and help the global industry ecosystem get to scale. That means the accelerated production of affordable handsets and app development.

Currently, just nine 5G handset models are available in the China market at 3,500 to 8,000

yuan, with another eight expected by year-end. But analysts believe the first 2000-yuan devices will launch in the second quarter of 2020, followed by 1,000-yuan phones in the fourth quarter. That will further drive take-up of 5G subscriptions and create an installed customer base for new and innovative 5G apps.

Worldwide, 56 carriers have built 5G networks and 40 have launched services. Among these, Huawei has won more than 60 contracts and shipped over 400,000 5G active antenna units (AAUs). Competition is one of the major decision factors behind 5G deployment. Telcos don't want to be left behind as their rivals begin to offer new services.

5G adoption is also being driven by an increasing level of confidence in the new technology. Many hundreds of 5G trials have already taken place and the trial results have all showed a major leap in performance over 4G. The 5G trial networks are achieving speeds of multiple gigabits per second, compared to

“We’re very confident that AR and VR services will be successful 5G applications. They can be offered over 4G but the 5G experience is so much better.”

hundreds of megabits for peak LTE.

Besides network performance, 5G also presents a strong economic case. Operators know 5G can increase bandwidth almost 20 times over 4G while at the same time reducing cost per bit tenfold. On the revenue side, it offers operators their best opportunity to escape the industry trap of flat revenue and fast-rising traffic.

In Korea, which introduced 5G services in April, data consumption among 5G customers has increased threefold while new revenue streams are opening up through services such as AR, VR, cloud gaming, and live 360° HD sports broadcasting.

We’re very confident that AR and VR services will be successful 5G applications. They can be offered over 4G but the 5G experience is so much better. The real differentiation in 5G comes from the enormous number of potential business and industrial use cases. The new mobile infrastructure will facilitate industry digitalization and enable businesses to expand their scope of operations.

5G will also enable control of applications that save manpower and improve efficiency and productivity. 5G is already proving its value in verticals such as media and in security and authentication in large venues.

Broadcasters can now replace a US\$40 million outside broadcast van and satellite link with a 5G-enabled backpack. For example, China CCTV used a 5G link to broadcast China’s national day ceremony from central Beijing on October 1.

5G is also supporting many innovative use cases at Beijing’s new Daxing Airport, like smart check-in, thanks to the large number of 5G-enabled cameras installed at check-in points and around the boarding gates.

These are applications that can be immediately implemented using chipsets and devices already in the market. It won’t take long for these to achieve scale. Future 5G use cases, like massive M2M and ultra-low latency, would have to wait for the finalization of the standard in 2020 or 2021. [www](#)



# Open Site

## 5G for society, society for 5G

Collaboration is the key to success. Through initiatives like Open Site, 5G stakeholders are coming together to pioneer a brighter future for all.

By Zhang Yu



“By enabling an open forum, members can discuss national policies on 5G, share industrial standards and resources, and exchange ideas and best practices.”

**T**he next generation of wireless technology has the potential to have a global impact. As the most advanced telecommunications system to date, 5G can bring people online who were never previously connected, advance ubiquitous connectivity, and transform how people all over the world live, play, and work.

Like anything with a global scale and scope, rolling out 5G worldwide is going to require significant time and investment. Globally, investments from mobile operators are expected to hit US\$1 trillion between 2018 and 2025, as telcos deploy the specialized networks that 5G requires. To lower these costs and speed up global rollout, Huawei is working with telcos, mobile carriers, policymakers, regulatory bodies and industry partners to find solutions that benefit all stakeholders.

## An open platform

One of these initiatives is the Open Site

Interest Group—a multi-partner body that aims to share, replicate, and promote good practices in site development, open up public social resources, and encourage partners from other industries to jointly develop site ecosystems. To help achieve these aims, the group’s stakeholders aim to build a resource-sharing platform and develop site construction standards through broad collaborations amongst diverse industries.

It’s an initiative that the Swiss telco Sunrise is embracing, working with Huawei to install 5G across the cities and countryside of Switzerland. “The Open Site Interest Group is interesting for us because it will help us to deploy more sites in an easier way in the future,” said Roland Eisenhut, Senior Manager of Central Radio Engineering at Sunrise. “We have partnerships with other companies, of course. But if we can somehow find a way to do this on a larger scale, it makes it easier for everyone.”

These collaborative efforts can have a real impact. By enabling an open forum, members

can discuss national policies on 5G, share industrial standards and resources, and exchange ideas and best practices. “The Open Site Interest Group is about the power of 5G and the development of 5G,” said Race Hao, President of Huawei’s Wireless Site Domain. “Huawei will continue to work with partners to perfect the ecosystem and seek more efficient infrastructure that accelerates 5G construction and reduces overall social costs.”

## Developing and standardizing infrastructure

One of the topics discussed at the Open Site was infrastructure. “We’re transforming towards the digital society, you could even call it the smarter society,” said Dr. Eun-Ju Kim, Chief of the Digital Knowledge Hub at the International Telecommunication Union, the United Nation’s agency that’s responsible for issues relating to the information and communications technology. Kim argues that to deliver this new smarter, digital society requires global 5G infrastructure. “You need



“The 5G global network is a complex ecosystem made up of various products and apps. Ensuring equitable, win-win partnerships among all stakeholders is central to a successful, global rollout of 5G.”

to have a new infrastructure. And new 5G networks with faster data rates and speed and then less latencies,” she said.

In the same spirit of collaboration as Open Site, operators can share both infrastructure and networks. However, this needs to be managed and organized in set parameters. “Infrastructure sharing needs to have some kind of regulations or policy guidelines in place. In the era of 5G, you need to work together to make this standardization and ensure interoperability between the machines and between all the devices,” said Kim.

“With the arrival of the 5G era, there is a need for standardization and the adaption of the infrastructure. However, we are yet to have a uniform standard,” said Hao. He argues that standardization could mobilize the resources and present a fast, low-cost network construction solution.

Policymakers are important stakeholders in this discussion, as they can provide the legal

frameworks in which 5G can flourish. “It’s not really that the authorities need help give us infrastructure,” said Eisenhut. “It’s more to help us to set the rules so that we can use the infrastructures properly.”

## An interconnected ecosystem

The 5G global network is a complex ecosystem made up of various products and apps. Ensuring equitable, win-win partnerships among all stakeholders is central to a successful, global rollout of 5G. The Open Site Initiative could be the answer by fostering a collaborative, transparent environment amongst telecom operators, policymakers, regulators and other industry stakeholders.

“We need to work together as partners to make sure this technology can be beneficial for all,” said Kim. “5G can improve our quality of life, help our socioeconomic development and support the sustainable development goals.” 

TECH  
4ALL

Education

## DigiTruck Training on Wheels

Huawei is working with the NGO Close The Gap, UNESCO, Safaricom, and local authorities in Kenya to improve the digital skills of people living in remote areas and to put an end to digital illiteracy.



Building a Fully Connected, Intelligent World





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