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Revamp, Rise, Reinvent

**XL Axiata on digital
transformation**

**China Mobile aims
for 1.75 billion
connections by 2020**

**Enabling business
success for telcos
with video**



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ROADS to new growth

Huawei gave keynote speeches, hosted forums, and showcased its latest products and solutions at Mobile World Congress 2017 with a central theme in mind: Open ROADS to a Better Connected World – ROADS to New Growth.

We believe that 5G, video, IoT, VR/AR, AI, full cloudification, and digital transformation will remain the industry's key focal points throughout 2017. And the big questions will revolve around how to maximize returns from digitization, maintain growth, and stay profitable.

There are in fact many roads open to telcos. By 2020, an estimated 85 percent of data traffic will come from video services, an opportunity that they must not miss. Video will become a basic service and a rapid growth engine in entertainment, communications, and industry. So, what's the best way to position and monetize video as a basic service?

By 2025, 85 percent of all enterprise applications will be on cloud, every enterprise will use cloud services, and the penetration rate of industrial intelligence will exceed 20 percent. Moreover, a staggering 100 billion connections will cover the globe. How can you set sail on this blue ocean and enable verticals with cloud services?

Customers expect a ROADS experience, and telcos must go digital to deliver it. That's easy to say, but transformation is long and complex. It requires agile digital operations that reflect a telco's scale, capabilities, and business strategies, plus networks that can cope with the added complexity delivered by 5G, IoT, and VR/AR. How can you get there?

Telcos have a huge asset advantage with their networks and the potential to offer high-value services, but they must cloudify their equipment, networks, services, and operating systems. Building All Cloud networks will lower costs and lead to gains in network robustness, scalability, and agility. Do you have the right business model for balancing business and network construction needs and maximizing network value?

Huawei is committed to answering these questions and becoming the best partner for helping you achieve digital transformation and strong business growth.

Sally Gao, Editor-in-Chief



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Revamp, Rise, Reinvent

XL Axiata on digital transformation



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“The movement from voice and SMS to data services is much faster than we expected,” comments XL Axiata CEO Dian Siswarini on the rapidly changing Indonesian market. But, in a nation where 98 percent of subscriptions are prepaid, loyalty is low and churn is high. Telcos must satisfy the demand for data services with an experience that keeps users happy.

By Gary Maidment



The only way is digital

Though the consumer shift to data is a well-known global trend, the speed at which it's happening requires telcos to react with extreme agility. For a large business that's dragging a slew of traditional practices behind it, transforming into a nimble digital player is tough: “It's not just about the business model or product; it's about the whole mindset of our employees. Transformation has to be supported by the right

organizational structure and the right policies and strategies,” explains Siswarini. “It isn't something that can be done overnight, and so we're taking baby steps.” With a special division assigned to digital business, XL Axiata is progressing well in areas like finance and advertising for B2B customers. But, for Siswarini, “The most challenging part is making our core business more digital and more agile.”

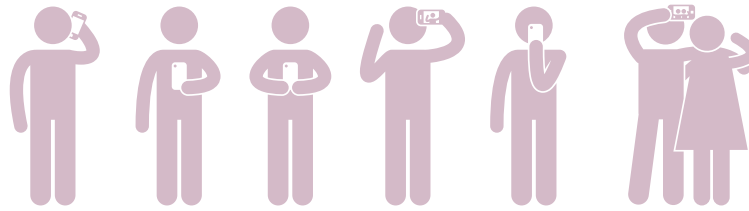
Voice has gone quiet

On top of digital transformation, Indonesia's unique market dynamics heap additional complexity onto telcos in the consumer domain. For one thing, the prepaid dominance and trend for daily top-ups are hard cycles to break when only 60 million of the archipelago's 250 million people have bank accounts. The recipe is perfect for strong churn and weak loyalty: “People have a tendency to buy a new SIM card every month,” says Siswarini, “and some change them two or three times a month. They just keep churning.” She also believes that the burgeoning appetite for data encourages disloyalty because subscribers care less about changing their phone number if they're using data more than voice services.

“ It’s not just about the business model or product; it’s about the whole mindset of our employees. Transformation has to be supported by the right organizational structure and the right policies and strategies. ”

— Dian Siswarini, XL Axiata CEO





XL Axiata's 3R strategy

The shift to data will only grow with Indonesia's increasing smartphone penetration, which tops 40 percent now and is predicted to rise to 47.6 percent by 2019.

What's a telco to do?

XL Axiata upscaled its operations and subscribers in 2013 with the acquisition of local rival Axis from Saudi Arabia's STC. Even so competition remains fierce, further cementing the fickle nature of Indonesian subscribers because there's so much choice out there: "There are still six operators offering data services even after the acquisition," says Siswarini. "This means there's an abundant supply of network capacity for consumers."

An obvious response to strong competitive forces like these is to reduce prices, which has had an equally obvious consequence. "The pricing level for data services in the Indonesian market is one of the lowest in the world," comments Siswarini. XL Axiata, for example, offers 100 MB of data for 1,600 rupiah (US\$0.12), less than half the price of one of its competitors.

Though an effective short-term approach, competing on price alone isn't an effective strategy for the long-term.

Something more is needed than "just selling subscribers access," says Siswarini, which can only take telcos down the dumb pipe route. "Previously we were known as a price leader [but] unless you have a very good cost structure model, that isn't sustainable." To raise its game, XL Axiata has started bringing rich content offerings to the table framed under its new 3R strategy. The main aim of 3R is to get firmly back in the black with new business models that center on data services.

Revamp, Rise, Reinvent

Revamping involves shifting the telco's business model "from volume-based to value-based to cut churn and create a more sustainable business environment," says Siswarini. Rising up what she terms the "segment ladder" means developing a cohesive business model that shifts away from the low-price value proposition because, she explains, "You can't position yourself as a price leader and then say, 'oh we want high-end subscribers.'" This segmentation is designed to give access to more people, then deliver high-value services under the XL brand. "Reinvent", according to Siswarini, is the digital transformation part of the 3R equation, reflecting the medium- to long-term goal of evolving from a telco into a strong digital player.

In the near term, the ways to “Revamp” and “Rise” are to get people connected at a good price and offer great content bundles with flexible pricing, which is what XL Axiata is doing.

Entertaining subscribers the 3R way

“It’s content that demonstrates the value we can offer,” states Siswarini. Alongside the Yonder music app, XL Axiata offers VoD and live services on its Tribe platform for people to watch sport in real time and stream their favorite shows – a lot of Korean soaps in Indonesia’s case. Alongside content, Siswarini points out that XL Axiata’s pricing strategy is no longer locked in on winning a price war, “It’s flexible and doesn’t just focus on service or traffic quotas like gigabytes,” instead taking a broader approach that’s designed to engender loyalty and encourage more postpaid subscribers. And it’s working.

Starting to reshape the market

The 12 months leading up to September 2016 saw an 18 percent growth in postpaid subscribers for XL Axiata, taking numbers past the half million mark to top 1 percent of its 45 million subscribers. During the same period, the company’s ARPU increased by 8 percent. In a market as unique as Indonesia, these gains are very promising. The uptake of postpaid deals implies an increased stickiness that’s rarely been seen before, while the ARPU jump shows that people will pay for decent content.

Wait, how many terabytes?


But doing all this requires some serious network muscle, especially when the 12 months leading up to September have seen XL Axiata’s total traffic load skyrocket by 145 percent from 136,188 TB to 334,910 TB. Anticipating this trend, the telco spent US\$250 million on its 4G LTE network in 2016 under the 3R strategy. As Siswarini puts

it, “Only 4G can deliver a good data experience.” Indeed, the investment has proved to be timely and wise, “Now, we’ve become the biggest LTE provider in Indonesia [and] as people move to LTE, ARPU increases.”

Equally, XL Axiata’s UMTS 900 project with Huawei is delivering rapid ROI, “We deployed 5,000 U900 sites with Huawei in just one month, a record for a non-China market,” says Siswarini. Using a low-frequency 3G band, U900 is an outstanding network performance solution that ticks boxes in the areas of superior 4.5G voice fallback, MBB coverage, and data service experience. According to Siswarini, the impact of implementation for consumers has been significant, “In just one month, data traffic increased by more than 30 percent...U900 gives a better experience because the U900 network spectrum travels farther than a 2.1 GHz network.”

A partnership for the long-haul

Gone are the days when a telco can just be a telco and go it alone. Siswarini believes in the value of long-term partnerships and approaching digital transformation with a player who knows the game well, which in her words means “someone who’s more knowledgeable and experienced than us at delivering digital services.” According to Siswarini, Huawei can help “because it knows about transformation, having transformed into an IT leader from a telecom equipment vendor.” As she points out, “It’s not only about the platform, network, or technology; it’s about how to fit this system into what consumers want. It’s in the revamping, in the adjustment, even on a daily basis. So, agile operations are what we need from Huawei.”

XL Axiata has the internal commitment and strong partnerships to propel transformation, network upgrades, and the 3R strategy. The telco is well on the way to reinventing itself as a leading digital player that doesn’t just respond to consumer habits, but also has a hand in shaping them. 

GSMA: Connecting everyone and everything to a better future



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Mats Granryd, Director General of GSMA, shares his thoughts on the development of 5G, the Internet of Things, and why mobile is so important to the UN's Sustainable Development Goals (SDGs).

Republished from *Mobile World Live Show Daily*

What do you see as GSMA's main role in influencing new technology and 5G?

Granryd: GSMA is working for its members and with its partners to shape 5G. As the association representing the mobile industry, we'll play a significant role in shaping the strategic, commercial, and regulatory development of the 5G ecosystem. This will include areas such as defining roaming and interconnection for 5G, and identifying and aligning suitable spectrum bands. Once a stable definition of 5G is reached, GSMA will work with its members to identify and develop commercially viable 5G applications.

What do you consider to be the most important feature of 5G?

Granryd: Clearly there's a lot of excitement around 5G because it offers enormous potential for both consumers and industry. In addition to being considerably faster than existing technologies, 5G holds the promise of applications with high social and economic value, leading to a hyper-connected



society in which mobile will play an increasingly important role in people's lives. However, it's important to note that many of 5G's technical requirements already form part of the network innovations being undertaken by operators today. For example, technologies such as NFV, SDN, HetNets and Low Power, Low Throughput networks are being bundled under the title of 5G, despite the fact that they're already being brought to market by vendors

mobile society

“ 5G holds the promise of applications with high social and economic value, leading to a hyper-connected society in which mobile will play an ever more important role in people’s lives. ”

— Mats Granryd, Director General
of GSMA



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We need to...build on current technologies such as 4G to enable new business opportunities in the near term, rather than being swept towards 5G deployment ahead of real demand.

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and deployed by operators. We need to continue to innovate and drive sustainable growth and service innovation that builds on current technologies such as 4G to enable new business opportunities in the near term, rather than being swept towards 5G deployment ahead of real demand.

How does GSMA plan to increase operators' involvement in IoT?

Granryd: GSMA has a program called Connected Living that's working with the industry to accelerate the potential of IoT. We believe IoT can be unlocked through industry collaboration, interoperability, and the development of common standards that will help to avoid market fragmentation, accelerate adoption, and encourage the IoT market to grow in a sustainable way. GSMA is working closely with operators and ecosystem partners in three critical areas that are integral to developing IoT:

One, interoperability and standardization:

Without a common approach, the market will become fragmented and reliant on proprietary solutions. Common standards and interoperability are essential for IoT to be sustainable.

Two, security: We're working to get best practice security guidelines adopted so that machines can

communicate via the mobile network in the most secure way.

Three, big data: IoT already generates a huge amount of data that is largely retained in vertical silos. We're working to establish an IoT Big Data Ecosystem (BDE) to unlock the potential of this data. A common, collaborative and interoperable approach will help to usher in a new era of IoT solutions, helping the market scale.

Are rival offerings to LPWA that compete with the 3GPP-backed NB-IoT good or bad for IoT?

Granryd: We created the Mobile IoT Initiative to align the mobile industry behind three complementary Low Power Wide Area (LPWA) technologies in licensed spectrum, and fast-tracked their standardization in 3GPP to accelerate adoption. Network operators are experienced and trusted providers of managed M2M solutions and are best placed to lead the development and commercial rollout of LPWA services that meet customer requirements. Solutions in licensed spectrum are scalable, reliable, secure, and flexible, and avoid unnecessary risks inherent with unlicensed offerings. We recommend that customers wait until licensed LPWA solutions are available in the market to avoid risking an unlicensed solution that may negatively impact their business.

With LPWA trials still underway, how can



We encourage operators to work with the GSMA's Mobile IoT Initiative or GSMA NB-IoT Forum to help accelerate the commercial adoption and deployment of NB-IoT technology.



operators ensure commercial NB-IoT deployment by next year?

Granryd: We've already seen many pilots and pre-commercial deployment of NB-IoT this year, with China Unicom, China Telecom, Etisalat, Deutsche Telekom, KT and Vodafone all announcing plans for network deployment in 2017. In 2016, AT&T also announced a number of LTE-M pilots, with customers with commercial rollout expected soon. We encourage operators to work with the GSMA's Mobile IoT Initiative or GSMA NB-IoT Forum to help accelerate the commercial adoption and deployment of NB-IoT technology.

Why is mobile so important to the UN's sustainable development goals?

Granryd: Globally, nearly 4.8 billion men and women subscribe to a mobile service – almost two-thirds of the world's population – and this is expected to reach 5.6 billion people in 2020. As an industry, we have the opportunity to leverage the mobile networks that we've built and the services we deliver to help achieve the UN's SDGs.

In February 2016, the mobile industry became the first sector to commit to the SDGs. In September, at the UN General Assembly week, we published the *2016 Mobile Industry Impact Report: Sustainable Development Goals*, which assesses the mobile industry's current impact at

achieving the SDGs and outlines future actions that will expand and strengthen that impact. This first-of-its-kind report also establishes a benchmark through which we'll measure the industry's progress in contributing to the SDGs by 2030, which will serve as a blueprint for other industries as they commit to achieving the goals.

This is an important opportunity. By working together as an industry with other sectors, governments, and key stakeholders, I believe we can make a real difference to people's lives.

In addition to the 17 SDGs, what other applications can raise the profile of the UN's goals?

Granryd: In addition to publishing the *Mobile Industry Impact Report*, we've partnered with the UN and Project Everyone to develop and launch the official mobile app, SDGs in Action. This will create a community for industry, governments, and individual citizens to work together to deliver the SDGs.

Users can get details on each of the 17 goals, including the associated SDG targets, explanatory videos, case studies, data, and suggestions on how people can take action to help achieve them. The app also allows individuals to highlight the activities they're undertaking in support of the SDGs and invite their social networks to get involved as well.

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More than 40 percent of the world’s population will still lack Internet access at the end of this decade, with most of the excluded population living in rural areas.

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The report and the app are just two examples of what we’re doing to put a spotlight on this important issue. GSMA and our members, along with many others in the private and public sectors, are working to build visibility around these global goals. There’s not a single organization that can do this alone – it’s critical that we all work together to make this a reality by 2030.

Huawei: What do operators and tech companies need to do to bridge the digital divide?

Granryd: Despite the strong progress we’ve made in connecting the unconnected, more than 40 percent of the world’s population will still lack Internet access at the end of this decade, with most of the excluded population living in rural areas. Digital inclusion can extend economic and social benefits to previously unconnected populations, fueling a virtuous circle that reduces poverty, improves infrastructure and services, and further increases Internet access and usage.

GSMA is working with the mobile ecosystem to address four key challenges to increasing digital inclusion:

Network coverage: expanding the commercially sustainable coverage of mobile broadband networks to underserved population groups, typically in rural or remote communities, by promoting shared infrastructure, regulatory best practices, and technical innovation.

Affordability: addressing key issues such as mobile-specific taxation to help make Internet access more affordable, especially for citizens at the bottom of the pyramid.

Digital skills and awareness: providing training to people so they understand the benefits and opportunities of being online and have the skills to use mobile Internet.

Locally relevant content: encouraging and promoting the development of content and services that are relevant to underserved population groups.

Huawei: How will GSMA approach privacy and security issues when it comes to digital authentication as part of the Mobile Connect initiative?

Granryd: The premise of Mobile Connect is that it offers consumers a single, trusted, mobile phone-based authentication solution. Fundamental to its uptake and effectiveness is that Mobile Connect must absolutely respect online privacy and enhance individual security by mitigating password vulnerability. The service securely authenticates users, granting them safe on-line access to mobile and digital services such as e-commerce, banking, health, and e-government. [www](#)

GTI: TDD/FDD convergence paves the way for future mobile broadband



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The Global TD-LTE Initiative (GTI) recently celebrated five years of success. Huawei caught up with the group to discuss its progress and plans for the future.

Republished from *Mobile World Live Show Daily*



What was GTI's mission when it was established in 2011? What are its biggest achievements? Did GTI achieve its initial mission? How do global industry players evaluate GTI's success?

GTI: GTI's mission was to construct a robust

ecosystem of TD-LTE technology, speed up the commercialization of TD-LTE, and promote the convergence of LTE TDD and FDD. Our achievements include successfully building a global end-to-end TD-LTE ecosystem, successfully commercializing TD-LTE globally, successfully converging TDD and FDD, and initiating joint operations. We definitely achieved our first-stage

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Many industry executives told us that GTI must not stop and that TDD still needs GTI to move to 5G, which strengthened our conviction to push GTI 2.0.

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mission. In fact, we exceeded expectations. The global industry has witnessed GTI's success and, as GTI's chairman, I've received many positive comments from the industry.

During MWC 2016 in Barcelona, Mats Granryd, Director General of GSMA, presented an award to GTI, recognizing the five-year partnership between GTI and GSMA. He also strongly praised GTI's continuous work on TD-LTE and the convergence of LTE TDD/FDD. Zhao Houlin, Secretary-General of ITU, commented, "GTI has made great achievements in driving the rapid and successful deployment of TD-LTE worldwide. I do believe that ITU and GTI will enjoy stepping up their cooperation and driving a prosperous future for TD-LTE."

Sunil Bharti Mittal, Chairman of Bharti Airtel, told GTI, "There's no doubt that India is committed to TD-LTE, and Bharti is committed to GTI." Shin Jong-kyun, President of Samsung, said, "We greatly appreciate GTI's strong support for TD-LTE development and fully respect its commitment and leadership in pursuing this new technology."

From a network vendor perspective, Rajeev Suri, CEO

of Nokia, remarked, "We acknowledge GTI's support and help in achieving maturity in TD-LTE technology and look forward to many stakeholders sharing our passion for TD-LTE as we move forward."

Moreover, last year GTI evaluated how to move forward now we've accomplished our initial mission. Many industry executives told us that GTI must not stop and that TDD still needs GTI to move to 5G, which strengthened our conviction to push GTI 2.0.

GTI officially moved into GTI 2.0 in February 2016. What's your new mission? How will you achieve it?

GTI: The mission of GTI 2.0 is to continue TD-LTE Global Development by continuing to promote TD-LTE, enlarging the scale of converged TDD/FDD terminals and networks, and promoting the development of TD-LTE enhanced technologies. We also want to propel 5G development and will do that by promoting and utilizing the advantages of TDD to facilitate 5G development, promoting 5G unified standards and the E2E ecosystem, and exploring 5G cross-industry market opportunities. GTI has already

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GTI provides a great international stage for Chinese enterprises to showcase advanced TDD technologies and solutions, as we connect them to global operators and the worldwide industry.

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become the most important global TDD platform, and we have a great industry base with 124 operator members and 111 partners.

Secondly, GTI 2.0 has obtained core operator support. The Chairman/CEO of Bharti Enterprises, China Mobile, KT, SoftBank and Vodafone have formed the GTI Leaders Committee, pushing GTI's future strategies to explore new markets and create innovative services and business models to lead 5G development.

Thirdly, compared with other global organizations, GTI is more focused on industrialization and trials. We have rich experience in quickly pushing the development of the E2E ecosystem.

What kind of role does GTI play in improving the global influence of Chinese companies?

GTI: Chinese enterprises like operators and end-to-end vendors contribute a lot to GTI's work. Without their contribution, we wouldn't have GTI or TD-LTE today. In fact, GTI is the most important platform for Chinese companies. With the great success of TD-LTE globally, Chinese enterprises and Chinese telecommunication techniques have won global recognition. GTI provides a great international stage for Chinese enterprises to showcase advanced TDD technologies and solutions, as we connect them to global operators and the worldwide industry.

During GTI's growth over five years, Chinese enterprises entered the global mobile market with incredible speed, including Huawei and ZTE and terminal manufacturers like Xiaomi and Oppo. With TD-LTE development, I believe Chinese enterprises will go further in the 5G era through GTI. [www.gti.com](#)



China Mobile aims for 1.75 billion connections by 2020



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In less than three years since the commercial launch of 4G, China Mobile was running 1.4 million base stations and serving over 500 million subscribers. With these totals forming a globally unmatched scale of operations, the telco has a lot to say about 4G and the future development of 5G.

By Li Yue, President & Chief Executive Officer, China Mobile

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In 2017, we'll push 5G field trials and in 2018 we plan to launch some small-scale commercial trials of 5G. In 2020, we hope to see 5G go commercial in China.

– Li Yue, President & Chief Executive Officer, China Mobile

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Changes arising from 4G

4 G mobile broadband (MBB) technology is the true enabler of the mobile Internet era due to the unprecedented wireless broadband experience it offers. Another contributing factor has been smart terminals, with current models far outstripping PCs in processing power. And a third is cloud computing technology, which provides various big data capabilities through low-cost, high-capacity systems. The mobile Internet era is people-oriented and experience is king. And we can also see de-layered company organizations and flat service structures, features that would have been impossible in the past.

4G has transformed people's lives, providing the fuel for broadband connectivity, video services, and people-to-machine communication. Once 4G arrived, our mobiles became truly indispensable and many

Internet services went universal. We had e-commerce before 4G, but things like shopping and marketing weren't as convenient. Now, Internet service applications are much more compatible with the way we live life. When people say mobile has changed our lives, they really mean 4G. But, where do we go from here on out?

Big connectivity with 5G

5G won't just change your life, it will change society; it will allow vertical industries and information to deeply integrate; and it will create an Internet that encapsulates everything. Telcos will be the builders of this environment and the cross-industry cooperation it facilitates.

In this sense, what is China Mobile's future strategy? We call it Big Connectivity or China Mobile 2020, and it will support the age of hyper-connectivity

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We've decided on an ambitious goal for 2020: doubling our total connections to over 1.75 billion based on our 860 million users.

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and the Internet of Things. With this strategy, we plan to expand the scale of connectivity, optimize connectivity services, and focus on different types of applications.

We've decided on an ambitious goal for 2020: doubling our total connections to over 1.75 billion based on our 860 million users. People will soon be connecting to objects around them like cars, fridges, and all kinds of control platforms and control gateways. If every person in China connects to ten objects, there will be 14 billion connections in total. So, it's perfectly feasible for us to hit nearly 2 billion connections by 2020, with the rollout of 5G. In 2017, we'll push 5G field trials and in 2018 we plan to launch some small-scale commercial trials of 5G. In 2020, we hope to see 5G go commercial in China.

To reach this point, we've set up a joint innovation center for 5G with GSMA, TDI, and other players in the communications industry. The center promotes basic communications capabilities, enables R&D on integrated products, and provides an open lab, which is currently home to 30 research projects. We've also set up research labs in Beijing, Qingdao,

Shanghai, and Chengdu that specialize in 5G service applications like IoT, Internet of Vehicles (IoV), basic capabilities, and smart homes. We hope to coordinate the development of 5G technology, vertical industries, and applications in different areas.

Of course, building a new IoT era will require us to develop in many areas. We're interested in mobile, home and enterprise customers, and new telco services such as digitized connectivity.

China is currently home to the world's largest VoLTE network, covering more than 300 cities. To integrate network technologies, we plan to build new types of data centers and new types of networks. Cloud-based network architecture will revolutionize traditional networking technology and is the key for operators to unlock low-cost, rapid growth. Recently, we've been looking at the wide-scale deployment of data center virtualization and SDN in traditional networks.

Partnerships are the key to the success of 5G, and everyone's combined efforts are necessary to pave the way to the truly connected IoT era.

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Our next focus is on IoT modules and chips. We aim to lower the bar of entry for different vertical industries to enter the IoT ecosystem to the point where module prevalence will remove the bar altogether.

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From terminals to IoT modules

Currently, there are more than 3,000 types of five-mode multi-band devices available on the market, and terminals in large part explain our success in 4G, with annual sales in China topping 200 million units for three consecutive years.

Our next focus is on IoT modules and chips. We aim to lower the bar of entry for different vertical industries to enter the IoT ecosystem to the point where module prevalence will remove the bar altogether; for example, if it costs around US\$5 to connect a fridge to the Internet, fridge manufacturers will be happy to do so. Thus, we hope that our efforts in terminals will help lower the cost of smart homes, IoT, and wearables, and increase the number of connected devices exponentially.

Application platforms for innovation

Application platforms, such as OneNet for IoT, which is open to everyone, are also important to our overall strategy. Currently, more than 3,000 enterprises, 30,000 developers, and 90 million users

are on the OneNet platform, and we hope to attract more. OneNet will play an increasingly important role because, as the number of connected devices grows, more vertical industries can use the existing platforms and customers can develop services that create value.

Big data for telcos

When it comes to big data, telcos have unique strengths that they have yet to fully exploit. Data gives us an accurate understanding of customers and detailed descriptions of their behavior, which telcos can turn into new services and products that create value. Operators also have strengths in services; for example, we interact with 860 million customers on a monthly and sometimes daily basis. Operators also have connectivity strengths as the gatekeepers of mobile Internet services for customers.

In the future, technologies such as cloud computing, big data, and, in particular, AI will undoubtedly contribute much to innovating new products and improving customer services and business value. At the heart, though, connectivity and connections makes everything possible. [www](#)



Enabling business success for telcos with video



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Successful telcos position video as a strategic priority for driving broadband development, growing user numbers, and increasing broadband service ARPU. In this sense, video is not just a value-added service.

By Eric Xu, Huawei Rotating and Acting CEO

The one to watch

Video and cloud services will be the driving forces behind ultra-broadband development. Telcos should position video, especially 4K, as a basic service, and develop it in the same way that they developed their voice businesses in the past.

Over the past year, two questions have been the

subject of extensive research, discussion, and debate at Huawei. How should telcos develop their video business and achieve business success? And on that journey, how should Huawei position itself – what initiatives should we take? Internally, we’ve already reached some consensus on these questions.

Let’s take a look at how telcos around the world are developing their video business. We can begin with China. Its video industry has gone through a lot over



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Telcos should position video, especially 4K, as a basic service, and develop it in the same way that they developed their voice businesses in the past.

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the past decade, and all industry players seem to have agreed on two key factors behind the development of video and broadband.

The first factor is ubiquitous fiber connectivity – providing all households with Fiber-to-the-Home (FTTH) access. China’s top three telcos – China Telecom, China Mobile, and China Unicom – all recognize the importance of ubiquitous FTTH.

Video everywhere

The second factor is providing a premium video experience, what we call Video Everywhere. The idea is to develop video services as a way to leverage the advantages of optical networks, increase ARPU and the number of broadband subscriptions, and stimulate broadband development.

It took more than 10 difficult years before Chinese telcos were able to recognize the importance of these two factors. Between 2005 and 2008, they simply viewed video as a value-added service, offering

it in the form of IPTV. They weren’t making any money from it. Back then, Huawei provided a video aggregation and distribution platform – and we didn’t make any money from that either. After exploring the video industry for a while, almost all telcos cut back on video investment. As a result, the video industry went into a downwards spiral.

Sichuan lights the way

The situation continued like this until about three or four years ago, when China Telecom’s Sichuan Branch began to approach broadband differently. They deployed FTTH across Sichuan province and integrated broadband with video. They no longer pitched “bandwidth” to their users; they shifted their focus to promoting ultra-high-definition, high-definition, and standard-definition videos, giving substance to abstract bandwidth statistics by presenting a perceivable experience that consumers could truly feel. These efforts paid off: Its broadband subscribers soared, and included 10 million video users. This success story has inspired other telcos across China



Telcos that have managed to succeed have positioned video as a strategic offering, not just a value-added service.



and their provincial branches to re-position video and redesign their broadband development strategies. This has also led to the widespread recognition of the two success factors for video and broadband that I mentioned previously.

Outside of China, about 140 telcos have launched IPTV services, but they vary enormously in how well they're doing. Between 2014 and 2016, IPTV subscriptions outside of China grew by only 14.7 percent. And only 26 of these 140 IPTV telcos attracted more than 50 percent of their subscribers to IPTV broadband. These telcos include Orange, Telefonica, Belgacom, PCCW HKT, and South Korean telcos such as KT, SKT, and LG U+. It's clear that the video-related challenges faced by telcos around the world are similar to those that Chinese telcos faced many years ago.

Three measures

In general, some telcos are succeeding at video, but others have stalled and some have written it off as a dead-end business. Telcos that have managed to succeed have positioned video as a strategic offering, not just a value-added service. They have taken the following three key measures:

- Leveraging video to drive broadband development, grow their user base, increasing the ARPU of their

broadband services, and incorporating video as a basic service in core service packages.

- Assigning an influential executive to oversee the video business from end to end, and streamlining organizations and processes from end to end, with video at the core.
- Redesigning networks to provide the best possible video experience.

We've taken a long, hard look at the market, researching the problems and challenges that telcos face in the video sector. Obviously, providing voice services is easy: You build the network and then launch your voice services – you don't need to consider the ecosystem. But video is very different because it involves an extremely complex ecosystem. If telcos want to become successful video players, building networks is simply not enough – they have to win support from the device ecosystem and develop capabilities in platform deployment, content aggregation, video operations, and user experience management.

Five challenges

Findings from our survey reveal that telcos face the following five major challenges when developing their video business:



We will help telcos decide how to position their video business strategically, how to deliver superior services and a premium video experience to consumers, and how to optimize their organization and processes to support video.



- They aren't sure how to position video in their broader service portfolios.
- They haven't found a way to acquire content easily and cost-effectively.
- The upfront investment in video platforms is high.
- They cannot get a clear picture of the video experience they're providing because there is no end-to-end management or control on their networks.
- Device costs are prohibitively high.

If these challenges aren't resolved, telcos cannot grow their video business. This is particularly true for small and medium telcos. Through extensive surveys, analysis, and discussion over the past year, Huawei has recognized that we need to clearly position ourselves if we wish to help telcos grow and succeed in their video business. We've decided that we must position ourselves as an enabler – one that develops video into a basic service provided by telcos and helps them achieve business success in video. Huawei is a global company and, with resources and talent from around the world, we can develop the end-to-end capabilities necessary to enable telcos' business success in video. To that end, we will undertake six strategic initiatives.

Six answers

First, we will build business consulting capabilities for video to enable telcos' video businesses to succeed.

We will build a team of experts with a deep understanding of the entire video industry. This team will keep researching models for developing the video business. It will also deliver strategic and business consulting services that help telcos find the path to video success, and take into account the regulatory environment in the countries in which they operate, their content partners, business environments, and the unique features of the telcos themselves. We will help telcos decide how to position their video business strategically, how to deliver superior services and a premium video experience to consumers, and how to optimize their organization and processes to support video. Our strategic and business consulting services will enable telcos to develop video into their basic service portfolio and achieve business success in video over the long term.

Second, we will develop capabilities in content aggregation to make it easier and less costly for telcos to acquire content and boost the efficiency of video operations.



Huawei – as a partner who provides products, solutions, and services to telcos worldwide – must take the initiative to invest in content aggregation.



For telcos to develop a video business, they must resolve problems around the acquisition of video content. There are more than 1,000 content providers worldwide. If we look at the national level, there are over 600 telcos around the world. For these 600-plus telcos, it's extremely difficult to engage in content partnerships with more than 1,000 different content providers. This is especially true for small and medium telcos. Content providers also find it difficult to deal with so many different telcos. Thus, a gap has opened up in the ecosystem. If this gap isn't closed, it'll be impossible for telcos to push their video business forward, much like the chicken-and-egg dilemma.

Huawei – as a partner who provides products, solutions, and services to telcos worldwide – must take the initiative to invest in content aggregation. We have an edge in providing global consumers with smart devices, integrated devices, and cloud services. With these competitive advantages, we should try to bridge the gap and make content acquisition easier, less costly, and more efficient for telcos.

Third, we will build a cloud-native, convergent video platform to help telcos develop and operate their video business efficiently and open up their video capabilities.

The existing video platforms of all telcos are not yet

really cloud-based. They cannot rapidly respond to customer needs or be fully convergent, which hinders the development of video offerings. We will build a cloud-native, convergent, open video platform. It will support both fixed and mobile access, as well as a variety of video services such as OTT, entertainment, communications, VR, AR, and industry video. Our video platform will enable telcos to rapidly respond to customer needs, boost their operating efficiency, and give consumers a ROADS experience – one that is Real-time, On-demand, All-online, DIY, and Social. Such a platform will also allow telcos to expose their video capabilities to ecosystem partners, driving more open innovation and sustainable business success. But we need to take this one step at a time. In this phase, we will focus on entertainment video and achieve cloudification and fixed-mobile convergence (FMC). The next phase will be the move to industry video.

Fourth, we will increase investment in STB chips and open up middleware to build the ecosystem around STBs and smart TVs.

Huawei has invested for many years in the chips of set-top-boxes (STBs) to make the devices more accessible to telcos. Going forward, we will invest more in STB chips to continuously drive advances in video technology. We will also open up the



Our STB chips support both HD and 4K video, providing a solid foundation for telcos at all stages of investment in video.



middleware on our chips to make it easy for STBs to connect with video platforms. This open approach will foster a more prosperous ecosystem around STBs and smart TVs, and meet the video needs of telcos in their markets. All of our STB chips support both HD and 4K video, providing a solid foundation for telcos at all stages of investment in video.


Fifth, we will build end-to-end networks that position video as a basic service and deliver a premium video experience.

A premium end-to-end video experience requires an end-to-end network to support it. Huawei can meet these requirements by optimizing the entire network architecture to make it video-ready, from home networks and access networks to backbones. In this way, the network will sustain a superior video experience. The key measures we will take include the following: First, we will deploy distributed Wi-Fi networks for seamless Gbps access in the household and ensure products can be plug-and-play. Second, we will provide Gbps access over any media, including twisted pairs, cables, optical fiber, and hybrid networks. Third, we will adopt a flat, convergent video network architecture, and decrease the O&M costs for distributed broadband remote access servers (BRAS) by enabling centralized management. Finally, we will increase investment in network technology

and architecture innovation to better support high-quality video experience and operations.

Sixth, we will develop capabilities in video business planning, design, integration, and experience management.

In addition to building networks with a superior video experience, we will also build a team of experts in planning and design consulting for the video business to provide customers with end-to-end services for platform and network planning, design, integration, and optimization. Our expert team can help telcos optimize and reconstruct their networks in a way that delivers a premium video experience. In addition, we will work with industry partners to create and optimize a video experience evaluation system and ensure that video experience is measurable. We will also establish a video-centric Service Operation Center (SOC) that uses big data and artificial intelligence to visualize, manage, predict, and sustain the end-to-end video experience. Our tools and technologies will enable telcos to manage the user experience in real time and optimize it dynamically.

Through these six initiatives, we aim to help telcos make the most of their video business and achieve business success in video. 



Smarter ways to a Gigaband world



Scan for mobile reading

Ryan Ding believes that Gigaband will continue to develop to become the foundation of the intelligent world.

By Ryan Ding, Huawei Products & Solutions President

Charlemagne founded Frankfurt on the banks of the Rhine River in the 8th century AD. More than 1,200 years have since passed and, today, Europe and the entire world are standing in the midst of a digital flood. We believe that a world is coming where everything will be connected, able to sense, and intelligent. But, before 2020, we need to get another 1.5 billion people online. This will require a huge investment, at least US\$450 billion. We will not succeed in bringing

ultra broadband to the world if we cannot use smart methodologies to help the industry achieve end-to-end commercial success.

The 1.5 billion

In 2015, Huawei defined Gigaband with over 300 industry leaders and experts. But, Gigaband is not just about hitting peak speeds of over 1 Gbps – those speeds must be available to 90 percent of people. But,

global broadband penetration today is just 40 percent. Broadband is not just about speed – it also means the best experience. We look forward to discussing with industry leaders and experts how we can jointly push the Gigaband vision forward.

The intelligent world has arrived

Virtual reality was a trending topic in 2016. An immersive VR experience requires a bandwidth of at least 1 Gbps; but, according to Akamai, the average bandwidth is only 20 Mbps, even in developed countries. This means that our networks aren't yet ready for virtual reality or augmented reality.

Everything is being connected and entire industries are going digital. These trends place much higher demands on our Gigaband networks.

When the scientists at CERN conduct experiments using the Large Hadron Collider, 5 GB of data is generated in just one second. They have to send this data to 170 distributed computing centers scattered across more than 40 countries. Over the past year, we've seen huge progress in Gigaband. According to Viavi, there are now at least 350 gigabit networks globally, 164 under construction, and more than 100 telcos offer Gigabit services.

It's as simple as ABC

In 2009, we unveiled our ABC curve to the industry. We've found that an exponential increase in bandwidth can lead to an exponential growth in costs, but much slower growth in ARPU. The cost and revenue curves diverge. So we developed a series of solutions to resolve this ABC paradox. The ABC curve addresses the fundamental problems of Gigaband, but this is far from enough. We also need to help customers make

their technology a commercial success. As digitization spreads across industries and extends into homes, telcos will have to provide not just pipes, but many other services, like live CCTV. To enable these services, the industry will need a bigger ecosystem of partners, so this year, we're adding a "D" to the ABC curve: D for developer. And we must remember that the ultimate goal of everything we do is to improve user experience. That's not just in our homes or for consumer services, it's key to everything we do.

UBB ARPU consists of several revenue growth units (RGUs). For example, in the consumer market, BT offers IPTV video services in addition to basic broadband services. 4K video means an additional RGU. And other services such as home CCTV, energy management, and healthcare services also represent new RGUs. The industry market is also full of opportunities. China Mobile, for example, offers a series of industry video services tailored to different scenarios such as public security surveillance and construction site surveillance. It has deployed 60,000 cameras, each of which can generate an annual revenue of US\$50. In 2015, China Mobile's video services for industry earned it US\$3 million.

Let's talk bandwidth

We're already in the post-Moore's law era. On the access side, we believe that we'll need synergies between multiple technologies to handle the upcoming surge in data traffic. For example, in Germany, Huawei and Deutsche Telekom jointly developed Hybrid Access, using LTE and DSL to offer speeds of over 100 Mbps. For network platforms, we believe that scalability is the most important factor. GPON is today's standard access technology. But 10G PON has already arrived, and we'll soon see 40G PON. Our future platforms need to be able to support seamless migration to 100G PON. We also need ongoing breakthroughs and innovation in basic technologies to build sustainability into our network and society.



The last mile is the most difficult and expensive part, so the key at the access layer is to use all existing technologies, including copper, fiber, and even wireless, to enable broadband connections to the home.



We're now testing a major new product – a next-generation 300T all-optical cross-connect. With the electronic cross-connects we have today, a 25.6T device uses nearly 20,000 watts of power. If we scaled that up by a factor of a dozen to 300T, it would consume 200,000 watts. This is impossible in our existing equipment rooms. But if we can swap the electronic device for an optical cross-connect (OXC), power consumption will be cut by 99.9 percent. A 25.6T electronic device, consuming 20,000 watts, will be replaced by a 300T device that uses only 200 watts, no more than the power used by two bulbs. We'll begin testing this device before the end of 2016 and we expect to launch it in 2017.

What does it all cost?

Another important factor is cost. The additional 1.5 billion people that we want to get online comprises about 500 million households. A total investment of US\$450 billion means that the cost of delivering broadband to each household is more than US\$900. Now, if we assume that each household generates an ARPU of US\$30, the payback period for that investment will be very long. We need to rethink E2E network deployment to cut costs.

The last mile is the most difficult and expensive part, so the key at the access layer is to use all existing

technologies, including copper, fiber, and even wireless, to enable broadband connections to the home. In rural China, the copper last mile used to be about 5 to 8 kilometers. When China Telecom rolled out its rural microwave transmission networks, it was able to cut the length of the copper last mile down to less than 500 meters. At a stroke, they cut the cost of connecting a household to a tenth of what it used to be, and could offer speeds of 20 to 50 Mbps. At the metro network layer, the key is network simplification. Both Deutsche Telekom's Pan-net and Proximus's SIMBA aim to reduce the number of network layers. In the backbone network, the key is to achieve synergies. Routers cost five times more than transport equipment. If we can achieve IP + optical synergy, we will see a sharp decline in costs. SDN is the technology that will make this possible.

Teaming up

The ecosystem is also very important. Huawei has held two developer congresses and opened up 14 developer ecosystems. Huawei's smart home solution – OpenLife – has been deployed by Telefonica, China Telecom, and China Unicom, and we've brought in more than 200 partners to work with us.

We've exposed our capabilities in connectivity, bandwidth, QoS, and big data to Telefonica Latin America, for example, so that it can deliver safe home

Huawei's ABCDE strategy



Innovate to create more RGUs and basic bandwidth



Achieve multi-technology synergies, apply new tech to make networks scalable, improve resource rescheduling, and better respond to bandwidth needs



Enable access via any media, reduce the layers in MANs, and synergize IP + optical in backbone networks



Create healthy developer ecosystems for shared success across the entire industry



Monetize networks by making user experience the key metric for building, optimizing, and maintaining networks

solutions. We've also helped China Unicom Sichuan deliver safe home solutions, and tailored services for the elderly and childcare.

In 2015, we launched the U-vMOS model to define video experience and have done much work constructing experience-centric networks over the past year. After a year of applying U-vMOS 4.0, China Telecom Zhongshan now provides the best video experience in Guangdong, cutting complaints by 23 percent and increasing video users by 51 percent. Using visualized, preventive O&M, China Mobile Shandong has increased its video experience score from 3.18 to 3.42, and now has 5 million users for its broadband video service. Building on our experience with video, Huawei launched gMOS – a model used to evaluate gaming experience – at HUAWEI Connect 2016. We've been working with industry partners to define quality in the gaming experience and jointly provide a better experience for our end users.

The ABCDE strategy

To sum up, we need to focus on A, B, C, D, and E:

For **ARPU**, video has become a basic telecom service, and telcos today are moving from video to video +. They'll need to keep innovating to create more RGUs in addition to basic


bandwidth and unleash the potential of Gigaband.

For **Bandwidth**, we need to achieve multi-technology synergies and apply new technologies, such as all-optical cross-connects, to make networks more scalable, improve resource rescheduling, and better respond to the ever-increasing demand for bandwidth.

For **Cost**, we need smarter ways to enable access via any media, reduce the number of layers in metro area networks, and achieve IP + optical synergy in backbone networks.

For **Developers**, we will work with telcos to create healthy developer ecosystems for shared success across the entire industry.

For **Experience**, Huawei will help telcos successfully monetize their networks by making user experience the key metric by which we build, optimize, and maintain networks.

As the German philosopher Goethe said, "Knowing is not enough, we must apply; willing is not enough, we must do." Huawei stands ready to work with its industry partners to realize the vision of the Gigaband world. 

‘X’ marks the spot for verticals and mobile



Scan for mobile reading

From 3G to the emergence of 4G LTE and the evolution to 4.5G, the past decade has seen faster, more efficient networks driven by an insatiable demand for constant connectivity.

By Kavitha Majithia

A number of innovative apps have become prominent that, coupled with the rise of the smartphone, have changed how industries and services operate forever.

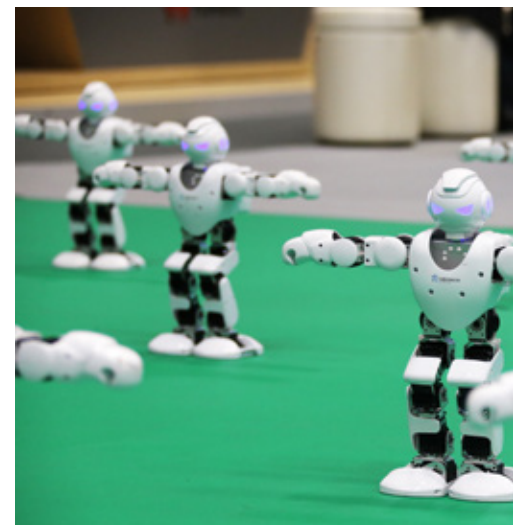
For example, without owning a single car, Uber has established itself as the largest taxi company in the world. Equally, Airbnb has emerged as the largest accommodation provider without holding a single piece of real estate.

Media services, such as Netflix and Spotify, don't sell their customers anything other than a

subscription. Instead, they provide a platform that gives users access to a plethora of rich, streamable content.

And that's all been made possible through the power of faster networks and innovative thinking. In effect, ownership is dying and sharing is on the rise.

As we now move towards 5G and a world that's adapting to new applications and services and interconnected devices through the Internet of Things, new companies and traditional players are ramping



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X Labs is different. This lab is for our customers and partners, because we want to find new business with our partners.

– Shi Yong, head of X Labs project, Huawei

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up efforts to capitalize on the evolution of mobile technology.

At this year’s Global Mobile Broadband Forum in Tokyo, the focus on verticals and cross-industry collaboration was understandably huge.

From dancing robots and high-flying drones to innovative VR games, AR capabilities, and of course, connected cars, players across the ecosystem were keen to showcase how they can tap into new verticals and use mobile connectivity to shape our future world.

X Labs

Huawei currently partners with more than 20 global players to look at how mobile technology can promote various vertical industries. At this year’s event, it launched X Labs. The initiative will comprise three new research labs that will explore various use cases for mobile applications, drive innovation, and promote an open industry ecosystem.

“At Huawei, there are many labs, but X Labs is different,” says Shi Yong, head of the project. “This lab is for our customers and our partners, because we





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Cellular networks are now vital to the payments industry and commerce in general.

– Nandan Mer, Executive Vice President at Mastercard

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want to find new business with our partners.”

Cashing in on connectivity

The drone market, for one, is beginning to gain real traction, both in the consumer and enterprise markets.

Michael Parry, VP of corporate marketing at leading drone manufacturer DJI explained how the company has made the technology easier to use, more affordable, and better performing, “so that more and more people can get up in the air.”

Parry says that wider availability means more people can do new “creative” things with drones and, perhaps more importantly, provide tangible benefits in various industry use scenarios.

“In the last year, we’ve started opening this up to more advanced, longer range communication that includes live streaming,” he says. “So while you’re in the air, you can be streaming to Facebook and show your friends around the world what you’re seeing.”

Parry believes that while this is fun and novel for consumers, it’s a game changer on the industrial side. “A mobile broadcaster could be out of sight in the middle of nowhere, but you can send a signal back to your

headquarters on the other side of the world, and get it up in the air live.”

The sheer reach of mobile is represented by the fact that a vertical player can pretty much mean anything. From DJI to MasterCard’s, all enterprises are looking at how to provide new and simpler solutions through connectivity.

Mastercard’s EVP Nandan Mer asserts that cellular networks are now “vital” to the payments industry and commerce in general.

“Speeds are of extreme importance,” he says. “Consumers come to expect that the data they’re sending over the airwaves will be secure for their benefit, and not shared or compromised as it’s transmitted back and forth to complete commerce transactions.

“In many ways, the mobile industry, the payments industry, buyers, and sellers are connected at the hip.”

Robots on the rise

The market for drones is clearly gaining momentum, but the hype around robots is on the verge of fever pitch.

Whether in industry doing repetitive tasks or assisting

consumers in everyday life, robots are becoming a mainstream technology.

This rise will no doubt be further fueled once 5G comes to market, and one company that's been pushing robots heavily in recent years needs little introduction.

Japanese behemoth SoftBank started by developing robotics solutions for B2B, but is now pushing B2C hard, doing a lot of work on understanding exactly what the consumer wants from a robot.

For the average person, SoftBank believes robots can develop beyond being just a toy and have actual real-life uses.

"At the very beginning, of course, the early adopters of robots will consider them more or less a toy," says Rodolphe Gelin, EVP, chief science officer at SoftBank Robotics. "But in time, we can roll out new services, and people will learn how to use a robot. We'll learn how we can provide the right services that people want from robots."

Gelin believes robots will possess three key capabilities in the future to make them attractive to the average future consumer.

One, the ability to check that everything is safe and secure in the home; two, butler-type services, which would be particularly useful for elderly people; and, three, cognitive and even educational support, for example, teaching languages. "I think that by 2025," predicts Gelin, "every family will want a robot."

Tristan Dai, CTO at gaming firm Noitom, cautions that it's still very early stages for things like VR, AR and robotics, and that use cases need to first be worked out commercially before such technologies reach the consumer. "VR, AR, and robotics are still very, very new," he says. "Everything is growing so fast, but there are a lot of things to do, and at this early stage, a lot can change."

Opportunities for operators

No doubt, connectivity will play a big part in bringing the robot into the mainstream of consumer technology.

IoT, which will see billions of devices interconnected, will be crucial for ensuring that robots and other devices are constantly connected and able to reach their full potential.

This is a big area for Toshiba, another prominent vertical player, which has launched a dedicated solution to develop IoT, providing products and services for different verticals and accumulating data intelligence for customers.

Shigeyoshi Shimotuji, VP of Toshiba Corp & EVP of Toshiba Industrial ICT solutions, believes the growth of IoT varies heavily between the consumer market, where the adoption of new devices could take about a year, and the industrial world, where uptake could take considerably longer.

But for operators, Shimotuji's message was clear. "Collaboration with verticals in IoT lies with the development of Low Power Wide Area (LPWA) networks, which are designed to provide low cost, efficient connectivity for devices."

On the wider IoT opportunity, MasterCard's Mer agreed, stating it's a "trend that we're watching very closely. I think it's early days, but if consumers are willing to trust their devices to make decisions on their behalf, who are we to question their trust?"

So, whether it's financial payments, drones, VR, AR or robots – all of which can be applied to the rapidly growing IoT ecosystem – the opportunity for verticals to tap into mobile technology continues to grow with deeper, faster, and more efficient networks. When 5G is rolled out, the influence on verticals will be huge. [UWM](#)

(Republished from *Mobile World Live Show Daily*)

Industry identifies success factors for 5G



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The insatiable demand for mobile broadband services from consumers and enterprises and the opportunities opened by the Internet of Things has made 5G one of the hottest topics sweeping the ICT industry.

By Steve Costello

As vendors and operators step up testing and move from the lab to the real world, there's an increasing shift towards commercial launches. While a number of question marks over potential timeframes remain – particularly as some players look to get a jump on the market – there's an emerging consensus as to when the technology will start to be more widely deployed.

Yang Chaobin, president of the 5G product line at Huawei, said that pre-commercial networks are likely to appear in the market in 2018, in line with the

emergence of early 5G standards. This means that from this point onward, operators and vendors will be able to push ahead with interoperability testing: "According to this pace, the commercial launch will come in 2019 and 2020," said Yang.

This aligns with comments from Mats Granryd, GSMA director general, who also pointed to late 2019 or early 2020 for the availability of commercial 5G solutions. The industry association is "working with our members and our partners on the strategic, the commercial, and the regulatory development of the 5G ecosystem," he said.



The road forward is not only about new technology; it's also about the new business models and services enabled by network evolution.



Paving the way

While there's much talk of 5G and the potential it offers operators to create new revenue streams, there's also a strong impetus to continue investing in 4G to meet the already growing demand, enable moves into new markets, and provide a solid base for 5G deployment. This will be particularly important in the early days, with initial 5G rollout likely to be limited on a geographical basis, much like earlier mobile network builds. Highlighting the importance of 4G, Fotis Karonis, managing director of IT and Mobile at BT Group, said: "If you don't have that foundation, the coverage, you can't build great 5G on top of that."

Ryan Ding, president of products and solutions at Huawei, agrees: "You don't have to wait until 2020 – you can start now to prepare for 5G, which will be a long journey," he said. "Operators can do a lot of work to be ready, and not just with their base stations." This is because the road forward is not only about new technology; it's also about the new business models and services enabled by network evolution.

NB-IoT, for example, will enable operators to look at the business models to support IoT applications, and start building the links with vertical markets that will be essential to drive growth in the 5G era.

4.5G networks will enable operators to work in areas such as high-resolution video, augmented reality, and virtual reality so they can push ahead with enhanced mobile broadband services, which will be the center point of future consumer 5G propositions. Juan Carlos Garcia, Wireless CTO at Telefonica, commented: "Even before the 5G standard is available, [operators] will have to test and try and develop and introduce new services in preparation for 5G. And in the case of business models, I think there'll be changes in terms of partnering with other industry players, and educating other sectors that may benefit from the new possibilities of hyper connectivity and very high bitrates."

Harmonizing global spectrum and unifying standards

According to Satoshi Nagata, 3GPP RAN1 chairman, the 3GPP standardization process for 5G will take place in two key phases, with Release-15, scheduled for September 2018, focusing on the "more urgent subset of the commercial needs" – prioritizing what operators need most.

This will be followed in March 2020 by Release-16, which will address the full range of identified use cases and requirements. Nagata also said that the design of a new radio interface should be forward



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Even before the 5G standard is available, [operators] will have to test and develop new services in preparation for 5G.

– Juan Carlos Garcia, Wireless CTO at Telefonica

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compatible, so features introduced at a later date can be added in an “optimal way.” What is particularly important, claims Huawei’s wireless CTO Wen Tong, is that the standardization process needs input from the whole ecosystem to deliver the best results: “It’s not a single company effort. It’s not a few-company effort. The entire ecosystem has to agree and reach a consensus to build these standards.”

Arriving hand-in-hand with technology developments is the need for new spectrum. And this issue is also not without its challenges.

Federico Boccardi, principal technology adviser at UK regulator Ofcom, noted that at this stage, “There isn’t much clarity about 5G services, so it’s not very easy to understand the bands we need to provide.” He did share his insights into the way spectrum allocation needs to develop in order to enable 5G to meet its full potential. “We need a diverse set of bands ranging from very low frequencies to very high frequencies to benefit everyone,” he said, noting that the provision of low-bands for good coverage is crucial. “We want 5G to lower the digital divide, not increase it.” This echoed comments from Arnaud Vamparys, SVP of radio

networks at Orange, who said, “We have a growing demand, an expectation, from our customers around coverage. They want really high-quality services at home, in transportation, in rural areas, so with LTE today and 5G tomorrow, we really have to achieve that.”

Ofcom’s Boccardi added that at the other end of the spectrum, there should be at least one global band to support millimeter wave technologies. “That’s very important to increase adoption,” he said.

Opening new markets

A key success factor for 5G will be its ability to create new revenue opportunities for operators. While services such as IoT and enhanced mobile broadband will become more popular in the 4.5G environment, this will need to pick up pace as technology moves on. Craig Ehrlich, chairman of the Global TD-LTE Initiative, advised: “The transition to 5G only makes sense if we’re able to create new markets. We need to find a way for our industry, for operators, to have a bigger piece of the pie.”

While some sectors, such as automotive and

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If you don't have that [4G] foundation, the coverage, you can't build great 5G on top of that.

– Fotis Karonis, managing director of IT and Mobile at BT Group

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healthcare, are keen to adopt mobile connectivity, other verticals haven't been as fast to move. And these present an important opportunity for operators to increase their revenue potential. BT's Karonis commented: "We need more industries, because it's important to increase the revenue pie. We can't just be in an asset investment cycle without getting the appropriate connections with industries so we can grow our revenue as telecommunications operators."

But a keen focus on business models will also be an important factor for 5G. "We have to move fast at this stage, and yes collaborate, but we have to understand that there are so many people who want to take our [operators'] business model away from us," warned GTI's Ehrlich.

Carving out 5G household access scenarios

While applications that make use of the mobile and wireless capabilities of 5G are obviously a core focus area, there's another area where 5G could carve out a lucrative position: the home.

"Providing 5G household access is one of the most important 5G scenarios," claimed Huawei's Yang Chaobin. In developed markets, this means the technology will be used to extend fiber networks to the home, addressing challenges with providing last-mile connectivity, particularly in areas with a dispersed population. Resource-sharing with 5G mobile broadband deployment will also cut costs for operators and reduce the cost of services for consumers.

In emerging markets, 5G will be able to provide access to stable and reliable mobile broadband services where cost factors and network deployment challenges have limited the uptake of alternative technologies. "In many regions of the world, fiber to the home is too expensive," the Huawei executive said.

Orange's Vamparys said there is an opportunity for 5G "as an extension to our fiber network in some rural and suburban areas." Ibrahim Gedeon, CTO of Canadian operator TELUS, agreed: "When you talk about connecting people in the home, that's critical, as well as a valid business case." [Ustream](#)

(Republished from *Mobile World Live Show Daily*)

4.5G is tomorrow's tech today

Many innovative new mobile services won't depend on 5G



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5G will transform the mobile industry, the world economy, and life for all. But that won't happen in the short-to-medium term: realizing the full potential of 5G will require both a new radio interface and new spectrum.

By Steve Costello

Mobile operators' commercial 4G networks are evolving in new and exciting directions. Operators can now upgrade their existing 4G infrastructure to 4.5G, which can support a wide range of innovative new services for both consumers and businesses, such as ultra-HD entertainment and ultra dense sensor networks. In fact, 4.5G infrastructure, which will co-exist with the 5G networks arriving in 2020, is likely to play a major role in the wireless ecosystem for the next decade and beyond.

While 5G will use a radio interface based on new orthogonal frequency division multiplexing (OFDM), 4.5G harnesses a clutch of advanced technologies for enhancing performance that can be achieved with the existing LTE radio interface. Over the next four years, 4.5G will foster new services, user behaviors, business models, and industry value chains, paving the way for 5G and attuning the market to the potential of wireless to transform everything from consumer entertainment to heavy industry.

First unveiled by Huawei in October 2014, 4.5G has since been standardized by 3GPP as LTE-Advanced Pro. Over the past two years, 4.5G technologies have progressed rapidly to the point where leading operators, such as Vodafone, Telefónica, Deutsche

Telekom and China Mobile, are now building commercial 4.5G networks. Huawei estimates there will be more than 60 4.5G commercial networks up and running by the end of 2016. By contrast, the first pilot 5G networks are likely to appear from 2018 onwards, ahead of commercial deployment from 2020 onwards.

Over time, 4.5G and 5G networks will become increasingly interwoven into a broader wireless ecosystem and standardization process. Release 14 of the 3GPP standards is due in 2017, and will incorporate both 4.5G and 5G technologies.

What will 4.5G do for operators and their customers?

The deployment of 4.5G technologies promises to boost the effectiveness and efficiency of today's 4G networks. That will enable operators to both maximize ROI on existing infrastructure and prepare for 5G.

First, a combination of 4.5G technologies can boost network capacity sixfold, enabling mobile broadband speeds of up to 1 Gbps. For most operators, that will represent an eightfold increase in peak data rate, and a tenfold increase in throughput speeds at the cell edge. This radical improvement in network performance will help



4.5G technologies will help operators roll out Internet of Things solutions designed for specific sectors like manufacturing, utilities, agriculture, and public safety.



mobile operators accommodate the ongoing rise in traffic and support compelling, but demanding, services. Huawei sees 4.5G as delivering Experience 4.0. For example, operators will be able to offer HD voice services with MP3 music level quality, while delivering ultra-HD (2K/4K) video, giving consumers a highly immersive experience. At the same time, 4.5G networks will support virtual reality, augmented reality and advanced online games, as well as enable the remote control of drones and robots.

Secondly, 4.5G technologies will help operators roll out Internet of Things solutions designed for specific sectors like manufacturing, utilities, agriculture, and public safety. New low power wide area technologies will enable operators to bring much higher levels of connectivity to a wide range of vertical industries. For example, NB-IoT (Narrowband Internet of Things) technology can enable connected devices to have a decade-long battery life, while extending coverage deep inside buildings, below ground, and across rural areas. It's now practical to connect energy meters, irrigation systems, and sensors in previously inaccessible locations, enabling companies to remotely monitor a wide range of assets. At the same time, operators will be able to use LTE-based broadband trunked (LiTRA) systems to provide reliable connectivity for emergency services such as the fire brigade, the police, and ambulance services. Moreover, 4.5G networks have the capacity and throughput to bring broadband to offices, factories, farms, and other workplaces that aren't connected to high-speed fixed lines.

How mature is the 4.5G ecosystem?

Many of the key 4.5G technologies were standardized in release 13 of the 3GPP standards, which were completed in March 2016. Chipset and terminal manufacturers are now building 4.5G technologies, such as multi-antenna (MIMO) technology, multi carrier aggregation, and 256QAM (quadrature amplitude modulation) technology, into their products. Both Qualcomm's Snapdragon 820 and Huawei's HiSilicon Kirin 950 chipsets, unveiled at the end of 2015, and three channel (3CC) carrier aggregation are likely to become a standard configuration in mid-range and high-end smart phones in 2016, enabling end-users to benefit from the deployment of 4.5G technologies in mobile networks.

NB-IoT is also maturing fast. In November 2015, a group of operators and vendors formed the NB-IoT Forum to steer the development of the technology. Following the acquisition of UK-based NB-IoT specialist Neul, Huawei launched a pre-standard NB-IoT chipset in 2015 to enable operators to implement network trials, which will be followed by a standard commercial chipset before the end of 2016.

Huawei has worked with dozens of leading operators to deploy 4.5G pre-commercial networks. In the first half of 2016, operators in various countries, including Norway, Germany, Kuwait, Saudi Arabia, UAE,

China, Hong Kong, Japan, Canada, and Singapore, demonstrated 4.5G networks achieving peak data rates of more than 1 Gbps. Moreover, operators in the UK and South Korea have started to build national LiTRA broadband trunked radio networks to support public safety services. Now that 4.5G technologies have been standardized, large-scale commercial networks are set to go live throughout 2017 and 2018.

What is distinctive about Huawei's approach to 4.5G?

Huawei has developed end-to-end solutions to support each of the key business benefits that will be delivered by 4.5G – gigabit throughput, Experience 4.0 services, and advanced Internet of Things solutions. Huawei's portfolio includes 4T4R MIMO multi-antenna technology, 4CC/5CC (four and five channel) carrier aggregation, 256QAM high-order modulation, better voice and video coverage, VMOS video evaluation, NB-IoT, and GigaRadio solutions.

Having conceived 4.5G, Huawei has a head start over its competitors, offering a more mature portfolio. Huawei was the first vendor to promote 2CC and 3CC carrier aggregation, and the unique IPRAN-based Inter-site carrier-aggregation solution. Huawei was also the first to test and demonstrate 4CC and 5CC carrier aggregation. Huawei's integrated 4T4R blade RF module and active antenna have been tested in Canada, Mexico, Saudi Arabia and Turkey.

At Mobile World Congress 2016, Huawei announced its GigaRadio solution, which supports gigabit peak speeds for individual users, gigabit throughput on a single module, single site x-gigabit capability, and a seamless indoor gigabit experience. Huawei estimates its GigaRadio solution is more than a year ahead of the industry in terms of capabilities, and will help drive technological innovation, compelling user experiences, and greater commercial success for operators.

During the Huawei Global Analyst Summit 2016, Huawei announced its CloudRAN solution. Leveraging cloud-based hardware and software, CloudRAN gives operators much greater flexibility by virtualizing network functions, moving resources to the cloud, and employing systematic cloud capabilities. Moreover, CloudRAN architecture is fully flexible, from topology to resource distribution. It supports 4G, 4.5G, 5G, and Wi-Fi for coordinating multiple technologies and multi-cells, so functions can be deployed on-demand in real time and non-real time, and enables network slicing – the provision of dedicated connectivity for specific applications. CloudRAN enables operators to employ flexible and efficient cloud architecture on 4G and 4.5G networks, so operators can directly and easily integrate 5G air interfaces into their existing networks.

Huawei's own network, device, and chipset operations give it an E2E perspective that allows it to work with a wide range of partners to address obstacles to 4.5G commercialization.

Huawei continues to co-operate closely with industry partners on the development of both 4.5G and 5G for consumer and business applications. For example, to accelerate the deployment of NB-IoT, Huawei is working with specialists in verticals, as well as operators, infrastructure vendors, chipset vendors, and module providers.

In summary, 4.5G is robust and ready to deliver many of tomorrow's mobile technologies today, opening up new opportunities for mobile operators. If they harness 4.5G sooner rather than later, mobile operators can meet existing customers' burgeoning demand for mobile connectivity and expand into new markets. But 4.5G is not a short-term fix: even after the 5G era begins in earnest in 2020, operators and their customers will rely on 4.5G for many years to come. [www.huawei.com](#)

(Republished from *Mobile World Live Show Daily*)

Back to basics with video



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Video has become a central strategy for operators, with content and experience equaling networks in importance. LG Uplus and Sichuan Telecom are two examples showing that positioning video as a basic service can provide strong growth opportunities for operators.

By Mi Xueping

A confluence of conditions

The evolution of the telecoms industry since the 1990s has followed an S-shaped curve, moving from landlines to feature phones, and then with the advent of 3G and Apple's first iPhone in 2007, to smartphones. In around 2010, mobile communications entered a period of maturity as 3G gathered in momentum and uptake, and smartphones became more pervasive. At that time, data consumption began to rise and IPTV increased in popularity. In 2015, 4G came on the scene and data consumption quickly hit the mainstream, a position which it continues to consolidate today.

And today, video is without doubt the most powerful driver of traffic growth. One reason is that it's constantly expanding into new areas. Initially popular as film and TV for entertainment and applications like Skype and FaceTime for communications, video is now gradually penetrating the commercial and enterprise domain, finding a footing in new areas such as e-learning and telemedicine.

Another reason is that new generations of

technology and equipment have changed consumer behaviors. In the past, people mainly watched video passively as movies and TV shows on large screens in fixed venues – at home or in movie theaters. Today, most people own several different-sized screens. They not only watch video, they're also producing their own, a fact that's changing how consumers are defined. "There's no such thing as a simple consumer anymore," states John Quinn, Group CTO of Digicel Play. "At the same time as consuming content, people are also constantly creating content. So, we've all become 'pro consumers.' "

These factors are driving a boom in the video industry: Ovum predicts that video services will account for over 80 percent of traffic on telecom pipes by 2020.

From VAS to basic

Surveys show that 70 percent of the top 100 operators around the world now offer video services, with half of the top 50 no longer positioning it as a VAS: "China Unicom already regards video as a basic service," says Dong Dawu, China Unicom's managing director of the operator's

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By bundling video and LTE services, LG Uplus shook up the South Korean telecom market, increasing its market share from 17 percent to 21 percent.

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TV VAS Operations Center. Dong not only believes that more users and a better experience will make video a source of service growth, but can in fact “serve as a catalyst for network transformation for operators.”

LG Uplus: Outpacing the competition with video

The South Korean telco LG Uplus is an example of how operators can use video to boost their market position. In the extremely competitive South Korean communications market, LG Uplus was stuck with the third largest market share for quite some time. According to LG Uplus’ former CEO Lee Sang-chul, “We needed a new breakthrough to change up the market. We realized that video was the answer.... At the time, no one was providing a good video service. So, we decided to ‘do video well’. Five years later, we know that was the right decision.”

By bundling video and LTE services, LG Uplus shook up the South Korean telecom market, increasing its market share from 17 percent to 21 percent, and boosting ARPU from US\$25 to US\$36. “We didn’t do video because we already had LTE. We deployed LTE because we wanted to do video services,” says Lee. “So, when we rolled LTE out commercially, we

also developed video services. We developed HDTV, built a large cloudified system for video services, and developed U+Box. We also brought video call services to market at the same time as rolling out LTE.”

Lee is confident that video services will bring more users and higher ARPU, and thus better returns.

Sichuan Telecom: Multiple paths

Sichuan Telecom took another path with its 012 strategy, setting different tariff packages for bundled broadband, IPTV, landline, and mobile offerings. At the same time, it positioned video as its top strategic priority, making it a basic service and using it as the basis for transforming its organizational structure.

In June 2013, Sichuan Telecom’s IPTV subscribers hit the 1 million mark. Then, after implementing its 012 and video strategies, the carrier entered a period of rapid subscriber growth. By June 2015, its subscriber base had swelled to 6 million, increasing by 330,000 a month. By the first half of 2016, the figure had jumped to 9 million. Its video strategy massively expanded its share of mobile subscribers, increasing its market share by 7.3 percent in just three years.



New content is being produced every day in different ways and forms – OTT content, user-generated content (UGC). It's not easy to keep up...As operators, we have to make tough choices when it comes to content.



Content and experience turn the key

The opportunities offered by video services are tempered by their complexity. In addition to network capabilities, operators must consider many other factors, especially content and experience.


Content: According to Digicel's Quinn, "New content is being produced every day in different ways and forms – OTT content, user-generated content (UGC). It's not easy to keep up...As operators, we have to make tough choices when it comes to content." At the Ultra Broadband Forum in Frankfurt in September 2016, attendees voted on "which video service will contribute most to overall service growth." The top choice was premium video, which includes SVoD, TVoD, and premium linear TV. Second was UGC. B2B video services like security and third-party video applications came in third, and fourth was video communications such as mobile calls, home video, and remote video.

Producing video content requires many different players plus complex upstream and downstream relationships. For example, are operators' relationships with OTT providers competitive, collaborative, or both? Should they produce their

own content or work with other players? There are no standard answers. The choice should be made based on the operator's unique circumstances and market environment.

Experience: User experience is a key driver of growth. Research shows that users will switch off a video if there's a two-second delay in loading. For every second that a video is loading or frozen, the viewer churn rate increases by 6 percent, and 35.2 percent will switch off if a video freezes. Channel switching time of more than 1 second can lead to user complaints, while less than 0.6 seconds will deliver an immersive viewing experience.

Alongside positioning video as a basic service, operators need a set of systematic cross-screen, cross-network, and cross-service evaluation criteria to measure video experience by monitoring parameters such as latency under a unified evaluation standard, so operators know what to improve.

Equally, content and experience are crucial for developing video services; however, operators need to devise strategies that suit their unique circumstances. They can then reap the rewards that video promises. 

Getting down to business with APIs: It's not all about the tech



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API-based digital transformation is a powerful engine that can help communication service providers (CSPs) drive the digital economy that's coalescing from rapid technological disruption. But, it's not just a question of getting the tech right. Business strategies need to be placed front and center with IT strategies built-in as business drivers, not bolted on as a support tool.

By Mohammad Alakhras



The answer is in the data

H eavy investment in IT is great, but it misses the target if CSPs aren't capitalizing on their vast data assets. Rather than deploying technology conventionally – on time, to plan, and within budget – IT projects should instead look at how people create and use information, how CSPs can change the way people use technology, and which tech to choose and why.

Most importantly, IT and business strategies should be joined in a way that makes IT the driver of change, not just a support system for business.

Most CSPs are formulating IT strategies to digitize their business and enable collaborative and cross-channel engagement with customers, suppliers, and employees. Social media is a key feature here, with B2C habits continuing to enter the B2B domain, as suppliers and partners seek to engage digitally.

Openness and accessibility is also a big part of the digital shift. For example, CSPs need to integrate procurement into supplier relationships to reduce manual processes, better track invoices, and develop portals to manage inventory in real time through collaborative forecasting. In a way that may threaten conventional thinkers, this type of collaboration includes controlled access to various internal information systems, possible temporary access to the workforce and IT assets of partner enterprises, and perhaps crowd sourcing.

Selective access to required systems and services would then help forge a more open ecosystem. But, those at the top need to have an IT mindset for it to happen.

The will of the C-suite

When business executives are keen to push the digital agenda and work harmoniously with IT teams, transformation is more fluid and the creation of digital units smoother. Conversely, companies where the IT and business relationship is patchy tend to be hamstrung by complex IT architectures, poorly integrated data, and fewer tech-enabled processes. In the paper *Driving Innovation and Agility* through an API Strategy, Accenture mentions that slow change is in part because digital opportunities are slow to reach and be accepted by senior management.

If CXOs have the will, then APIs can come into play. By exposing data, business processes, and other services with APIs, organizations can create compelling new business platforms that support internal and external users and partners. Flexible APIs can create major channels into CSPs' business domains that can be driven from anywhere. They can provide mobile, web, and other client interfaces as a flexible layer on top of APIs so customers can integrate directly into core systems. Ecosystems can then emerge that repurpose, resell, and re-bundle partner assets to reach new audiences that an

organization could never reach alone.

Tenacity and time

Transformation can be a long and painful process that can take years, even decades. Simply investing in technology alone is insufficient and doesn't tend to play out well, while uncertainty about their future role causes many employees to resist change.

Digital strategy and governance, including API initiatives, need to be part of a coherent company strategy that meets business needs and is free from conflicting objectives between departments. It must also consider the skills needed by the company's workforce and the technical maturity required to integrate processes with customers, suppliers, and partners. CSPs can then choose the capacity and extent of digitization and coordinate its implementation.

API-based digital transformation

Transformation based on APIs is an overarching process in which technology creates opportunities by underpinning certain business drivers. Pursuing these opportunities causes both incremental and radical changes in existing business models and creates new ones, ranging from new internal processes to cross-industry collaboration.

As part of the API-based digital transformation process, certain questions need to be asked: What are the business drivers? What will the new business models look like? What are the challenges and limits? How can CSPs monetize network assets with telecom APIs?

Mobile and cloud are major tools for API-based digital transformation. They can respond to different user segments with the right applications, cutting

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Large successful CSPs often find it hard to have a common view of customers or products because of internal silos that have their own systems, data definitions, and business processes.

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innovation costs and increasing the convenience for developers, partners, and internal and external users to access enterprise assets on an API platform.

By allowing others to build applications that integrate their own captive data and processes, enterprises will see new applications using their services in new and previously unforeseen contexts. However, large successful CSPs often find it hard to have a common view of customers or products because of internal silos that have their own systems, data definitions, and business processes.

An advanced approach to customer engagement or process optimization cannot occur without a common view. Web-based companies are better able to gain an advantage through analytics and personalization compared with traditional businesses that just use unified data and processes.

The challenges

The major bottlenecks are disparate IT and business strategies, a restrictive culture and mindset, and an ad hoc API set that sits apart from a coherent digital strategy. Others include not defining which APIs serve near or non-core businesses, miscorrelating APIs with revenues and profits, and a lack of critical mass that leads to fragmented, non-standard APIs.

Many CSPs don't capitalize on IT investment because they find it hard to adjust their approach and their IT functions aren't set up to accommodate new ideas. Moreover, communication with sales and marketing departments tends to be patchy.

To counter this, CIOs need to know what drives business, how business processes work, and how this fits in with IT. Huawei Rotating CEO Eric Xu believes that, "The value and positioning of CIOs should be redefined... CIOs should become CI³Os, with the I³ representing innovation, interconnection, and information." The right innovations could then help integrate IT and business, and enable cross-functional strategies.

More than tech

API strategies embody an architectural approach that can execute software-driven strategies where interfaces are regarded as self-service, one-to-many, and reusable. However, a big difference exists between an ad hoc set of APIs and a carefully curated and managed set. The latter needs to fully embrace the stages of strategy, governance, design, build and operation.

Any digital shift must balance existing assets, processes, systems, and operations. Service Oriented Architecture (SOA) is the best option for underpinning

the reusability of API systems. However, since SOA itself is actually built upon legacy systems, problems include:

SOA services are dependable and stable, but slow to change.

SOA services focus inwards and promote reusability, making them coarse grained and complex.

SOA service outputs are standardized, but they can't be modified quickly and they're open to interpretation.

SOA services cannot keep pace with innovations and short iterations in app development.

The remedy

To generate profits, CSPs need to identify which APIs can add value by enabling new applications and services. They can expose these to the developer community, bundle them into different business models, and offer them at the right price.

For example, third-party companies can develop applications and services for smart phones and tablets that enrich their products by tapping into CSPs' network APIs. Providing richer and more convenient apps for consumers drives revenues first for the third-party and then for the CSP.

AT&T, for example, successfully runs an API platform that lets app developers, software vendors, and XaaS service providers do things like create VAS, embed APIs into software and native systems to provide a customized experience, and build services on the AT&T platform. Telefonica launched its API platform BlueVia through its digital division, attracting its first carrier partner – Telenor – back in 2012. BlueVia is open for developers to incorporate different carrier-based

actions like messaging and billing into mobile apps. Both initiatives seem to enjoy a degree of success, though it's not fully clear how developer outreach and media attention correlate with revenue and profits.

Standardization has its flaws

CSPs are drawn towards standardized APIs because the cost of proprietary APIs is too high. This isn't necessarily a bad thing: If GSMA's 800 or so carrier members developed their own APIs, for example, total fragmentation would occur. That said, standardization is slow, so what's available doesn't generally represent the newest, most innovative ideas because the tendency is to go for the lowest common denominator.

Unfortunately, cross-operator, cross-border common API exposure requires agreement on syntax and the semantics of programming interfaces, as well as a support infrastructure that needs to be defined, implemented, deployed, and operated. CSPs would also require their own platforms, which would be a complex, investment-heavy undertaking. They would, of course, also need to take cyber security very seriously.

The bottom line

For CSPs, succeeding at API-based digital transformation depends more on organizational, cultural, and behavioral factors than it does technical issues. Technological reductionism doesn't work because even the best tech choices aren't necessarily a silver bullet against business challenges. Business modeling prior to implementing APIs ensure that an API initiative is a business strategy rather than a tech one, with clear business results set.

API implementation is thus best performed as a long-term, continuous, and iterative process with incremental steps and a coherent IT-driven business strategy. [www](#)

Airtel

A lot to learn, a lot to gain



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The world's third largest telco, Bharti Airtel, has started digitizing its operations in the regions where it's active: Asia and Africa. In some ways, the company is walking a different path than others by making it changes strategic and focused. The company's global CIO Harmeem Mehta took us along on this journey.

By Mi Xueping





Making the right plays

Historically, the tech-driven telecom industry has evolved faster than other verticals, with telcos transforming services every few years to move quickly up the ladder from 2G to 3G to 4G, and now to 4.5G and 5G pilots.

However, in what's touted as the fourth industry revolution, consumers have emerged as the main drivers of digital transformation. According to Mehta, "Their lives are getting far more digital, and they expect service providers to keep pace." That's why the telecom industry has tuned in to customer experience – a consistent E2E experience is the best way for a telco to differentiate itself.

Airtel has divided itself into different tracks based on themes of the customer journey, like awareness, consideration, purchase, retention, and advocacy. "In our digitization

strategy, Airtel is dividing itself based on these themes," explains Mehta, "So we're led by the customer journey and consumer behavior, not our historical behavior like organizational structure or business segments."

Designed and deployed in-house, Decision Tree works for customers by setting call center agents on the quickest path to resolving customer issues, which is complemented by a field app that automatically processes customer requests for SIM delivery at home or for new connections.

On the flip side of its customer facing strategies, Airtel has bypassed making sweeping internal changes, "We don't need to. What we've done is to take key people out of each vertical who head each theme and bring them together to do the digitization for us," says Mehta. In this regard, Airtel is picking the right people for the job across its operational chain, maximizing changes while minimizing organizational disruption.

“Airtel knows that its African and Asian customers are different...[They are] not only mobile first, but are becoming mobile only economies, particularly Africa.”

Lessons from Africa

Airtel knows that its African and Asian customers are different, which Mehta believes opens up a new way for telcos to “disrupt a lot of things in this world.” She feels these continents as not only mobile first, but are becoming mobile only economies, particularly Africa.

African consumers are clearly on the ball digitally. In Nigeria, for example, 65 percent of the population is below 24, so the nation has come of age in a digital world. This fact is reflected in the nation’s tremendous social media use, which accounts for 78 percent of all its Internet use, according to Pew Research.


Africa is also the fastest adopter of mobile money in the world. A joint survey by the Gates Foundation, the World Bank, and Gallup World Poll shows that 15 of the top 20 mobile money using nations can be found in Africa.

To Mehta this means there’s a “tremendous amount to learn.” When Airtel was granted the payment bank license by the Indian government in 2015, “the margins for mobile money were very low,” she says. “[But], it’s a mass business where the mark of success is

to keep the money circulating.” She believes that’s why the model needs extensive penetration and adoption before it can really become successful, and “that’s where India can learn from Africa.”

Fixing the engine while the car’s still running

The tech needs to keep up with changing consumer expectations by giving a better customer experience, which in large part means simplifying it. But the journey’s not easy. When telcos transform their networks and IT architecture, they need to keep applications running smoothly. “NFV is a little harder than everything else, because when you’re transforming the network, it’s like you’re fixing the engine of a car while it’s still running,” concedes Mehta. “But those are the kind of the problems that engineers love. They thrive on them. They’re having a ball.”

The marketing buzz in every vertical is around customers; but, Airtel shows us there’s more to it than that. It’s about making the right changes internally, it’s about learning from the right plays externally, and it’s about knowing who you’re transforming to serve. 

Roiland

drives IoV with cloud



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Dalian Roiland Technology is a leading solutions provider for Chinese Internet of Vehicles (IoV) and smart vehicles. The company first started constructing an IoV cloud platform eight years ago, since which time it's morphed into one of the China's leading IoV cloud platforms with over 2,000 physical servers.



“Growth in the IoV industry has followed a terraced model, with a long fallow period of waiting and knowledge gains followed by an industry-wide surge upwards.”

A wide brief

Roiland provides cloud applications, such as car sharing, vehicle control, and smart driving technology on mobile Internet for a number of services. These include new and used auto sales, vehicle repairs and maintenance, insurance, and transportation services.

Growth in the IoV industry has followed a terraced model, with a long fallow period of waiting and knowledge gains followed by an industry-wide surge upwards. When the last surge occurred, Roiland was unable to rapidly expand its IoV services to keep up with demand with the IoV cloud platform it had built in-house. In mid-2015, Roiland started to look at third-party public clouds, but finding one suitable for IoV services wasn't easy.

IoV has extreme demands

IoV levies very particular demands on cloud that not all can fulfill. Describing the extreme requirements of IoV, Roiland CEO Tian Yunong explains that: “You have Internet clouds, IoT clouds, and ubiquitous network clouds that are Internet plus IoT. Roiland's

IoV cloud is a ubiquitous network cloud, which is the next generation of intelligent IoV cloud platforms.” He believes that it's also the most complex type of cloud application, because it involves people-to-things and things-to-things connections, as well as direct people-to-people connections. “As a result, it involves interaction between people, vehicles, and sensors,” says Tian.

He describes the requirements of IoV, as “extreme,” but what exactly does this mean?

Tian pinpoints five main features:

Always connected: Roiland's IoV application is a remote-control feedback system that comprises onboard equipment, a cloud platform, and an app. As it involves the safety of vehicles and people, a clear channel of communication between each of these features must be maintained so vehicles can always receive control commands and upload data to the cloud control platform.

Mobile: Traveling at very high speeds can cause delays and interruptions in communication. However, IoV must support connectivity requirements in scenarios of up to 150 kph.



Real time: IoV must capture the data of all collisions involving moving vehicles. As physics holds that a collision takes 20 milliseconds, data collection has to be completed within 10 milliseconds and then transmitted within another 10.

Handling massive amounts of data:

With every component in an intelligent car constantly generating data about its operating status, a single vehicle can produce up to 1 GB of data per second. So, the IoV cloud would need to receive the same amount of data in the same timeframe to fully understand the real-time status of a single cloud-controlled vehicle. For an IoV cloud platform, vehicles are like its customers, with each producing data equivalent to at least 10,000 Tencent or Alibaba users. Current communications tech cannot fully support such a large data upload, as a cloud platform would need to support access capabilities for at least 100 Mbps per device.

Security: In IoT, security involves personal possessions and privacy; with IoV it can be a matter of life and death. IoV must be impenetrable.

Huawei Enterprise Cloud (HEC)

In July 2016, Huawei and Roiland signed a strategic agreement to develop a next-gen IoV solution and cloud platform. The project, which would also advance the driverless tech and smart vehicle ecosystem, involved connecting Roiland's IoV cloud platform to HEC to achieve dual-active backup.

How did Huawei meet the rigorous demands of extreme IoV applications? Huawei's highly flexible and low-latency enterprise-grade Infrastructure as a Service (IaaS) applies its industry-leading FusionSphere cloud operating system, OceanStor enterprise-class storage, FusionServer servers, and software-defined networking and security. It gives Huawei the E2E capability to support enterprise-grade cloud services and user migration to hybrid cloud.

On the service side, HEC stays customer centric. It provides reliable cloud services for industry customers through unique three-level network nodes that cover China's seven regions and integrate highly available cloud resources.

“Our common background allowed us to come together with Huawei. IoV is a typical ICT application, which meshes precisely with Huawei’s expertise,” states Tian, when talking about Huawei’s superior understanding of IoV application scenarios and related technologies compared with other vendors. “And Huawei was able to provide a complete solution comprising chips, devices, and a platform; for example, SDN, unified IoT gateways, and an open IoT device platform.”

HEC focuses on enterprise-level cloud infrastructure services based on open collaboration, integration and, also in Huawei’s favor according to Tian, its strict commitment to network security and maximizing gains for the customer – Huawei doesn’t monetize customer data.

High-speed complexity

As Tian points out, Roiland’s IoV cloud platform is different to other clouds. In an IoV cloud, fast-moving scenarios create frequent base station jumps; for example, a vehicle moving at 100 kph switches to a new base station every three seconds. Other clouds are unable or haven’t been designed to support this kind of high-speed mobile scenario. The global service capabilities offered by the HEC and Huawei’s quick response times were perfect ingredients for IoV cloud service provision that could give Roiland a powerful boost in the IoV arena. “Huawei’s research capabilities and adaptability were also particularly strong,” says Tian. “Huawei was able to get on board very quickly after learning about our particular scenario.”

He admits that at first the project met with some difficulties when integrating Roiland’s IoV platform and HEC. Huawei’s cloud, for example, initially mistook Roiland’s IoV upload feature for

second-level data as a DDoS attack, although the feature was an “extreme” yet normal service type. However, Huawei quickly adapted to the scenario, reconstructing the solution and producing new iterations of the platform architecture. Over more than one year of collaboration, Tian has been most impressed by Huawei’s “combat-level response.” HEC’s performance, security, and services have combined to solve all the issues Roiland faced, and no problems have occurred that needed escalating to the vendor’s 800 call center.

Roiland’s IoV cloud platform provides a number of services for downstream customers, including professional IoV cloud services like PaaS and SaaS for IoV enterprises; pre-installation and smart IoV solutions for auto manufacturers; RCTS, UBI, RDM, and RLAS for auto finance and insurance companies; post-installation smart IoV solutions for car sales and service companies; and intelligent urban transportation solutions based on next-gen smart IoV.

Roiland is now mapping out a next-gen smart IoV cloud platform. In collaboration with Huawei, the company hopes to form an industry alliance with upstream and downstream partners to promote the construction and development of the next-gen IoV and a cloud industry ecosystem. Tian outlined a number of expectations for next-gen smart IoV, including a standards system, driverless technology, broader global customer service capabilities, and an ecosystem alliance.

With car exports growing in China – the world’s largest car producer – Roiland hopes to provide IoV services globally in a more efficient way, using Huawei’s global technical service capabilities and cloud data center resources. [www](#)



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Exploring the future of mobile



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Huawei has a clear view on the future of mobile communications and how we're going to get there. If I were to use a sentence to sum up the current state of play, I'd say, "We're living in a wild world of mobile apps."

By Ken Hu, Huawei Rotating CEO

New applications are emerging every day that are reshaping the world, and the number of mobile apps is increasing very quickly. When App Store first opened eight years ago, it only had 500 apps. The number reached 1 million in six years and then doubled in another two. So today we have more than 1 million apps in App Store and more than 5 million apps in

Android stores. This is truly explosive growth.

Mobile applications are helping us in all aspects of life, from work and travel to education, entertainment, and sleep. Mobile apps for things have emerged very fast in recent years as well, like wearable devices, smartphone apps, smart metering, and smart parking. All these amazing applications are getting the world

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The latest smartphones pack 20 sensors into a single device. In future smart factories, we'll see more than 120,000 sensors. And these sensors are growing smaller, cheaper, and performing better.

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more connected and more intelligent.

New apps, new services

A couple of days ago, Airbnb announced that they're going to use the latest technology to upgrade their platform for tourism. They want to extend from their traditional house-leasing service and use the latest technology to create an immersive experience for all their users. So let's imagine next time we're in a street in Tokyo, we open the Airbnb app. We pick a house owner. We talk with him. And then we ask the app to book the best restaurant nearby. So I believe that in the future, all services will be delivered through apps.

It's hard to estimate how many apps there'll be in the future. However, from the technology perspective, we can identify some key enablers, including mobile broadband networks, sensors, man-machine interfaces (MMI), cloud computing, and AI. These enabling technologies will give us a sense of where apps are heading and how they'll change our lives. For

example, extended mobile networks are getting every person and everything online. Actually, going from offline to online has become a huge game changer, creating lots of disruption in service models, operating models, and in particular, consumer behavior.

New, exciting tech

Sensors are all around us now. For example, the latest smartphones pack 20 sensors into a single device. In future smart factories, we'll see more than 120,000 sensors. And these sensors are growing smaller, cheaper, and performing better.

This will help us to eventually transform the physical world into a digital world.

The full potential of man-machine interfaces has not yet been explored. However, with breakthroughs in artificial intelligence, I'm sure that very soon we'll see some amazing technologies that'll help us make future MMIs more natural, more immersive, and more intelligent.

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Video has become the most popular form of content delivery and the market is huge – we estimate that it'll be worth more than US\$700 billion in 2020.

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Cloud computing is everywhere, more available and more affordable than ever before. We can now easily develop and launch all applications on cloud, and I'm sure that in the future all applications will be operated in cloud.

AI is a very hot topic, and no longer the realms of science fiction. Actually we've seen lots of amazing applications powered by AI in real life; for example, machine learning, visual recognition, and diagnostic assistance. All these enabling technologies will continue to advance at a very fast speed. More importantly, it will merge and integrate, just like a chemical reaction, to create lots of brand-new applications for services and products.

GE's digital twin is a perfect example of combining sensors, big data, and artificial intelligence to build a digital version of a machine to help us better understand and better manage operating systems. I believe the concept of digital twin will eventually become reality in every vertical.

Opportunities abound

The first major opportunity is video. Video has become the most popular form of content delivery for media, social, and professional communication, like

marketing. And the market is huge – we estimate that it'll reach more than US\$700 billion in 2020. It now accounts for more than 60 percent of data traffic and more than 23 percent of time spent online.

Carriers are doing a lot in this space. For example, AT&T recently announced that they're going to acquire Time Warner. So, they can start with content aggregation and then improve network performance and innovate business models with the content supplier.

We're also seeing huge opportunities in wireless video for vertical applications, for example, public safety, logistics, and traffic surveillance. All these applications require very strong wireless support.

And then there's video communication. In addition to traditional video communication – video calls – there are lots of new forms of video communication emerging such as live video, which is a global phenomenon.

Going live

In China, more than 300 million people subscribed to video in less than two years. Recently, an Olympic medalist gave a live broadcast. She was eating a



We have to identify specific opportunities that best leverage mobile network capabilities. So we believe that connected vehicles, wide area IoT, and public safety should be the target markets for the first wave.



cupcake and chatting about nothing of any real significance. However, she attracted more than 10 million viewers for a full hour.

She also received a US\$15,000 virtual gift from one viewer. So one hour eating and chatting, more than 10 million viewers, and a US\$15,000 US dollar gift – that’s amazing.

Actually, live video has created huge data traffic in networks, alongside lots of opportunities for innovating business models. We mustn’t miss out on that.

WTTx to the home

The second opportunity is homes. Right now, there are around 2 billion households in the world. Unfortunately, 1.3 billion don’t have a broadband connection, and more than 300 million have connections that are slower than 10 Mbps. So in total, these 1.6 billion households could be the perfect blue ocean for mobile programs.

At Huawei, we call this WTTx, wireless to the x. Around 100 carriers in the world have deployed WTTx solutions for more than 13 million households. More importantly, their experience has shown that

the payback period of WTTx is two years, which is much shorter than the eight years required for fixed broadband investments. This is another huge opportunity, another blue ocean.

A vertical view

And the third opportunity is vertical industries concerns every vertical going digital. I believe that mobile communication will become a key enabler for digital transformation in all verticals. That will open the door to many new opportunities.

At Huawei, we’ve actively participated in many projects around the world, obtaining some very useful takeaways in the process. The first is that there are lots of things we can do in the vertical realm, but we need to focus.

We have to identify specific opportunities that best leverage mobile network capabilities. So we believe that connected vehicles, wide area IoT, and public safety should be the target markets for the first wave.

The second takeaway is that we should develop a fresh mindset on cooperation while we develop the vertical market, because service providers, carriers, and enterprises have to work closely to figure out

use cases, technology solutions, and, in particular, successful business cases.

So I believe that partnerships are critical for developing vertical applications.

To sum-up, video, homes, and vertical applications are the immediate opportunities that we see ahead of us. They're all huge, untapped, and relatively easy to access. And more importantly they're all about new applications. To seize these opportunities, from the technology perspective, we believe we have to transform our existing networks to elevate from technology-centric to application-centric.

Three considerations

To achieve this, there are three key factors: connectivity, architecture, and the application enablement platform.

We've enhanced connectivity to support different kinds of new applications by improving network performance and introducing new technologies for new services. For example, to better support HD video, we have to provide mobile connections with 10 MB and 50 millisecond latency. We hope that the deployment of 5G networks in the next couple of years will help us eventually allow VR applications to be supported by mobile networks.

We also need to introduce new technology like wide-area IoT for connecting things and LTE-V for connected vehicles.

Alongside enhanced connectivity, we also need to build end-to-end cloud architecture. In the process of cloudification, in addition to the core and IT system, the cloudification of the air interface is the best way to help us maximize the value of the most important asset in mobile networks. Obviously, this will require a

lot of technological innovation.

Generally, we believe that end-to-end cloud architecture is urgently needed. It will help us make whole networks more agile, allow them to access resources on demand, and better support fast changing applications for people and things.

As an application-centric network, we believe a strong application enablement platform is needed. It should provide ATIS, data storage, and data analytics capabilities, as well as cloud management services. We believe this will help third parties develop applications in a much more effective way, and enable service providers to better open up network capabilities to the market.

Looking to the future

We're focusing on technological innovation and developing the ecosystem. Tech innovation now focuses on cloudifying whole mobile networks, from access to the core. Actually, all-cloud strategies continue to be the key to efficient technological innovation.

On top of technological solutions, we've also developed application-centric solutions for different scenarios, for example, video, gaming, homes, and connected vehicles. Our goal is to help you with technological innovation, greatly boost network performance, slash costs, and seize new business opportunities.

Building the ecosystem

In addition to technological innovation, we also believe that for mobile communications to develop, a support ecosystem is necessary.

We're pleased to see that more companies have



We hope that the X Labs will become a new open platform that brings together technology providers, carriers, and companies from all verticals.



joined us in cross-sector alignment, like the 5GAA body we initiated in Munich for 5G application in the automotive industry. We're also pleased that more companies are joining us to create technological solutions.

More pilot projects like Tech City have been established around the world. We have a great chance to learn from SoftBank and build a Tech City in Japan. At Huawei, we aim to support and enable this ecosystem. We have achieved some progress and we believe we can do more.

Our new initiative: X Labs

We hope that X Labs will become a new open platform that brings together technology providers, carriers, and companies from all verticals to jointly explore use cases of mobile communication in different scenarios, jointly innovate technology and business, and jointly develop the open ecosystem.

We want to be an open platform, and we've identified some key areas to further explore for people, verticals, and homes. We've also established individual labs covering three areas:

mLab will focus on creating an immersive user

experience for new mobile applications relating to voice and vision, for example, live video, AR, and VR.

It will help us figure out how to deliver an amazing experience through a stronger network and how we can jointly develop successful business cases based on immersion and a better user experience. We also have to monetize this better user experience.

vLab will focus on vertical industries. There are lots of things we can do in this space: connected drones, smart manufacturing, vehicles, different industries, energy, transportation, and public safety. We hope that vLab will help us make mobile communications an enabler for digital transformation in many other verticals.

hLab will focus on how to take advantage of broadband connectivity in the huge home market with applications like security, entertainment, education, health, and even romance.

We believe that this should be a joint effort from all participants; it should be a joint effort that crosses sectors. We're at the starting point of jointly exploring the wonderful future of mobile communications. So please join us. 