

# WinWin



## SkyRail

BYD's silver bullet for urban congestion

## NTT DOCOMO

takes a co-creation approach to 5G

## SAP

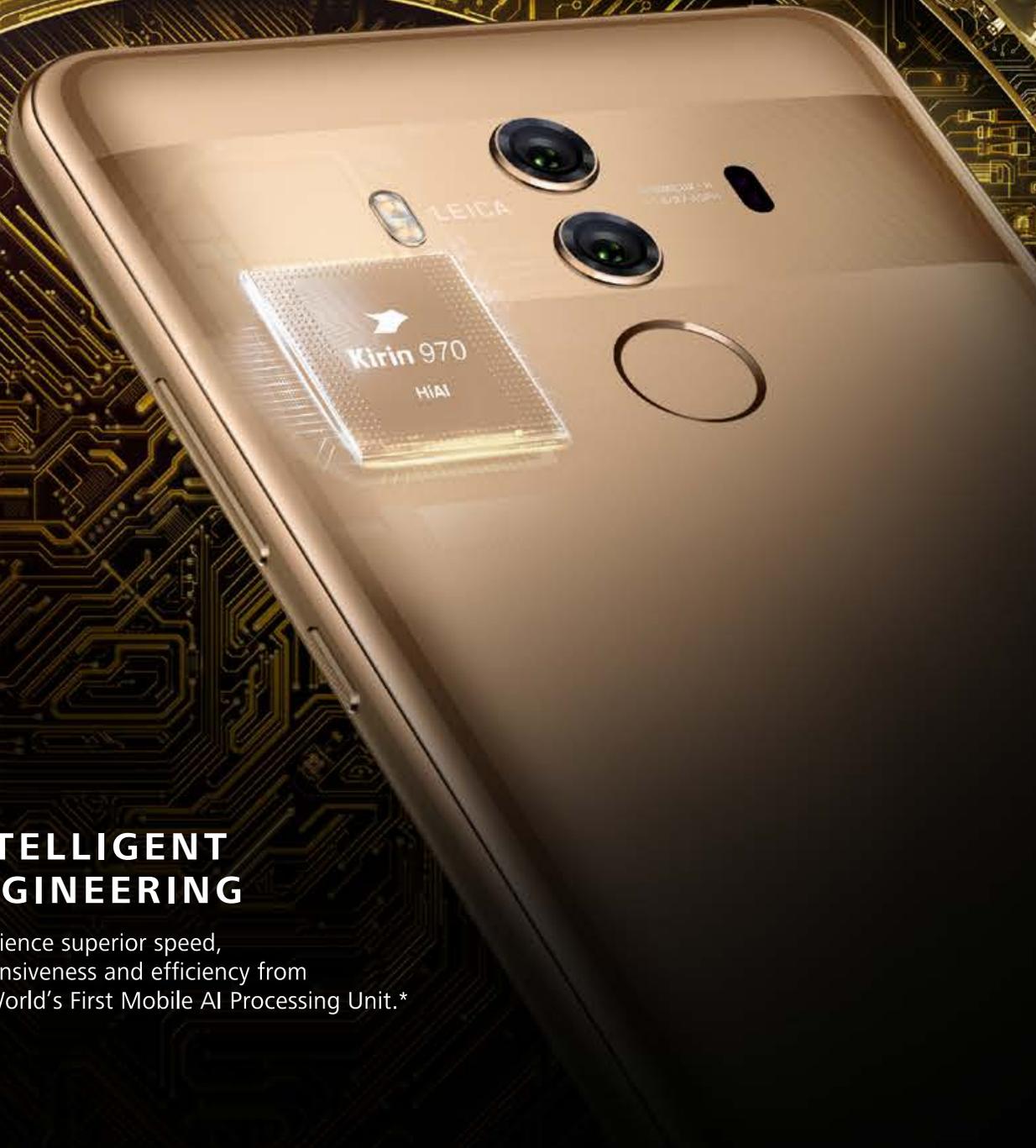
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## 5G is here

At this year's Mobile World Congress, 5G took center stage with all the latest industry trends present and on show, including plans, modems, devices, spectrum, and trials.

On the eve of the event, Huawei unveiled Balong 5G01, the first commercial 5G chipset supporting the 3GPP standard, and the first commercial 3GPP-based 5G device empowered by the chipset, giving us a glimpse at the astonishing possibilities for technological development that it will bring in the future. According to Richard Yu, the CEO of Huawei's Consumer Business Group, "Huawei's first 3GPP-standard commercial 5G chipset and device is a key breakthrough for the global 5G industry. It means the 5G era has arrived."

5G networks and devices are the two basic requirements for 5G commercialization. And when it comes to devices, chips are central to the industry's development and maturity. Balong 5G01 makes Huawei the first company to smash through the bottleneck to 5G commercial use, making a significant contribution to the growth of the 5G industry. It also makes Huawei the first company with capabilities in 5G chipsets, devices, and networks, and the first that's able to offer an end-to-end 5G solution.

As we approach 2020, the growth of 5G-based enhanced mobile broadband networking (eMBB) and IoT applications will skyrocket, including VR/AR apps, industrial Internet, driverless technology, and the Internet of Vehicles.

Huawei began researching 5G in 2009 and has so far invested US\$600 million in 5G R&D, establishing 11 5G research centers around the world and partnering with over 30 telcos on 5G, including China's big three plus Vodafone, SoftBank, T-Mobile, BT, and Telefonica. In 2017, Huawei was the first company to launch pre-commercial 5G networks with its partners. And in 2018, Huawei will push forward the completion of the industrial chain, complete interoperability testing, and support the first round of commercial 5G network launches.

The future is partnerships, the future is 5G.

Sally Gao, Editor-in-Chief



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“ BYD formally entered the trillion-yuan rail transit industry with a 5 billion yuan investment in SkyRail tech R&D in 2012, and the company fully owns the IPR for the SkyRail monorail system. ”

— Wang Chuanfu, Chairman and President of BYD

# SkyRail: BYD's silver bullet for urban congestion



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BYD has greatly expanded its commercial footprint since 1995, when it hit the tech scene as a battery producer for cell phones. Today, the Chinese company has emerged as a leader in new energy vehicles and photovoltaic energy storage technology as part of its Four Green Dreams strategy, covering solar power plants, battery storage power plants, electric cars, and rail transit.

By Xu Shenglan, Xue Hua



**G**iven today's ubiquitous traffic congestion, BYD believes the solution lies in "3D" traffic networks that combine underground, ground, and air transport. This belief led to the genesis of its straddle monorail project, SkyRail.

With five years of development propelling the project forward, BYD Chairman and President Wang Chuanfu feels

that SkyRail can forge the silver bullet that will stop urban congestion in its tracks and make transportation truly smart.

## Building cities on rails

Wang cites a past gridlock experience as his inspiration for SkyRail. On business in Beijing six years ago, a sudden rainstorm brought the entire city to a standstill – as a

“

Building a 1-kilometer length of subway costs 1 billion yuan, compared with 200 million yuan for the same length of SkyRail, just one-fifth of the cost, and the construction time is up to 75 percent faster.

”

result, it took him four or five hours to get from Xizhimen to the airport. “That [traffic jam] left a particularly deep impression on me,” says Wang. The next week, he visited Tokyo and, despite more cars and fewer roads relative to Beijing, the traffic ran smoothly. On investigation, he observed that, “Tokyo is a city of railways, with 85 to 90 percent of the population opting for public transportation on weekdays.” In contrast, says Wang, “Cities on rails is the future [for China] because the popularization of cars and urbanization have overwhelmed urban roads.” The stats support his view: From 2012 to 2016, automobile production and sales in China rose from 19.3 million to 28 million vehicles per year, while the nation’s rapid urbanization will mean that 60 percent of the nation’s population – some 850 million people – will be living in cities by 2020 if current estimates pan out.

According to Wang, SkyRail will mainly meet the needs of second- and third-tier cities, “The number of cars in these cities is increasing by 15 percent per year, but the number of roads is growing at just 1 percent,” he says. “As people’s standard of living improves, buying a car has become a must-have and so congestion is inevitable. The solution is public transportation.”

**Investing 5 billion yuan to unlock a 1-trillion yuan door**

BYD formally entered the trillion-yuan rail transit industry with a 5 billion yuan (US\$790.3 million) investment in SkyRail tech R&D in 2012. Moreover, the company fully owns the IPR for the SkyRail monorail system.

The most obvious advantage of SkyRail is that it’s relatively cheap, so small- and medium-sized cities can benefit in a way that extremely expensive subway construction doesn’t allow. According to Wang, “Building a 1-kilometer length of subway costs 1 billion yuan, compared with 200 million yuan for the same length of SkyRail, just one-fifth of the cost, and the construction time is up to 75 percent faster.” He mentions that there are 273 prefecture-level cities like Shantou in China. “It’s not feasible to build metro systems in medium-sized cities such as these,” he says. “But, multiplying 273 by 40 billion yuan gives you a market size of over 1-trillion yuan.” As a straddle monorail, SkyRail covers a small area, has a good ability to climb and a small turning circle, and can hit speeds of up to 80 km/h.

Wang is crystal clear about SkyRail’s market positioning. He believes that subways and high-speed railways are high-capacity traffic systems, whereas SkyRail is a medium-capacity system that’s a seamless fit for medium-sized cities and the



suburbs of large cities. “SkyRail can be integrated with existing public transport systems to create three-dimensional transport networks consisting of underground, surface and air transportation,” says Wang. “In the transit systems of first- and second-tier cities, SkyRail can be widely used for feeder lines and new lines, and as main trunk lines in third- and fourth-tier cities, as well as for sightseeing lines for tourist attractions.”

## SkyRail blooms at Yinchuan Flower Expo

On September 1, 2017, the first SkyRail line went into commercial operation at the Flower Expo in Yinchuan, marking the city’s first ever rail transit system and giving SkyRail users the best view of the sea of flowers on show. Around 40,000 people were estimated to have used the system on launch day, rising to more than 60,000 more each day on September 2 and 3 – the peak first weekend of the expo. As a tourist carrier, SkyRail’s speed in this scenario was limited to a sedate and barely audible 25 km/h.

“The project got underway on April 18 and by August 31, the railway was officially up and running,” explains Wang, describing just how fast the project got off the ground. In just over four months, work on constructing

the infrastructure, erecting steel columns, installing track girders, installing mechanical and electrical communications equipment, and constructing the battery storage power station was completed. Neither the rapid turnaround nor the heavy initial use affected quality, however. “Because the number of people visiting the garden exceeded our expectations, we launched a plan to run a backup SkyRail,” says Wang. “All seven of the SkyRail trains ran at full capacity with zero safety faults or passenger complaints, and on-time rates exceeded 99 percent. It went almost perfectly.”

Each SkyRail car is equipped with high-speed wireless broadband services, so passengers can easily share photos and videos. Based on real-time passenger flow monitoring technology, announcements about congested areas are played on platforms and in cabins in real-time, so passengers can plan their routes.

Since the launch of SkyRail, BYD has signed contracts with over a dozen cities, including Shantou, Shenzhen, Bengbu, and Guilin, as well as Yinchuan. On August 22, 2017, the company also signed a contract with Iloilo City in the Philippines to build a SkyRail of over 20 kilometers in 2019, an indication that SkyRail will be rolled out in more overseas regions in the future.

## The fast track to autonomy



In the event of a mains failure, SkyRail can automatically switch to an onboard battery and drive safely to the next station in driverless mode.



In the future, SkyRail will adopt a high-tech driverless system, with BYD tech providing the highest level of automation out of the four possible for rail systems. Unattended train operation (UTO) delivers full automation, enabling the shortest safe train headway, automated diagnosis, automated sleep and wake-up capabilities, real-time passenger flow monitoring, facial recognition, and full automation during power failures. “In the event of a mains failure, SkyRail can automatically switch to an onboard battery and drive safely to the next station in driverless mode,” says Wang.

Each morning, SkyRail trains can automatically wake up and enter the network after carrying out tests on traction, braking, doors, lighting, batteries, and air conditioning. They’re then able to operate automatically and, after completing their set schedules, automatically return home and sleep. Before and during operation, SkyRail trains carry out self-diagnostics comprising more than 300 tests on their entire system. The system also works perfectly well in extreme temperatures, able to adapt to lows of -40 °C and withstand highs of up to 80 °C.

As well as BYD’s control and positioning technology, SkyRail uses Huawei’s eLTE communications technology in the shape of its 4.5G rail wireless network, which acts as a channel for the fast and

efficient transmission of information. The Huawei solution has three important advantages: First, thanks to 4.5G’s high reliability, low latency, and A+B dual-network configuration, eLTE provides a more reliable communication network for SkyRail’s driverless systems to ensure low-latency service handover and service continuity when the trains are moving, which increases SkyRail’s reliability.

Second, eLTE’s advanced anti-interference technology can handle interference by virtue of end-to-end encryption and authentication algorithms, making car-ground communication more secure and stable.

Third, eLTE’s advantages in coverage capabilities, multi-user access capabilities, and QoS guarantees mean multiple services like railway signaling, passenger information systems, and closed-circuit television can be carried over a single network, enabling simple and smart car-to-ground communication over the network. According to Wang, “Huawei’s 4.5G wireless network for railways meets SkyRail’s requirements for reliability, efficiency, and intelligence.”

Already off to a great start, BYD hopes to play a greater role in narrowing the physical distance between people by expanding its operations on a global scale and building a strong collaborative ecosystem. [www](#)

# SAP: Making digital transformation simple, agile, and powerful



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In 50 years, the average listing on the Fortune 500 has dropped from 61 to 18 years. For added longevity, digital leadership has become an essential skill for C-suite executives, especially for restructuring business models and processes to implement new tech. To pave the way to success, SAP helps enterprises forecast market trends through the phase-based analysis of industries.

By Hunter Dong, Sr. Director, SAP Global Business Development and Ecosystem

## Rapid change

The Internet, wireless networks, e-commerce, and social media have completely transformed the way we communicate, live, and work. The next decade will continue this trend of great transformation, with value exchanged in new ways on next-gen Internet thanks to tech like blockchain and hyper connectivity, plus the wide adoption of artificial intelligence (AI) and augmented reality (AR). These technologies will spawn new applications that dramatically transform every industry. At the current market disruption rate, 75 percent of enterprises on the S&P 500 index in 2012 will fall from the list over the next 10 years.

Next-gen Internet will bring huge opportunities and challenges for companies. While it will improve productivity and optimize business processes, business models will be impacted. SAP's Digital Transformation Officer, Dr. Chakib Bouhdary, argues that to meet the new slew of challenges, CEOs and management teams will need to be well versed in digital technologies and have clear plans to reconstruct their business models.



Hunter Dong

To describe companies' progress in digital transformation based on its analysis of 25 industries, SAP has identified three phases: Hurricane, Tropical Storm, and Tropical Depression.



**Hurricane – disruptive transformation:** Industries in this phase are primarily consumer-driven, for example, banking, retail, telecoms, media, and entertainment. These verticals are in the midst of the digital storm and disruptive transformation. With more consumers searching, shopping, and socializing online, building an omni-channel presence is now the key to survival. However, most companies have outdated business processes and technology infrastructures, so they need to go a step further to respond to the more agile and disruptive enterprises entering their industries, like Amazon, Apple, and Alphabet.

**Tropical Storm – accelerated transformation:** IoT and hyper-connectivity are transforming every industry, even conservative ones like manufacturing. In this phase, everything is connected, including cars, homes, farms, patients, and logistics. Traditional business is a thing of the past, the cost of sensors and computing power has plummeted, and smarter algorithms are in play, accelerating transformation.

**Tropical Depression – preliminary exploration:** While small scale innovation in asset-intensive industries such as oil, gas, chemicals, and mining has occurred, these industries are still lagging behind with digital

transformation. Alongside the impact of IoT, enterprises in this phase will primarily focus on two things: one, increasing plant and equipment uptime through predictive capabilities; and two, improving return on assets. Substantial productivity increases will reshape these industries and drive the major restructuring of the existing landscape.

In the digital age, every industry will inevitably be in the eye of the storm. How should corporate managers respond to this eventuality? What action should they take to embrace the change?

## On your bike

The legendary motorcycle brand Harley-Davidson used to design and manufacture motorcycles in the traditional, standardized way. The company, though, faced new challenges in the era of personalization to customize each motorcycle it makes. In response, management optimized its sales and manufacturing processes to meet demand for personalized orders, reconstructing five factories with IoT and converging the production capacity of the different manufacturing models used in each factory. This digital transformation resulted in increased competitiveness, reducing costs by 7 percent and lead time from 21 days to 6 hours.



We believe that all CEOs, boards of directors, and their management teams are duty bound to reconstruct their business models and find ways to adjust or diversify revenue streams.



Product quality, operating systems agility, and market predictability were all improved.

SAP's systematic analysis recommends that businesses take the first step on the digital transformation journey by innovating business models, business processes, and modes of work using demand-oriented design thinking.

## Building new systems based on digital thinking

### Innovating new business models based on digital technology

A number of global trends are causing businesses around the world to rethink their service scopes, operating models, client bases, and transformation strategies. These include high levels of product personalization becoming the norm, customer demand for immediate gratification, companies and people constantly on the go, and the increasing adoption of AI and machine-to-machine communication.

Business model reconstruction used to be the preserve of innovative start-ups or Silicon Valley entrepreneurs. But today even the largest multinationals are having to learn how to reconstruct

or risk being quickly disrupted or replaced. We believe that all CEOs, boards of directors, and their management teams are duty bound to reconstruct their business models and find ways to adjust or diversify revenue streams.

### Boosting business process innovation through digital capabilities

To meaningfully improve productivity and customer experience, companies must reconstruct all business processes. We've identified five functions that are already used in business processes. They aren't mutually exclusive and can be used in combination by enterprises to maximize profits.

According to Dr. Hasso Plattner, Chairman of the SAP Supervisory Board, to become industry leaders, companies need to gain market insights and internal business insights as quickly as possible and act on them.

### Reconstructing work modes: Injecting consumer-grade experiences into the workplace

Thanks to smart devices and consumer applications, people expect more from their everyday activities, whether it's studying, shopping, traveling, or communication. Although consumer-grade user experiences aren't yet common in most workplaces,



Integrating design thinking into the backbone of the business is the secret to developing long-term, sustainable, and innovative thinking for businesses.



we expect the situation to change over the next two to five years, as businesses deploy new technologies such as AI, cloud computing, social media, and e-commerce.

This is a fantastic opportunity for enterprises to reconstruct their work modes. To eliminate business complexity and change the workplace, companies need to take action in four areas: One, increase visibility and manage business in real-time; two, enable collaboration between different teams and the company as a whole; three, optimize staff productivity; and, four, eliminate manual work and automate repetitive processes.

A raft of new technologies will improve staff efficiency by between 20 and 50 percent. There hasn't been as dramatic an increase in work efficiency since the introduction of enterprise resource planning (ERP) and efficiency tools back in the early 1990s. It will be hard for any business manager to overlook such huge value. Moreover, these innovations will help companies increase employee engagement and talent retention.

### **Enterprise digital transformation based on design thinking**

Design thinking is crucial to help enterprises succeed in the digital economy, regardless of whether their

industry is in the Hurricane, Tropical Storm, or Tropical Depression phase of digitalization. Enterprises are seeking suitable models of thinking and methodologies they can use to innovate and integrate technology, personnel, and services.

SAP's design-thinking method is, first and foremost, a people-oriented approach that stresses understanding the needs of users. The goal is to identify employees' or consumers' unmet needs and enhance their experience in a highly collaborative way. Companies can use design thinking to integrate all teams, be they technology or business focused, so that they're united and can work together to realize the company's future vision and reinvent the brand experience. We believe that design thinking is the ideal way to enhance innovation and create a culture of creativity across various products and processes.

Integrating design thinking into the backbone of the business is the secret to developing long-term, sustainable, and innovative thinking for businesses.

### **Partnerships for the future**

According to Bouhdary, "Seventy-four percent of the world's transactions run on an SAP system, putting SAP in a unique position. We have the experience, solutions, and ecosystem to streamline value chains and drive efficiency for our customers." It's SAP's duty



Through collaboration, SAP and Huawei have helped many enterprises, including Cepsa, Fonterra, BYD, and Heilan Home, carry out digital transformation, helping them to become market leaders.



- 1**  
Customer experience  
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- 2**  
Real-time services  
Using data from multiple sources as demand signals from any device, anytime, anywhere.
- 3**  
Predictive insight  
Using forecasts and simulations to make forward-looking decisions at work to reduce delays and increase profitability.
- 4**  
Cross-enterprise collaboration  
Seamlessly interconnecting employees, suppliers, and systems to innovate and provide better services for customers.
- 5**  
AI and automation  
Slashing work tasks, streamlining operations, and driving full automation through integrating workflows and interconnecting assets.

to work with customers and partners to facilitate and guide their journey toward increased speed and agility with various digital technologies.

SAP has invested over US\$35 billion in acquisitions and R&D on breakthrough technologies such as in-memory computing with SAP HANA and innovative cloud solutions. “To make our value proposition even stronger, we’re forging strong partnerships and working hard to embed the latest innovative technologies like AI, machine learning, AR, and blockchain in our platform. This will enable our customers to access the latest and greatest solutions that are easy to consume, can solve big business problems, and create significant value for their stakeholders,” says Bouhdary.

Through strategic collaboration, SAP and Huawei have helped many enterprises, including Cepsa, Fonterra, BYD, and Heilan Home, carry out digital transformation, helping them to become market leaders.

SAP is committed to building world-class partnerships that drive greater business innovation in sectors such as smart cities, smart manufacturing, energy management, and new retail, as well as joint solutions and market collaboration in big data and cloud platforms. [www.sap.com](#)



## NTT DOCOMO takes a co-creation approach to 5G



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Japan's largest mobile operator NTT DOCOMO is gearing up for one of the world's earliest and highest-profile 5G launches, targeting commercial deployment in time for the 2020 Summer Olympics in Tokyo. Dr. Hiroshi Nakamura, CTO of NTT DOCOMO, talks about making 5G a reality.

By Linda Xu

**A** key takeaway from CTO Hiroshi Nakamura's keynote appearance at Huawei's Global Mobile Broadband Forum (MBBF) 2017 was that partnerships are vital for 5G success. DOCOMO is working with an extensive list of partners, from mobile technology suppliers to railway companies

and local governments in Japan.

The operator began researching 5G technology in 2010, the same year it launched 4G. In the past three years, it's partnered with 13 technology vendors to test 5G across existing spectrum bands, including 800 MHz



and 2 GHz, and higher frequency bands like 3-6 GHz, 6-30 GHz and >30 GHz. Its network partners include Huawei, Fujitsu, NEC, and Mitsubishi Electric, and other partners include the systems solution vendor Panasonic, the chipset vendors Intel, Mediatek and Qualcomm, and the test and measurement providers Keysight Technologies and Rohde & Schwarz.

Nakamura describes its work with Huawei as “one of the most important partners we’re working with,” referring to Massive MIMO technologies. “We have greater spectrum efficiency using Massive MIMO,” states Nakamura, revealing that a test in Yokohama in the 4.5 GHz spectrum band achieved a maximum spectral efficiency of 79.82 bps/Hz at each cell site.

Aside from the technology trials with mobile network vendors, it’s DOCOMO’s work with partners outside



Dr. Hiroshi Nakamura

of the traditional telco industry that’s establishing 5G as a true revolution.

“5G is unique compared with previous generations because industries are already showing a big interest, even before commercial services are available,” says Nakamura. “As an operator, DOCOMO can provide 5G and AI technologies to the market to enable new services and new business models, but we also believe we cannot do that alone. We need partners to realize new services.

“

We opened the 5G trial sites to invite verticals to evaluate and jointly help create 5G use cases. We need to identify what kind of businesses we can create with our vertical partners.

”

For example, automated driving will definitely require car manufacturers to be on board, and VR will require partnering with content providers. Co-creation for new services is fundamental to 5G's success.”

## 5G trial sites

In May, 2017, DOCOMO opened a series of 5G trial sites, which have seen the operator and its partner companies collaborate to create new services that aim to leverage 5G's strengths such as low latency, ultra-high-speed, ultra large capacity, and massive device connectivity.

During his keynote presentation at MBBF, Nakamura referenced 8K live video streaming services as part of the trial sites, as well as 4K video streaming services, which were sent to multiple devices during an experience tour of a new express train.

“We opened the 5G trial sites to invite verticals to evaluate and jointly help create 5G use cases,” Nakamura explained in this speech. “We need to identify what kind of businesses we can create with our vertical partners.”

Nakamura says that many industries are always on board, including car manufacturers, TV broadcasters, and companies in the following sectors: construction, railway, security, image processing, printing, display, and IT

services. “These verticals have their own requirements and issues. We as an operator need to hear their voices to help create new services.”

Nakamura gives two examples: First, DOCOMO's work with a TV broadcaster found that the latter used large table-sized screens, with viewers stood around the screens and interacting with the screen via augmented reality (AR) technology. “Large images and AR definitely require broadband communications. 5G is an exact use case for that demonstration,” says Nakamura.

Second, DOCOMO has teamed up with a construction company to trial remote-controlled vehicles for use in areas that are unsafe for human's to work or where highly skilled drivers are unavailable. The vehicles are equipped with 4K and 8K cameras. “This requires high-speed and high-bandwidth data communication as well as low latency for the remote control,” says Nakamura.

## AI's role in 5G

Nakamura is convinced that artificial intelligence (AI) will play a major role in DOCOMO's 5G future. “I believe that 5G and AI are core technologies for realizing a new world and new lifestyles,” he states. “And AI also requires working with partners.”

Nakamura outlines how AI can be used for two different purposes: one, as a personal agent to enhance people's



The AI Agent Open Partner Initiative means that partners can create their own agent and improve their business to create new services using our AI platforms.



daily lives and, two, to optimize social systems.

As a personal agent, DOCOMO is using AI to improve its e-commerce service platform, which currently has around 15 million customers. In June, the operator went a step further by opening up its AI agent platform to partners. Nakamura says that its AI Agent Open Partner Initiative means that “partners can create their own agent and improve their business or create new services using our AI platforms.”

The initiative is device agnostic, “so our partners can use the AI agent devices they choose to,” he says.

Nakamura claims many of its partners already support the initiative and are using it to create their own AI agents in various fields, including chipset companies, price comparison websites, department store chains, computer hardware manufacturers, and machine tool manufacturers.

In terms of AI use cases for optimizing social systems, Nakamura heralds the potential for vertical industries as “unlimited.” He gives the example of agriculture: A local government in a northern Japanese city is using DOCOMO’s deep learning technology to incorporate photo images from drones to combat plant disease and insect damage in rice fields and pine forests.

A different example has DOCOMO helping taxi drivers

boost their income. Nakamura explains that the operator uses AI and deep learning in population statistics to predict 30-minute future demand for taxis in certain locations.

“The analytical results are sent to the driver who can go to specific areas to pick up passengers. After three months of field tests, we were able to increase each driver’s sales by about 1,400 yen per day, that’s around US\$12 to US\$13,” reveals Nakamura. “That’s another example of using NTT DOCOMO’s open approach to 5G, which also extends to the official ratification of the technical standard. Earlier this year DOCOMO was part of a global push to speed up the standardization of 5G, with 3GPP agreeing to finalize the non-standalone New Radio standard by December 2017, well ahead of an earlier target of June 2018.

“DOCOMO will use this December’s first non-standalone spec for our commercial 5G services,” confirmed Nakamura in an interview at MBBF 2017. “We’re completely in line with 3GPP and 5G specifications.”

With less than 1,000 days to go until DOCOMO launches its commercial 5G service, it’s clear the operator isn’t embarking on this journey alone. As Nakamura concluded at Huawei’s MBBF event in London, “When thinking about services in the 5G era, the important thing is partnerships and co-creation with verticals. We as an operator can enable the market, but we definitely require partnerships to create new services.” 



## P&G: Making the ordinary extraordinary with mobile



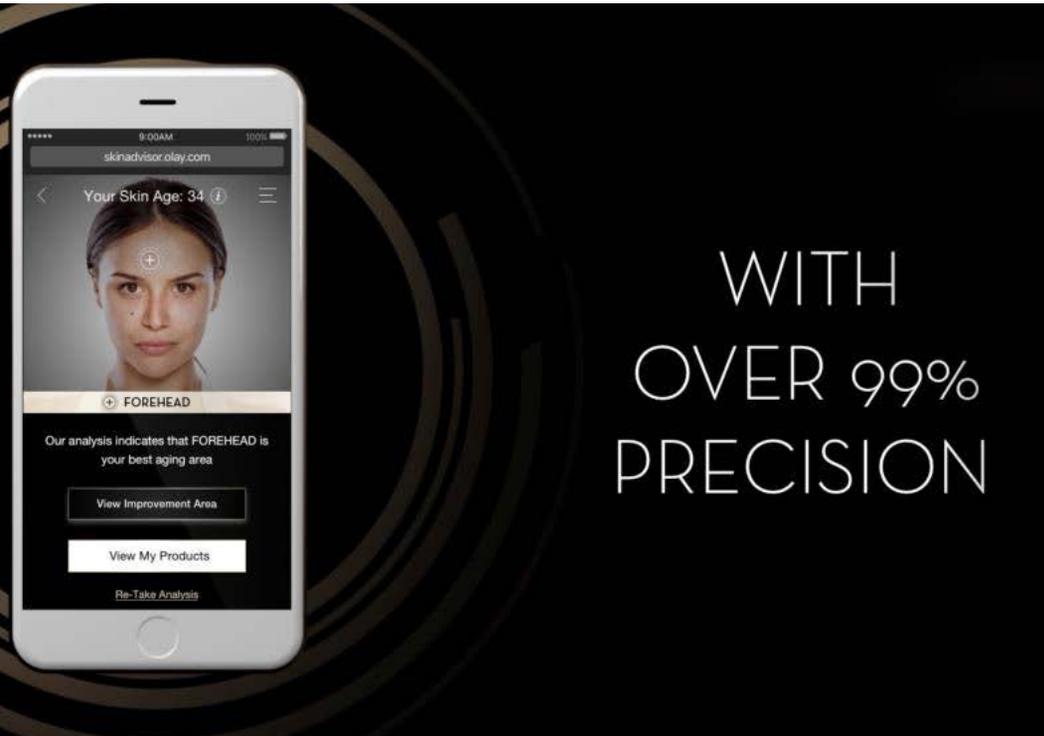
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The evolution of mobile technology has transformed almost every industry across the world. It has heightened consumer expectations about their relationship with suppliers of everything from the next generation of cars to everyday items such as toothbrushes and skincare products. One company that has embraced this new technology and propelled the everyday to new heights is multinational consumer goods company Procter & Gamble (P&G). President of P&G Europe Gary Coombe shares his thoughts about how to boost digital capabilities to enhance the customer experience.

By Linda Xu

Customers now have new methods to communicate with companies, and agile businesses can take advantage of the opportunities to create new engagement platforms and expand the types of services they

offer. One company which has embraced this new technology and propelled the everyday to new heights is multinational consumer goods company Procter & Gamble (P&G). P&G is one of the largest companies in the world, with annual sales of US\$65



WITH  
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PRECISION



Gary Coombe

billion and operations across the globe. Despite being in business for 180 years, mobile has created one of the largest disruptions the company has experienced.

This is a challenge P&G has grasped enthusiastically. It has introduced new technologies to its range and pioneered apps that help IoT become a reality within its sector.

P&G launched the world's first smart toothbrush at Mobile World Congress in 2016 and has since enhanced that application, in addition to creating health and wellness products based around AI and other smart technologies.

According to Coombe, the company has seen great success with the connected toothbrush, collating data that shows the vast difference the innovation has brought to the lives of customers. "The Internet of Things allows a range of products to be connected. And so our product design is changing – to the delight of

consumers," he said at Huawei's 2017 Mobile Broadband Forum in London. "The impact of mobile has been transformational."

Discussing the toothbrush and related app – which has already attracted three million downloads – he added, "It's a remarkable piece of technology. It connects your toothbrush with your cell phone. It's like having a dentist in the bathroom." The toothbrush itself allows the consumer to understand the level of pressure they apply when cleaning their teeth and identify any areas of their mouth where their brushing technique is less than optimum. "On average, a consumer that uses this technology brushes for over two minutes, versus 45 seconds normally," Coombe said. "So it makes a meaningful difference to oral health, all enabled by mobile technology."

## Applying expertise

P&G has an extensive portfolio that includes the

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Our beauty and toothbrush apps are the result of the company’s strategy of utilizing and developing new technologies to diversify and enhance its existing offerings.

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beauty brand Olay, cleaning product Flash and detergent company Ariel. For a number of these notable international brands, it has developed smartphone apps to enhance the value customers get from the company. In some cases, this has also created excellent upsell opportunities.

One of the company’s best received and most well-publicized ventures is creating a digital application for its beauty brand, Olay.

Users of Olay Skin Advisor take a selfie, which is then analysed against images of women of a similar age and provides an estimate of the subject’s age. The app then offers advice on how to reduce the signs of ageing based on skin condition, and recommends which one of Olay’s products can address the problem areas.

“The potential of AI is enormous,” Coombe said. “We’ve started on that journey and we have a great example already. Many millions of consumers have downloaded the Skin Advisor app.”

“There’s a huge moment of truth as a consumer because the first thing it tells you is your skin ages and then of course it advises you on a skincare

regimen and which products to use to improve your skin. That’s an AI-driven system and I’m sure there’s much more to come.”

The hugely competitive industry of toiletries, beauty products, and other fast moving consumer goods relies on being able to offer something unique, yet something that can be expanded widely.

Coombe added that P&G’s beauty and toothbrush apps are the result of the company’s strategy to utilize and develop new technologies to diversify and enhance its existing offerings. This is one of the many ways P&G seeks to differentiate itself in the competitive retail sector.

## Mobile marketing

It isn’t just applications designed to enhance the use of existing products where mobile technologies have made an impact on P&G and companies like it: Mobile has transformed everything from logistics to marketing.

In marketing and advertising – two key elements of a consumer-facing business such as P&G – the Internet and then mobile changed the landscape completely.

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The creative that works on TV is a 30 second commercial that you view on a 40 inch screen. The creative that works on mobile is 1.7 seconds on a 5 cm screen – completely disruptive.

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New channels offer greater personalization opportunities, but fewer spaces for large-scale, detailed ads.

Coombe said the firm’s spend on digital channels in Europe had now expanded to become larger than its TV advertising budget across the continent.

“It’s now overtaken TV as our primary channel and of course that raises enormous challenges for us,” he added. “The creative that works on TV is a 30 second commercial that you view on a 40 inch screen. The creative that works on mobile is 1.7 seconds on a 5 cm screen – completely disruptive.”

“The other thing is the media supply chain is very different,” he added. Although admitting techniques to perfect the platform were still being developed, he saw a bright future for the platform. “It’s not a fair or well-run supply chain yet,” he noted.

“There are far too many bots viewing our advertising as opposed to human beings. We’re not getting what we pay for right now.”

As P&G has a number of brands aimed at the family market in its portfolio, the company has

to be careful of the types of content its branding was seen in the proximity of, and linked to, when advertising online.

“There’s a danger in this newly emerging world that our communication is associated with unsavoury or unsuitable content on the Internet,” he warned. “Digital is huge for us but it’s still a little bit like the Wild West. It’s important that the media suppliers, media owners, and the technology companies help us create a media channel that’s worthy, appropriate, and fair.”

## Retail disruption

Technology has brought disruption across the entire span of P&G, and its partners’ businesses. The Internet and industrial IoT have transformed the manufacturing, logistics and retail industries completely, creating both efficiencies and opportunities.

In manufacturing and logistics, IoT has enabled cost savings as well as improving the control large companies have on their supply chains.

Traditional retail, however, has arguably seen the biggest change from the Internet. Coombe said his company recognized there was now a second round

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Voice shopping is coming, but perhaps the most exciting thing for me is that our historically fairly functional products, with the addition of mobile technology, can create new services.

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of disruption taking place in the retail sector.

“First was the move from real stores to going online, usually using a cell phone,” he said. “Now mobile technology is enabling even more disruption, which is the move to voice.” This, he emphasised, impacts both retailers and the brands themselves.

“Technology transforms every aspect of our business; the way we communicate with them, the way we enable them to shop via online and mobile-enabled shopping,” he added.

“Voice shopping is coming, but perhaps the most exciting thing for me is that our historically fairly functional products, with the addition of mobile technology, can create new services.”

## Partnering for success

To fully embrace mobile technology, it's vital that companies such as P&G stay ahead of its rivals and launch successful and popular use cases that embrace new technologies such as the Internet of Things.

To achieve this, P&G carefully selects its technology partners to ensure it stays ahead of the curve and delivers

innovations that customers find exciting and useful

“As we think about developing products that utilize mobile technology – I mentioned the Oral-B toothbrush, there are many others like that coming – we're looking forward to partnering with many companies in this space to develop that technology together and to delight consumers together,” Coombe added.

“The fact that [mobile] technology can create products and services for consumers that delight them is very, very exciting for our industry.”

Commenting on his experience with Huawei at the Global Mobile Broadband Forum in London, he added, “If they can deliver the sort of technology dreams that I've seen them talk about, it will be transformational. Not just to the telecoms industry, not just to the digital industry, but to all industries.”

“The reality is what's being created has the ability to disrupt all industry and all of commercial enterprise. Disruption can be a negative thing, but it can also be a huge opportunity and I'm sure that Huawei can deliver the technology to help us disrupt industry for the better, and delight consumers going forward.” 

# Shop till you drop: Retail goes omni-channel



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IDC predicts that by 2018, 30 percent of major retailers will adopt an omni-channel digital B2B2C commerce platform. This platform will integrate multiple channels, including physical stores, e-commerce, mobile terminals, and social media. It will also achieve seamless connections both online and offline and between buyers and sellers for the whole purchase lifecycle. To fully benefit, what strategies and digital technologies do retailers need to think about?

By Kevin Hu, President of Huawei Network Product Line

## Convergence is key

**T**he retail vertical is still feeling the impact of e-commerce, the momentum of which has been gathering over two decades. Today's millennials are fully at home with high digitalization and social media, while displaying little brand or channel loyalty.

In turn, traditional retailers are going online to promote growth as well as extending the use of traditional retail stores. At the same time, purely online retailers are facing a bottleneck in development, because the explosive growth in Internet traffic that drove e-commerce is a thing of the past. Some forward-thinkers are exploring omni-channel, including big names like Carrefour, Starbucks, Oasis, and Burberry. Notably, Amazon

is ahead of the game with its AmazonFresh offline grocery store; Amazon Go, a convenience store based on IoT; and Amazon Books, an integrated online and offline book store.

Consumer behavior also supports the omni-channel approach. A survey by Deloitte shows that nearly 80 percent of consumers interact with brands or products on digital channels before visiting a physical store. The luxury brand Burberry found that its average consumer visits its website eight times before making a purchase.

It's clear that multiple integrated channels, including physical stores, e-commerce, mobile devices, and social media, are the most effective at seamlessly connecting online and offline channels and buyers and sellers. For consumers, it makes shopping more

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Multiple integrated channels, including physical stores, e-commerce, mobile devices, and social media, are most effective at seamlessly connecting online and offline channels and buyers and sellers.

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personal and scenario-based. For sellers, it makes their products more accessible and enables greater personalization.

### Building loyalty with insight

Enterprises that master omni-channel retail can use data in the same way that e-commerce companies do to optimize operations and decision-making, and engage the five senses of consumers in a way that they now expect on the buying journey. McKinsey has found that basic omni-channel services, such as ‘buy online, pick up in store’ and checking inventory online, are becoming commonplace. Its research also shows that more advanced omni-channel experiences, including VR stores and online customization, are also triggering strong consumer demand.

For new retailers to explore omni-channel, cloud computing and IoT technologies are key tools for optimizing operations, while big data makes user profiles and personalized user management possible. Analytics can use purchase history, membership statistics, and consumer behavior to create precise models for customer stratification and personal loyalty plans. For example, the commercial Wi-Fi solution

released by Huawei in partnership with Cloud4Wi can increase profits in the retail industry, and improve customer loyalty through precise positioning and personalized push services.

### Intelligent retail fuels growth

There are various ways data-driven technology can improve the customer journey and efficiency for retailers. Virtual shop assistants can find customers through smart terminal locations and provide intelligent assistance. Smart shopping carts can locate products quickly and precisely. Smart fitting rooms use virtualization to make fitting easier. Smart shelves can automatically detect product shortages and outdated products. And electronic shelf labels (ESLs) can change prices in batches and in real time.

CloudCampus Solution for the Retail Industry uses sensors to deliver commodity statuses in real time, automatically pushing product information to consumers based on their actions and providing a function for mobile payments.

The solution generates a vast amount of commercially valuable data; for example, the number of people attracted by each interactive terminal,

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Ubiquitous connections bond people, things, and scenarios, and – in the retail space – can attract an audience, increase stickiness, and influence buying decisions.

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which products they're interested in, how long they showed interest in each product, the number of interactions per product, and the most popular product. This serves as a source of commercial data analytics, and forms the basis of decision-making for departments like operations, marketing, finance, and asset management.

Adding value to these innovative solutions are the data collection, transmission, and analytics applications that are available anytime, anywhere. For example, Huawei's open cloud management platform CloudCampus has abundant APIs that can connect with customers' and partners' mature industry applications. With the help of big data, cloud, and mobile Internet technologies, CloudCampus collects, transmits, manages, and analyzes the vast amount of commercial data that's generated every day in retail stores. It shares it with various industry applications and breaks down existing data islands of siloed applications. Data is thus converged into an ocean, from which its commercial value can reach the shore.

CloudCampus revolutionizes campus network management through E2E network planning, installation and deployment, O&M, troubleshooting,



and network inspections. Quick network deployment reduces investment in O&M personnel and the solution can reduce OPEX by up to 80 percent.

The digital transformation of the retail industry has just begun. Ubiquitous connections bond people, things, and scenarios, and – in the retail space – can attract an audience, increase stickiness, and influence buying decisions.

Connecting commercial data and unleashing its value promises a digital retail model that brings a better experience to consumers and better value to retailers. [www.huawei.com](#)

# UHD: What's in it for telcos?



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4K UHD's 3064 x 2,160 pixels are an increasingly mainstream TV experience as content offerings increase from few and far between to a fairly decent showing today. After a slowish start, content streamers like Netflix and Amazon and operators such as British Telecom are realizing the potential of pixel-rich content. Thierry Fautier, President and Chair of the Ultra HD Forum, gave us his thoughts on the challenges facing the UHD domain, especially for operators hoping to compete with OTT players.

By Gary Maidment

## Three main challenges

**R**esearch by the Ultra HD Forum shows that the most pressing issue for most operators is the availability of UHD content. According to Fautier, "This means high-quality content they can put on a channel to provide a commercial service, not a spike of two hours every week like you often find in Europe." An unbroken stream of content like British Telecom's 4K offering, BT Sport Ultra HD, the UK's first 4K channel, is obviously more attractive to service providers and subscribers than a series of one-off movies.

And that's also the catch-22: For UHD content to be broadcast and consumed, a service channel must be in place and enough subscribers must have UHD devices to watch it on. But, service providers are unwilling to build a UHD service channel and invest in the tech to do so if there isn't enough content. The same is true at the user side, says Fautier, "A family won't spend upwards of €1,000 to buy a 4K UHD TV, unless they have a good reason. They need enough content."

Challenge number two, says Fautier, is the "capability

of devices – from production to delivery to playback and display – to offer a true UHD experience, including HDR, your high framework rate, and your white-color gamut." He also refers to device interoperability, which is necessary to ensure that the standards defined by Ultra HD Forum actually work in real life. A case in point is High Dynamic Range (HDR) technology, one of the latest acronyms in the image realism armory. Offering a range of color, contrast, and brightness that achieves an eye-popping level of realism, a special HDR camera is needed to shoot HDR content. That said, true HDR-capable TVs can upscale content to near HDR levels of millions of colors, but native HDR content is better.

The third stumbling block for operators thinking of deploying UHD services is an excess of standards. HDR, for example, doesn't have a single standard and is therefore impossible to regulate in the context of "HDR-compatible" claims when it comes to TVs.

## Four standards

There are four main HDR standards: HDR10, Dolby Vision, HLG, and Advanced HDR. Of these, HDR10 is the most commonly adopted, with big name TV manufacturers like Sony, Samsung,

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If a trial isn't successful, operators are postponing the decision to offer UHD channels because they want to scale. If you have 1 or 5 or 10 million subscribers, you cannot afford a glitch.

– Thierry Fautier, President and Chair of the Ultra HD Forum



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LG, Vizio, and Hisense all supporting HDR10, as well as Sony's PS4 Pro and Microsoft's Xbox One S. Samsung has gone one step further and released its own standard, HDR10+, while LG and Vizio have produced models that support Dolby Vision, a step up from HDR10 to the tune of millions of colors.

Developed by the BBC and NHK, HLG is designed more for live broadcasts, while Advanced HDR, the newest high-def kid on the block, targets broadcast media and the upscaling of SDR to HDR. Although these standards are compatible with HDR10, "Many more are coming," says Fautier. "So operators are a bit scared of which standard to pick and in what timeframe."

## Show me the money

For operators and broadcasters, 4K UHD must make sense from a financial point of view. And they're understandably cautious. To get the ball rolling, Ultra HD Forum developed a range of standards that Fautier describes as "well-defined but not ambitious." Or that's what the forum thought at the time, having launched Phase A in 2016 based on simple, easy-to-deploy technologies. Operators didn't respond as

anticipated. "After 12 months since we first published our technical specifications, we're still not seeing operators deploying services, which means we were maybe a little too ambitious," says Fautier.

The reason? "If a trial isn't successful, operators are postponing the decision [to offer UHD channels] because they want to scale," he explains. "If you have 1 or 5 or 10 million subscribers, you cannot afford a glitch." Users want and expect a UHD service to be smooth and simple straight out of the box. As Fautier points out, there's no 1-800 number for users to call if it isn't.

So, here's where the industry is currently at: "Operators are testing, they're trialing, and they're also working closely with STB manufacturers and TV manufacturers. They want to have everything working," he says. "I think everybody's now starting to understand that once operators see trials working, they'll be much more confident."

Ultra HD Forum acts as a partner and guide on the UHD journey, with its mission centered on "bringing together market leaders from every part of the industry;

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The forum works with operators to ensure they can capitalize on their inherent advantages, such as robust infrastructure for content delivery and huge numbers of subscribers, in readiness for UHD industry maturity.

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broadcasters, service providers, consumer electronics, and technology vendors to collaborate on solving real-world hurdles, and accelerating Ultra HD deployment.”

As part of this, the forum works with operators to ensure they can capitalize on their inherent advantages, such as robust infrastructure for content delivery and huge numbers of subscribers, in readiness for UHD industry maturity.

## Key technologies

Despite the reticence of operators, Fautier states that the basic tech building blocks for UHD are in place. In terms of delivery, we need bitrate speeds of 20 to 25 megabits to stream live events like sporting events. “Only fibers of

very advanced vector technology like G.Fast can support those bitrates. Don't forget that if I'm saying 25 megabits for my video service, I probably need 10 or 20 for my data services, which means the lines need to be at least 30, 40, or 50 megabits to sustain this. And this is quite high.”

G.Fast technology comes into its own in the last mile of transmission, potentially achieving gigabit speeds over short distances by extending frequency spectrum. However, higher frequencies also mean higher costs and greater power consumption. So, in practice the frequency band that's ultimately used is a compromise between performance, cost, and implementation. For operators, G.Fast requires a well-thought-out solution.

## G.Fast in action

Last year Openreach, British Telecom's fixed-line and infrastructure arm, selected Huawei to help deliver the first phase of G.Fast deployment in the UK. The agreement is part of a project that will bring ultrafast broadband speeds to 10 million UK premises by the end of 2020, the culmination of a £6 billion investment by the British incumbent that will no doubt expedite the reach and take up of UHD services.

Announced in July 2017, Huawei is partnering with Omantel to deploy the first E2E G.Fast solution in the Middle East, minimizing investment by reusing copper



When all the features of UHD technology are stable, you'll be able to transplant those technologies into a VR environment. And this is something we believe should happen around 2020.



lines to deliver ultrafast broadband. Omantel is planning to deploy a high-performance G.fast home gateway, which will provide subscribers with dual-band gigabit Wi-Fi and improved voice, data, and video services, including the potential for 4K UHD services.

### Now until 2020

Fautier states that consumers can look forward to a much more immersive experience in the future, when UHD, HDR, and other technologies like High Frame Rate (HFR) intersect with VR. HFR is a proven means of dialing up realism by eliminating the strobing and blurring that can affect moving images, something we're perhaps not yet completely ready for. Peter Jackson's controversial decision to use 48 frames-per-second (FPS) instead of the usual 24 FPS for his Hobbit movies received criticism for being so realistic that it was distracting. However, in a VR context, it's exactly what's needed.

"Then we have Next Generation Audio," says Fautier, touching on another ingredient for true VR immersion. "It can be channel-based, object-based, and interactive." Channel-based audio is the traditional method of capturing sound with the user device in mind. Object-based audio (OBA) is a newer surround sound technology that overlays up to 128 audio tracks onto a 3D rectangular coordinate with defined audio channel locations. For example, a gunshot

in the distance will sound like it's coming from the distance, forming part of a rich, highly layered sound experience, as if you're in the scene. "When all the features of UHD technology are stable, you'll be able to transplant those technologies into a VR environment. And this is something we believe should happen around 2020," predicts Fautier.

The logical progression of mature immersion technology is "six degrees of freedom," says Fautier, which will produce a hugely data-intensive, full-image capture scenario that will allow the user to move inside a scene, "All these applications when they come together will give an outstanding experience." He believes that Huawei is well-positioned to play a part in this immersive future, "Huawei understands the internal workflow from creation to delivery to the end, so it's uniquely positioned to catch the VR wave."

Equally, the opportunities for operators are definitely there, assuming the right partnerships and strategies. A key growth point for them over the next few years is the convergence of fixed and wireless services with bundled communications, broadband, and TV services – with UHD as a key offering. There's always risk, but as Fautier puts it, "It's like digging for oil – if you don't try you'll never find anything." [www](#)

# Winning the digital transformation race requires new business strategies



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Industry digitalization is heading into deeper water. Manufacturing, services, and other traditionally non-data-intensive industries have begun generating large amounts of data. Data, in fact, has become one of the key elements of production. Meanwhile, ICT has become tightly integrated with all industries, changing from a support function to a production system.

By William Xu, Huawei Chief Strategy Marketing Officer

**T**he aim of enterprise digitalization is no longer just to achieve higher efficiency in existing business; rather, it is to create value in new business. Witness the advent of “digital production,” the processing of data in a way that creates value and allows enterprises to provide digital products and services.

The concept of digital production can be traced back to a late 20th-century project involving the Joint Strike Fighter in the US military. This project required the development of an aircraft capable of simultaneously meeting the different needs of the Air Force, the Navy, and the Marine Corps.

To meet the project deadline, defense contractor Lockheed Martin led a task force made up of 50 companies from 30 countries using digital design, development, and management methods. The results were impressive: the design time, number of components, and design, manufacturing, and maintenance costs were cut in half, while manufacturing time was reduced by 67 percent, and assembly work fell by 90 percent.

Digital production will soon extend beyond high-value sectors, such as the military and aviation, to



William Xu



Smart hardware and the Internet of Things (IoT) generate huge amounts of data. Whether you're running, driving, shopping, or even sleeping, basically anything you do is generating a digital footprint.



encompass many other industries. For example, WeChat, China's leading social media platform, uses data for targeted advertising. GE uses data to predict when aircraft engines will require maintenance. Hospitals use data to determine when someone may contract an illness. And governments use data to operate smart city programs. One day, nearly all companies will use digital production.

## Controlling core data

Smart hardware and the Internet of Things (IoT) generate huge amounts of data. Whether you're running, driving, shopping, or even sleeping, basically anything you do is generating a digital footprint.

Enterprises can use analytics, AI, and other technologies to extract more value from that data. In the first half of 2017, Tesla sold just 47,000 vehicles, but its current market value is higher than GM, which sold 4.7 million vehicles during the same period. A major reason is that Tesla collects massive amounts of data from its self-driving vehicles, then uses it to improve the technology.

How should traditional enterprises establish a strategy

for turning data into a competitive strength?

The first step is to start generating data from assets. For enterprises, digital transformation requires three types of data: customer data, operational data, and asset data, including information about products and services. Of these categories, asset data is the key to digitalizing production; it is also unique to each industry, so difficulties faced by different industries can vary significantly. Sectors such as finance, e-commerce, and telecom are data-intensive, whereas manufacturing and public services will probably need to modify their assets before they can collect all the data they need. For example, GE uses several hundred sensors on its aircraft engines that continually spit out a stream of data. The bike-sharing company, ofo, uses narrowband IoT (NB-IoT) technology to collect data from bikes, even when they're parked underground.

The next step is to make data flow. This means enterprises must evolve beyond having each department collect and manage data separately, and instead begin to create a single unified database. Through proper data governance, data can be kept consistent and can be shared, making it "flow" and generate value.

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Insight from digital twins will help us to automate network operations, provision applications, and perform network maintenance.

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The third and most important step is product modeling. For each of their core products, enterprises must build something like a “digital twin,” a term coined 14 years ago by Professor Michael Grieves at the University of Michigan. A digital twin is a virtual model of a physical asset, such as a jet engine. Digital twins enable two-way communication between the digital and physical worlds. They also create a feedback loop that can maximize the value of the data generated by the physical asset.

The idea behind a digital twin is to have a digital replica that enables real-time and monitoring of physical products as they operate. This helps prevent risks, allows the asset to be controlled remotely, and generates valuable data about how the asset is performing.

Digital twins can improve efficiency in activities including R&D validation, sales, manufacturing, supply, delivery, and the operations and maintenance of physical





Digital production requires that a large quantity of information be sent from devices and equipment, which means that machines need to be able to “speak.”



products. Gartner forecasts that within five years, hundreds of millions of physical objects will have digital twins.

Huawei’s explorations in wireless communications are a good example of how value can be created from data. By leveraging the data accumulated from its network of roughly 3.5 million cellular base stations, Huawei built a digital twin of its base station products. Data gleaned from this effort allowed us to reduce costs and improve efficiency.

## Transforming production systems

With a clearly-defined data strategy, enterprises can consider integrating devices, networks, and the cloud, and working to build a powerful digital production system. The result of this is a virtuous cycle where data turns into opportunities, opportunities turn into services, and services turn into revenue.

First, production can be modified at the device level. Digital production requires that a large quantity of information be sent from devices and equipment, which means that machines need to be able to “speak.” With sensors spitting out a constant stream of data, actions are turned into records, records become data, and data enters systems.

Many scenarios also require smart devices to have edge computing capabilities. According to some estimates, a self-driving car generates a gigabyte of data every second. To process such a large volume of data in real time requires the use of edge computing.

At the network level, digital production requires that all of an enterprise’s assets and equipment be connected and managed. Special networks, such as NB-IoT, are needed to maintain large numbers of connections with low power consumption over long distances. Enterprises also need to use campus networks, professional security services, and other means to ensure the security of data transmissions.

## Reshaping customer value

Traditionally, the fundamental value that an enterprise provided to its customers did not change much over time. For example, an automaker provided value to customers relating to things like transportation, safety, comfort, and status. But in the digital age, technological advances have greatly reduced the time and cost of turning data into opportunities. Services that were once expensive to provide are now much more affordable. Formerly smaller-scale services are becoming much larger in scale, and some services that were not feasible to provide in the past can now be easily offered



Digital services don't just emerge out of thin air. The major pacesetters in global digital transformation have approached the challenge by relying on their existing competitive products.



to customers. Large-scale digital services are becoming increasingly lucrative. We are beginning to see a transition of value from traditional products and services toward digital services.

Digital services don't just emerge out of thin air. The major pacesetters in global digital transformation have approached the challenge by relying on their existing competitive products. Building upon this foundation, they have integrated ICT and their deep understanding of their industry to provide digital services to customers. Enterprises need to find a way to get their foot in the door with respect to digitalization by considering their current situation. This, in turn, will help them find new business opportunities and reshape the value they bring to customers.

Enterprises involved in traditional manufacturing can install sensors on their most competitive products and build a digital production system that integrates devices, networks, and the cloud. By analyzing and utilizing real-time data, companies can transition from selling tangible products to offering digital services. For example, GE no longer directly sells aircraft engines. Instead, they sell engine flight hours, and provide flight services including real-time diagnosis and dynamic maintenance, fault prediction, and fuel line planning. The German farm equipment company Holmer provides preventative maintenance services for the 3,500 sugar beet harvesters

it has sold globally, reducing maintenance costs by 30 percent.

Interest in ICT is also surging in traditional service industries, as participants seek to reshape core businesses and transition towards providing digital services. For example, telecom operators are beginning to provide video, cloud computing, and other services on top of their connectivity services. Banks are transitioning toward digital banking. As a first foray into big data and AI in the insurance industry, China Pacific Insurance recently launched the industry's first intelligent insurance advisor, Alpha Insurance, which relies on data accumulated from the company's 110 million insurance clients. Just four days after its launch, the service had been accessed more than 2 million times. Innovations and value creation based on digital transformation are occurring across many other sectors, including transportation, water utilities, agriculture, and public safety.

Digital transformation is a bridge every enterprise must cross. Leading companies already feel pressure from competitors and sense the pace of change across the ecosystem. Opportunity waits for no one, and the digital era calls for decisiveness. If we don't act, opportunities to boost competitiveness and enhance business performance will be lost, perhaps for good. 

# AI: The reality and the hype



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Artificial Intelligence (AI) is a pervasive technological force that's impacting individuals, business, and society. While another AI winter seems unlikely thanks to the advances in deep learning this decade, it's important to separate fact from fiction so that governments can regulate AI in a way that doesn't stifle its potential, play up to public fears, or create a climate of overhype.

By Gary Maidment

## Probably a better driver than you are

According to University of Edinburgh's Professor of Epistemics, Jon Oberlander, the answer to whether AI is overhyped is a "very firm yes and no," meaning that the tech is viable, but that tangent obstacles exist. He uses driverless vehicles as an example, "I think they're not quite as close as we might imagine...The reasons aren't technical, they're regulatory."

The first issue with regulating driverless cars is ethical. Imagine a child running into the road after a ball where avoidance would force the car to either swerve into an elderly couple or cause injury to its passenger – the AI would need to make its choice in a split-second. And where would insurance and the law sit in this type of scenario?

A linked second issue is accountability: Who's responsible if a driverless car crashes? The manufacturer, tech vendor, or passenger-driver? In the blurry worlds of semi-autonomous vehicles and the impending mix of autonomous and human-driven

vehicles, the liability issue gets even more complex. According to Oberlander, "It's the designers or the owners...of the machines, the self-driving cars, who should be responsible for all of the actions of their tools." Manufacturers are divided: Volvo, for example, made the news in 2015 as the first car maker to say it would accept full liability for its vehicles, whereas Tesla CEO and founder Elon Musk believes the occupant's insurance should take the hit for non-design related faults.

## Distrust about AI

When assessing the perception of driverless vehicles, surveys in both 2016 and 2017 by the insurer AAA reveal that, "Three-quarters of U.S. drivers report feeling afraid to ride in a self-driving car." Research by MIT in 2016 shows similar results, "The trust to adopt these technologies is not yet here for many potential users and may need to be built-up over time," while another MIT survey holds that 48 percent of respondents wouldn't buy a fully autonomous car.

Oberlander believes that a mix of public trepidation

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There’s a whole lot of arguments that the AIs being developed now are not quite ready to be socially acceptable.

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and unclear regulations are why there’s “a whole lot of arguments that the AIs being developed now are not quite ready to be socially acceptable.”

### It’s not just cars

A 2016 survey by the British Science Association found that people are reluctant to use AI in other scenarios: 53 percent in the case of surgical procedures and 62 percent for commercial aircraft.

However, this hides the fact that AI is alive and kicking in both cases. In healthcare, the tele-operated Da Vinci system has to date performed more than 3 million operations, and AI is already helping radiologists check scans for tumors. Concerning aircraft, the tech mag Wired addresses the public perception issue in the title of the article, “Don’t freak out over Boeing’s self-flying plane – robots already run the skies.” Reporting on Boeing’s plan to take pilots out of the equation completely by extending more decisions to AI, the writer points out that this isn’t really that far from what’s happening now.

According to Oberlander, though, many AI’s are “not doing quite the things that you might think of

as being really ‘AI-ish’ just yet.” This is a key point. While narrow AI abounds in various fields whereby the AI system can perform a very specific task outstandingly well, the public’s perception of what AI does is a bit murky because it’s hard to define. Thus many people have mixed feelings towards it, although few believe in the movie trope of robot overlords.

Nevertheless, we might be going in the wrong direction if regulations are influenced by a collective misunderstanding of AI.

### AI’s tech enablers

For those in the industry, the technological side of AI is less overhyped than the anticipation of the sci-fi-esque ways it’ll be applied. Its major technology enablers are beginning to fall into place, including broadband connectivity, data centers, cloud, big data and analytics, and IoT.

How do they slot together? Broadband connects the data centers that provide cloud services like computing, storage, and XaaS, including AI-as-a-Service. In large part thanks to cloud, computer processing and GPU power recently became



cheap enough to facilitate sufficiently fast parallel processing on a massive scale and enable deep learning.

IoT and its potentially billions of sensors yield the big data that AI needs for its algorithms to perform deep learning and analytics. However, Oberlander points out a current issue with AI's dependence on big data, "On the one hand we have a surfeit of data...But, a lot of data is not labeled, and so to use some of the most powerful techniques, supervised learning techniques, you need to label that data."

## Going deep

In the area of deep learning applied to computer vision, big data and improved computer processing power helped Google's Andrew Ng make a breakthrough in 2012 by bombarding a vast neural network with 10 million video thumbnails from

YouTube over three days. The system was given a list of 20,000 items without being instructed on how to distinguish between them in an unsupervised learning scenario using unlabeled data. Over the course of the experiment, it began to detect human faces, human body parts, and cats with 81.7 percent, 76.7 percent, and 74.8 percent accuracy, respectively. "There's genuine excitement particularly in areas around neural networks and deep learning, where there's been dramatic progress," says Oberlander.

Another exciting field is probabilistic machine learning in natural language processing, which according to Oberlander, "uses Bayesian Inference for unsupervised language acquisition; basically, just throwing the machine in the deep end." With Bayesian Inference, there are no target prediction examples that predicate statistical learning. Oberlander explains how his colleague from the University of Edinburgh's School of Informatics, Dr. Sharon Goldwater, used Bayesian

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Over the decade, my feeling is that there'll be a lot more AI there, but you won't necessarily notice it.

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Inference “to explain how you can build automatic speech recognition from first principles.”

Oberlander also mentions deep reinforcement learning, a crossover point between cognitive science and deep learning that takes a reward-punishment approach to AI learning. Talking of Google's Deepmind's success at learning several Atari games by retaining past experience rather than following separate programming for each game, he says that, “There's a very clear reward function...The numbers that constitute the reward, I think, are what the systems themselves discover.”

## Artificial General Intelligence (AGI)

While there's clearly a lot of excitement about the cutting-edge of AI research, Oberlander isn't particularly bullish about AGI, believing we're still “a long way off” from the theoretical singularity whereby artificial intelligence equals human intelligence across the whole spectrum of human intellect. Despite Deepmind's skill at Atari games, which ostensibly implies some sort of generality of intelligence, aka AGI, Oberlander believes that, “pulling together the narrow intelligences we have now isn't necessarily the route to

that destination.”

He takes a pragmatic view towards what's going to happen over the decade, “My feeling is that there'll be a lot more AI there, but you won't necessarily notice it.”

AI ubiquity, therefore, may pass without much fanfare as far as the reality goes, while regulations could well push back against how fast exciting applications like driverless vehicles and robot assistants become socially acceptable. In July 2017, The Guardian reported on researchers' calls for robots to be fitted with an “ethical black box” to explain an AI's decisions if accidents happen in scenarios like healthcare, security, customer assistants, and driverless vehicles.

The excitement in the industry is thus tempered by a lack of clear regulations not just on liability should an accident occur, but also on both transparency in AI research and on releasing open-source code, which some companies already do. Astro Teller, who participated in Stanford University's One Hundred Year Study on Artificial Intelligence, wrote in his blog that, “For that last reason (regulations), it is imperative to ensure that the basics of AI (what it is and how it works and

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We need to start thinking about the implications of the technology now if we want to be able to control that technology and deliver the right kinds of social benefits in the longer term.

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what it can and can't do) become critical knowledge pieces for the government of any high functioning developed nation.”

Equally, Oberlander strongly believes in the responsible development of AI, “We need to start thinking about the implications of the technology now if we want to be able to control that technology and deliver the right kinds of social benefits in the longer term.”

And public-private partnerships are one way to promote the responsible application of AI. Announced this June, the University of Edinburgh and Huawei are collaborating on a joint lab, which will be housed in the university's School of Informatics. The partners are focusing on distributed data management and processing, NLP, general inference in neural networks, and machine learning on huge data sets.

## Getting down to business

With robust regulations in place, AI can flourish in a transparent environment that can have huge benefits on society, result in a well-informed public, and fuel the digital economy.

Business is one area where AI's value is destined to



match the hype. Research by Accenture suggests that AI will double economic output by 2035 in 12 developed economies it studied, and increase labor productivity by up to 40 percent.

Cloud computing will enable AI-as-a-Service and bring innovation potential into the many more hands across the globe. Continued advances in robotics, big data, IoT, deep learning, and predictive analytics will produce actionable insights across all industry verticals, delivering a goldmine of efficiency and productivity – something that's worth getting really excited about. [IBM](#)



# 5G: Moving closer to reality



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MBBF 2017 was rich in insights, providing a rich array of opinions from those at the forefront of the industry. And 5G, of course, was one of the central topics. Carriers from around the globe share their views on 5G, its challenges and opportunities.

By Justin Springham, Mobile World Live

**H**uawei's Deputy Chairman and Rotating CEO, Ken Hu, kicked off MBBF by noting that while the evolution of the industry means "opportunities are everywhere," networks need to be ready to support this. "Future networks should be application-centric, data-driven, and eventually, they should be intelligent systems," he said in the opening keynote address. Hu warned that networks will be expected to support a range of use cases, but in terms of operations and maintenance (O&M), there has been little in the way of change.



Huawei has found on average that network O&M costs are roughly three- to four-times the cost of equipment itself, and that 70 percent of major network faults are the

result of human error. Hu believes the use of big data and artificial intelligence (AI) will enable operators to build networks which can be controlled and managed more intelligently. "We think 'intelligent network' points to an important direction for the telecoms industry, and it's a solution to the paradox in the industry." This paradox, said Hu, "is the need for networks to support more diverse and complex applications, but at the same time network technology is becoming more complicated as well as advanced."

Gary Coombe, President of Procter & Gamble (P&G) Europe, is also optimistic about the opportunities, despite the disruption caused by new technologies. He explained in his keynote presentation how the company's business model, honed over 180 years, is being turned upside down by mobile and digital technologies, which are also impacting the advertising

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GSMA predicts that by 2025 5G connections will reach 1.2 billion – a figure which will be more than the total 2G connections at that time.

– Alex Sinclair, CTO, GSMA

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industry and retailers. “The technology being developed could be judged as a threat, but we don’t see it that way. We see it as a huge opportunity to transform our business,” Coombe stated.

## 5G focus

5G was the main focus of the keynotes during day one at MBBF. Indeed, improved efficiency is major selling point for 5G, claimed Vodafone Group CTO Johan Wibergh. “The increased efficiency you’re getting means that 5G is significantly more efficient than 4G. And if you look at cost, you almost have ten-times the cost efficiency with 5G. I don’t understand why we as an industry are not talking more about this, because at the beginning of 5G there is going to be much more mobile broadband usage, and cost is a challenge for us.” Wibergh argued the mobile industry also needs to focus on what 5G can deliver in the near future, rather than looking at far-off use cases. “We know that at the end of the day we need to make a business case to make this work,” he continued,

noting improved efficiency could play a part in this.



**Bruno Jacobfeuerborn,**  
CTO at Deutsche Telekom,  
lamented on day two that  
right now the business

cases for 5G aren’t there. “That’s the sad story. But we will have a business case, for sure,” he asserted. He pointed out for the first time ever the customer is the focal point – in the 2G and 3G eras, technology was the focus (and even to some extent too in the 4G world). To that end, Deutsche Telekom is running a 5G New Radio trial in a real-world setting on its network in central Berlin in an attempt to gain consumer-led learnings from early 5G developments.

Highlighting the speed with which the industry will move to 5G, **GSMA CTO Alex Sinclair** said in his keynote that the organization predicts that, by 2025, 5G connections will reach 1.2 billion – a figure which will be more than the total 2G connections at that time.



NTT DOCOMO CTO Hiroshi Nakamura also emphasised that co-creation will be fundamental to accelerating future 5G services. The executive said innovations such as autonomous driving, VR, and smart homes and smart cities can be developed but require collaboration with partners. “I believe 5G supported by AI is a core technology for realizing a new world and new lifestyles. DOCOMO’s vision requires co-creation

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Clearly the innovation is there [for 5G], it's coming to market quickly. But, ultimately, as carriers we've got to make a significant investment and lower CAPEX, and the business case still needs to be, I think, learned.

– Gavin Patterson, CEO, BT

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– we cannot launch these new services alone.”

It was also claimed that 5G networks will require increased use of microsites to complement an operator's existing macro sites.



**Eros Spadotto, EVP at Canadian operator Telus**, told the audience that its traffic increases by about 30 percent in areas where it deploys microcells. In many cases, he said microcells have

payback periods of less than a year (and on average only around two years). “That’s a tremendous opportunity as we look to make more money,” he declared.

**BT CEO Gavin Patterson**

also made headlines in the keynotes on day two by agreeing that there’s a need to have a clearer business model on which to build 5G network investment plans. “Clearly the innovation is there, it’s coming to market quickly. But, ultimately, as carriers we’ve got to make a significant investment and lower CAPEX, and the business case still



needs to be I think learned, in many ways,” he said.

## Start now with 4.5G

Although 5G deployment is still a couple of years off, Ryan Ding, president of Huawei’s Carrier Business Group, used his address at the opening of day two’s keynotes to urge operators to “act now” in building capabilities to support future 5G services. “Our industry cannot just sit and wait for 5G,” he warned during the ‘4.5G Innovation and Growth’ session. “We must act now, incubating new services and building new capabilities in 4.5G networks. I believe that WTTX [fixed-wireless access] and NB-IoT will be a good start,” he said. “These two services will not only create some new revenue, new services, but they will prepare operators to build 5G capabilities in operations, in organization, and most importantly, in ecosystem,” Ding continued.

In Europe, Telefonica isn’t waiting for 5G standards to be ready, noted CTIO Enrique Blanco, who said the operator is focused on using the full power of 4G LTE and being prepared for 5G when it becomes possible. Meanwhile, Arnaud Vamparys, Senior VP for Radio Networks at Orange, revealed plans in the 4.5G keynote session to start end-to-end 5G

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While there are many IoT applications where the quality and speed of today's networks are good enough, there are many opportunities which require better quality communications and 5G will play a clear role here.

– Joni Rautavuori, Group VP, ABB Robotics

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trials next year, with national coverage targeted in 2021 or 2022.

## Quality jump



Beyond the operator and vendor keynote presentations,

**Joni Rautavuori, a group VP at ABB Robotics,**

grabbed attention in his address by stating that future networks need to be more robust and faster in order for industrial

applications to truly go mobile. “While

there are many IoT applications where the quality and speed of today's networks are good enough, there are many opportunities which require better quality communications, and 5G will play a clear role here,” he explained.

David Lynn, President and CEO of Viacom International Media Networks, expressed confidence in mobile becoming a mainstream pay-TV platform, rivaling fiber in quality, but also noted that milestone may have to wait for 5G networks. “I'm certain mobile will become a mainstream platform for pay-TV, but

perhaps mobile streaming will not fully come of age until 5G networks are widely established,” he said.

“Mobile may then match fiber or Direct To Home (DTH) for choice, reliability and quality, allowing it to differentiate itself by offering new content experiences, including AR and VR.”

Closing the keynote programme, Edward Deng, Huawei's President of Wireless Solutions, conceded that network architecture will face new challenges as new services will have increased in diversity, but must be supported on a single network. The network therefore needs to be flexible and agile to support this and to shorten the TTM to help operators take advantage of these opportunities.

Deng pointed out another challenge will come from network management efficiency. More cell sites will be needed and more spectrum will be released in the future, which will result in increased network complexity and growing OPEX. Deng said that to support future capabilities, tomorrow's wireless networks must be more intelligent to make operations simpler. “So 5G, cloudification and intelligence are the most important elements for future mobile networks,” he concluded. [www.abb.com](#)

# On the money in Bangladesh with **bKash**



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How can you create a flourishing economy when 85 percent of people don't have a bank account? In Bangladesh, bKash is the simple, secure, and mobile answer. Affordable and effective, it's already attracted 30 million registered users. How did it do that and how does it work?

By Wang Hai, Du Juan





**B**angladesh's 165 million people live in the most densely populated nation in the world. More than 70 percent live in rural areas, where mainstream banks don't provide services. In fact, only around 15 percent of Bangladeshis have access to banking services, while most are unable to obtain credit, make digital payments, remittances, or deposits, or start a savings account.

The government has made great efforts to develop mobile payment services to aid the 85 percent of the population without a bank account, introducing regulations to encourage more players to join the market. In 2011, under the direction of Bangladesh Bank, the country's central bank, the government issued 28 mobile financial services licenses to operators and qualified banks. One was awarded to bKash – a subsidiary of BRAC Bank. The new company's founding mission was to expand financial inclusion by providing convenient, affordable, and reliable financial services.

## Making life easier

With no access to formal banking services, most people struggle with day-to-day finances like sending money to other accounts, paying bills on time, or carrying cash safely. By integrating banking and telecom services, bKash makes it possible for anyone with a feature phone to access its ten main services, which include deposits, withdrawals, transfers, and payments on a USSD service interface. Today, bKash's service covers 98 percent of Bangladeshi mobile subscribers.

Raju works in the capital Dhaka, and supports his family who live in the countryside. In the past, it was hard for him to send money back to his village, but now he can securely send money to his wife's account on his phone using bKash. Maya can then pick up the cash straight away from a nearby bKash agent.

Shudeb Kumar Ghosh runs a family dairy business. Financial transactions were a lot of

“bKash has more than 50,000 companies on its network, including shops, medical facilities, and educational institutions, that provide payment services for users.”

hassle, and sometimes meant he had to stop production to collect money from buyers. bKash lets him receive payments for goods in a few hours via secure and real-time transactions on his phone.

## Team effort

bKash collaborated with all the GSM operators in Bangladesh to establish its payment service. Consumers can use a Grameenphone, Robi, Banglalink, or Teletalk number to open a bKash account, with their phone number serving as their account number. Services are operated via the telco's USSD and SMS systems.

bKash is increasing its collaboration with banks and international remittance companies. It has signed cooperation agreements with 14 banks, including Sonali Bank, Bangladesh's largest state-owned commercial bank, to use their nationwide network to provide receipts, payments, and other services to bKash distributors. bKash also teamed up with Standard

Chartered Bank to launch Straight2Bank wallets in Bangladesh and Western Union and MasterCard to provide international remittance services.

On the making payments side of things, bKash is partnering up with more businesses to increase service coverage and build up the payments ecosystem. bKash has more than 50,000 companies on its network, including shops, medical facilities, and educational institutions, that provide payment services for users.

By generously sharing benefits with its distributors, operators, and other partners, bKash has stimulated significant growth for its service. It has distribution agents in over 160,000 locations, and the company has built up a huge business network through a four-tier hierarchical management system. bKash has agents in many remote areas and even small bKash booths open past 10pm, which bank counter services cannot rival.

## Trusted brand



bKash's bright pink signage is eye-catching and easily identifiable amid the lush green backdrop of Bangladesh's rural areas. The company's advertising billboards also often occupy prominent locations in towns and cities and promote the value of the service through customer stories. In Bangladesh, everyone knows of bKash whether or not they've used its service.

bKash frequently teams up with merchants to run promotional campaigns, especially during holidays. Its real-time cash back service uses Huawei's Mobile Money platform, which gives users a slight rebate when using bKash to pay selected merchants.

bKash continues to refine its platform to provide users with a more secure, reliable, and diverse service. The company aims to turn the brand into a lifestyle product that's more than just a money transfer tool. bKash's next step is to focus on developing a user-oriented app and providing financial services that connect to banks. As bKash's platform-side strategic partner, Huawei will assist the company achieve this vision.

bKash's CEO Kamal Quadir believes that the Huawei solution is very well designed, helping bKash tailor needs to different customers. "A customer may say, 'I want to use this platform to access my bank account', 'transfer funds', 'buy airtime', or 'buy insurance', and so on," says Quadir, "That's the main reason we're working with Huawei."

bKash's vision for the future is to provide financial services for low-income areas not covered by conventional services, and thus cover more people in Bangladesh. In just six years, bKash has grown into Bangladesh's largest mobile financial services provider, with 17 percent of the population holding a bKash account.

It's now a trusted brand whose rapid and widespread success comes down to easily accessible services, a reliable and secure solution, diverse service scenarios and ecosystems, and a socially responsible brand culture. Simplifying money transfers from the city to the countryside is bKash's key contribution to economic development in Bangladesh. [www.bkash.com](#)

# T-Mobile Czech Republic

## Fixed on success with wireless



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Today's competitive and transformative communications environment means that even market leaders have to make bold moves not just to stay at the top, but to stay in the game. And Deutsche Telekom subsidiary T-Mobile Czech Republic is no exception. The mobile operator's Executive Director B2C Dusan Svalek explains how Fixed Wireless Access (FWA) in the form of WTTx can plug a connectivity gap in the nation of nearly 11 million and open up new business models in readiness for 5G.

By Gary Maidment



“Other players haven’t been investing heavily in future-proof fixed broadband technologies like FTTH and so broadband penetration isn’t at acceptable levels.”

– Dusan Svalek, Executive Director B2C CMO, T-Mobile Czech Republic



## Quality gap

**W**ith nearly 6.2 million subscribers under its belt, T-Mobile Czech Republic enjoys a decisive market lead.

In the first three quarters of 2017, it grew its user base by 128,000 and kicked up revenues by a healthy 3.2 percent. However, according to Svalek there’s still plenty of opportunity for growth, “A lot of broadband coverage is either mediocre, with low speeds, low-quality, or, I would say, based on obsolete technologies like Wi-Fi.” Indeed, the surge in home device connections and blind spots are providing a substandard Wi-Fi experience for many, while all-you-can-eat data plans and the rise in competing technologies like LTE-U and FWA are challenging the wireless stalwart’s popularity.

Svalek explains that a lack of fixed infrastructure in the Czech Republic is creating a quality gap that fast movers in the mobile domain can exploit, “Other players haven’t been investing heavily in future-proof fixed broadband technologies like FTTH [and so] broadband penetration isn’t at acceptable

levels.” He goes on to state the surprisingly large opportunity this presents given that, “The product offering for over 40 percent of the population isn’t very good.” Therefore, agrees the company’s Innovation Manager Jan Fiser, “It’s logical for us to migrate those users to WTTx because of higher margins compared to reselling DSL.”

## Shifting to fixed

T-Mobile Czech Republic has its eye on FWA technology – specifically Huawei’s WTTx solution – as the key to bridging the quality gap, a bold move considering that FWA is uncharted waters for most mobile operators. Though FWA in form, in practice it’s more like a fixed offering, “I don’t think it’s a wireless product in the nature, in quality, and in the sales processes,” explains Svalek.

For a mobile operator, sailing into fixed territory requires a change in mindset and operations. “It’s not a trivial thing for the mobile frontline to start selling fixed products,” Svalek says. “It requires transforming everything behind it, starting from training, the incentive system, and steering

“T-Mobile Czech Republic is planning to expand FWA deployment in the nation’s bigger cities, including Prague, targeting pockets of population that aren’t well-covered by existing infrastructure.”

mechanism, because the provisioning process is completely different from mobile.” He points out that in the FWA scenario, provisioning an outdoor antenna takes about two weeks, unlike the immediacy of mobile provisioning. For T-Mobile Czech Republic, that means restructuring the frontline, something that Svalek concedes “is not easy, but not unbeatable.”

## FWA goes urban

FWA generally suits SMEs and homes in rural areas and emerging markets that lack the fixed infrastructure to deliver broadband using fiber, copper, or hybrid schemes. It uses wireless technologies such as 4G or 5G to connect base stations to fixed wireless terminals, which provide backhaul capabilities for customer premises equipment (CPE). FWA’s major selling point is that it connects the disproportionately expensive last-mile at a far cheaper rollout cost than FTTH. It’s also faster to deploy and incurs less OPEX.

T-Mobile Czech Republic is planning to expand FWA deployment in the nation’s bigger cities, including Prague, targeting pockets of population that aren’t well-covered by existing infrastructure – an approach that brings with it challenges. Covering densely populated areas with FWA with

high population density is tricky. You have to really think twice how much capacity you have for the given zones or given regions,” explains Svalek. Poor planning will fail to bring to bear FWA’s competitive advantages against both Wi-Fi and xDSL, the network technologies it’s competing against, especially in, he says, “low-speed DSL areas or areas saturated with DSL.”

According to the operator’s FMC Director Juraj Bona, FWA also delivers another clear OPEX advantage, “It’s utilizing our network, which is sometimes not fully utilized.” And this isn’t just confined to under-served urban areas. “It gives high and quick access to rural areas where customers also demand high-speed Internet,” says Bona.

Despite its advantages, the cost of CPE is a major factor when deploying FWA at scale. Svalek warns that, “CPEs are sometimes prohibitively costly, especially for Czech households.” CPEs serve as wireless gateway routers for LTE-based, high-speed data services. For its FWA project, T-mobile Czech Republic is continuing its long-term partnership with Huawei, having selected Huawei’s flexibly mounted outdoor CPEs, which provide LTE connections of up to 600 Mbps downlink and

150 Mbps uplink, 4x4 MIMO, and 5G capabilities.

## Two differentiators

Alongside the tech, Svalek knows that experience sits at the heart of subscriber loyalty, “We’re keen to differentiate with our quality of service and customer care, including taking care of all household telecom needs,” he says, proceeding to give two examples of how the operator plans to keep consumers happy.

This first is tariff. T-mobile Czech Republic will offer unlimited data in conjunction with a speed-based tariff for FWA services. “You have to bring in a tariff that addresses customer pain points,” says Svalek. In this case, his rationale goes back to FWA as a fixed product, “Without unlimited tariff, i.e. with the introduction of FUP (Fair Usage Policy), you wouldn’t be clearly positioning against other fixed product where non-FUP is a standard in the Czech market. So if you want to conquer the fixed product market, you have to structure the product in the fixed-line domain.”

Additionally, he’s clear that brand equity plays a strong role, “That’s why FWA as a technology, and consequently the tariff, can have success, because it’s a higher-quality product that’s provided by a major telco operator. That in itself is something that customers in the Czech market value,” Svalek says.

The second differentiator that T-mobile Czech Republic offers is services, “We’ve done a major shift in our portfolio...We upgraded our mobile portfolio completely, and also launched new products, including new broadband services,” he says. One such product is IPTV, an area where

T-Mobile Czech Republic earned pioneer status in Q2 2017, becoming the first operator ever to launch the service over a wireless network, outpacing fast-movers like America, Japan, and Korea. Svalek also mentions that the operator is considering the viability of 4K TV in the future, but is pragmatic in that the viability of ultra-high def depends on a number of factors, “Throughput, stability, the utilization of our existing network capacity...If these conditions allow for it, we’d love to use 4K. 5G may enable it, but it’s more like a, I would say, 5-year horizon.”

5G, of course, is still on the operator’s radar. “We’re definitely looking at it quite closely. We’re working on up to 10 groups of use cases... like the automotive industry and especially mHealth,” says Svalek. “We’re also thinking big about what to do with 5G on the IoT side.”

## 5G FWA

As a mobile broadband add-on, FWA is an excellent choice for connecting homes and enterprises that lack FTTH infrastructure. When it’s rolled out, 5G will take service provision and low-latency to a level that can easily compete with high-capacity fixed solutions, with network tech like beamforming and Massive MIMO enabling better coverage at higher frequencies.

Right now, technological progress in the 4G arena positions FWA as a sustainable choice for T-Mobile Czech Republic to try something new when it comes to coverage, services, and revenues – something that will consolidate its current leadership and pave the way to a fully connected future. [www](#)

# Guangzhou

## Shaping urban perfection with government cloud



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The perfect city – one that’s both highly livable and business friendly – is a simple aspiration that’s been around since ancient times. With today’s technology, the true smart city is within reach. We can anticipate a time of good governance, good business, and a high standard of living. In a smart society, technology is a tool for increasing government capabilities and efficiency. And government cloud sits at the heart of smart society.

By Yu Zhenghua, Zhang Donglan





**G**uangzhou Municipal Government (GMG) first proposed its Smart Guangzhou plan in 2010. Top-level design started in 2012 and construction in 2013. Then in 2014, GMG adopted Huawei's government cloud platform for all its bureaus, commissions, and offices, culminating in the GMG Information Cloud (GMGIC). GMGIC provides nine major support services, including computing, storage, networking, security, and basic software. Procurement takes place centrally, but contracts are signed individually with each department. Over 240 departments have deployed in excess of 900 service systems and, in November 2017, IDC awarded Guangzhou a digital transformation prize for its excellent digital infrastructure and strong operations and management systems.

## Just how big is China's largest government cloud?

As of October 2017, GMGIC comprised 3,860 virtual servers, 857 physical servers, and 4,546

TB of storage. Underpinned by Huawei's open and trusted unified management platform, GMG's various bureaus, commissions, and offices cut the numbers of its servers, storage, and other hardware by 75 percent and shortened project implementation by more than 70 percent. Initially, the GMGIC mainly provided IaaS services, but it now includes a PaaS layer, SaaS layer, and DaaS service layer.

In the past, GMG invited bids every few years for new cloud services, leading to long deployment cycles. To solve this, GMG is building its own government cloud services marketplace with a more flexible mechanism, so that emerging technologies and new customer requirements can be quickly provisioned and applied.

## Just how good is China's largest government cloud?

GMGIC supports numerous important government applications. A good example of a successful one is the municipal

“The information sharing system has 6.8 billion data points. Government departments exchange more than 17 million pieces of data every day – the highest volume in China.”

government information sharing platform. Information silos between departments are a key factor behind inefficient government administration. The cloud platform enables information and data via the information sharing platform, eliminating silos and connecting departments, substantially increasing efficiency. According to Xing Yihai, director of Guangzhou Municipal Information Center, “The information sharing system has 6.8 billion data points. Government departments exchange more than 17 million pieces of data every day – the highest volume in China.”

## Goodbye fraud

The information sharing system hosts more than 30 special services. Pre-deployment, for example, the business tax collection rate for all of Guangzhou sat at only 69 percent. Post-deployment, the rate increased to over 98 percent for nearly all sources of tax revenue in Guangzhou, boosting government tax revenue by more than 5 billion yuan

(US\$790.3 million) a year. It also facilitates big data analysis of the entire city’s economic performance and tax collection operations.

The government can now run special services such as financial checks for low-income families and a license plate lottery for small and medium passenger cars. The Civil Affairs Bureau (CAB), for example, has to check the financial status of a large number of low-income families that apply for income support. In the past, this used to be done manually and it was very difficult to verify applicants’ personal information, leading to cases described as “BMW drivers applying for low-rent housing” and people falsely claiming welfare payments. By deploying the shared special services on the information sharing platform, the CAB was able to implement automatic cross-departmental, cross-sector data verification that included information on insurance, real estate registration, and financial assets. This slashed the number of false claims, with statistics from 2016 indicating that



around 15 percent of applications put through the system were determined to be unqualified, realizing savings of over 100 million yuan in government funds.

## Licensing and credit

In 2016, GMG initiated electronic license services and public credit services based on the information sharing system and government cloud infrastructure, providing a unified and systematic shared service for all departments in the city. Today, when applying for services from government departments, residents only need to carry one license, rather than lots of photocopies or original documents.

The GMGIC also got the authority thinking about new approaches and ways of operating, including video cloud. More than 80,000 video surveillance signals have been connected to Guangzhou's video cloud system and the smart system can automatically detect important surveillance signal information.

For example, thanks to automated video surveillance and algorithms, the system automatically calculates the rate of duckweed growth in Guangzhou's rivers and automatically alerts the relevant department if the threshold is reached. In the past, river flooding in summer used to cause duckweed to multiply quickly and block the main waterways, causing a range of problems, including pollution, which required teams of people to be assembled to regularly inspect the rivers.

The video cloud can also automatically detect when construction work is being carried out against regulations, like at night, which is difficult to detect through inspections. The system can then automatically notify the police and the government.

## Data is key

Introducing new technology is the first step in the journey, but high-level service and technology integration is yet to be achieved. "Many requirements arise from services,"

“The top-level design of the government cloud has shifted to overall service architecture, whereas the previous focus was overall technical architecture.”

says Xing. “The relationship between technology and services is no longer one of supporter and supported; now they’re a fully integrated whole.”

First, the top-level design of the government cloud has shifted to overall service architecture, so that services are fully considered, whereas the previous focus was overall technical architecture.

Second, traditional cloud construction for governments used to be application-centric, but it’s now data-centric. Xing gives an example, “In lifecycle management, the system lifecycle, which is quite short, used to be the emphasis. Now it’s the data lifecycle, which is almost infinitely long. So, we need to adjust our approach accordingly.”

Third, business investment previously focused on internal benefits. In contrast, the GMGIC is an investment in government informatization, so the government is more concerned with external benefits and driving the overall development of society.

The preliminary planning and design objectives of the GMGIC platform are now completed. By the end of 2018, the business information systems of 80 percent of all government departments will be migrated to the cloud platform, and by 2020, that figure will reach 100 percent. GMG will fully leverage next-gen information technologies, such as cloud computing, big data and artificial intelligence, to build and quickly deploy a new government IT framework. This will promote a flatter service management model, solving chronic problems like information silos that have arisen because different government departments have built, managed, and used their own systems, often duplicating construction and wasting resources.

Now though, we’re entering a new age of innovation and development that will benefit all [www](#).

# CEB

## Downsizing IT upsizes profits for banks



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When you've invested heavily in your legacy IT infrastructure, migrating to a slimmer, faster IT system on the path to digital transformation isn't easy. But with data as the new key to competitive success, it's got to be done. And fast. One bank in China shares how it implemented the right technologies at the right time. So, what are the right technologies and how should they be deployed?

By Zhong Jianfeng



“As competition between banks intensified, the decentralized IT management model quickly started killing competitiveness.”

## Bloated infrastructure is dead weight

**H**eadquartered in Beijing, China Everbright Bank (CEB) is China's first state-owned joint-stock commercial bank. Previously, most of its 38 branches in major cities ran IT systems that the bank itself had deployed, resulting in multiple equipment brands, complex management, and low resource utilization due to independently deployed physical machines. Moreover, strict demands on system security required each branch to build its own separate disaster recovery (DR) system, which was costly and unreliable.

As competition between banks intensified, this type of decentralized IT management model quickly started killing competitiveness. To improve IT resource management, simplify maintenance, and maximize security by stopping branches independently developing their own IT systems, CEB identified private cloud as the way forward.

## Three private clouds

After comparing mainstream cloud computing architectures, CEB decided that its private cloud should comprise three clouds – production, branch, and development and testing. Together they would unify the management and supply of all the bank's resources so that each branch could take the resource it needed from a centralized pool under a unified service system.

Plans for this infrastructure began to take shape in early September 2016. Overall deployment was divided into a two-tier resource pool, split between the head office and branches. The tier 1 resource pool for the head office took shape as a traditional converged infrastructure that included storage resources, network resources, production and transaction systems, and low-traffic office applications that connected the head office and bank branches. The tier 2 resource pool included low-traffic applications for branches, such as imaging platforms, email, and office systems.

However, given the large number of tier 2 resource pools required by different branches, a simple solution for rapid deployment and simple management was needed. CEB opted



for an infrastructure that was converged and hyper-converged at the same time. All head office and branch resources were brought under the cloud management platform for unified, centralized management and resource scheduling. CEB applied software-defined networking (SDN) to enable application-oriented and automated network delivery, and used process orchestration and resource interconnectivity to facilitate the E2E delivery of cloud services.

## Downsizing completed in 80 days

On the day CEB's tech department submitted its plan, it received instructions to complete the project by the end of 2016. According to CEB's department head, "We had to avoid impacting the bank's normal business operations. But, the project involved 38 branches, so this turnaround time was extremely tight."

Deployment and migration was divided into three phases: first, a pilot in two branches; then, two phases of migrating the system to 18 branches in each phase.

To migrate head office applications to the cloud, CEB decided to gradually migrate its production system, starting with the office and IT management systems. The migration of branch applications was divided into two phases: Applications that used less backbone bandwidth and which had no special peripherals would be migrated to the head office tier 1 resource pool. All other applications would remain on branches' local tier 2 resource pools.

After 80 days, CEB completed production and testing of the branch clouds without a hitch, migrating 76 service applications and deploying more than 600 operating systems to the head office production cloud. It migrated over 900 development and testing environments and 400 virtual desktop environments to the development and testing cloud, and more than 1,000 branch application systems to the branch cloud. "By deploying Huawei's FusionCube hyper-converged infrastructure, we downsized 38 branches using the two-tier resource pool," said CEB's department head. "We also centralized branch production and transaction applications and migrated them to the head office tier 1

“CEB integrated disaster recovery bank-wide through resource integration and branch application migration, bringing significant cost savings.”

resource pool, creating an innovative two-tier infrastructure for the whole bank.”

### Trimming fat, adding muscle, and saving US\$15.8 million

FusionCube’s hyper-converged infrastructure, which recently entered Gartner’s Magic Quadrant as Challenger, created a standardized and flexible cloud platform that improved CEB’s downsized IT systems across the board, boosting the efficiency of E2E resource delivery; optimizing production, office, and development and testing processes; and guaranteeing system-wide security. Resources from head office and branches now required just half an hour from application to delivery, while centralized management increased overall resource utilization from 20 percent to 60 percent and reduced infrastructure expenditure by 40 percent.

For 38 first-tier branches, scheme deployment realized total savings of around 100 million yuan (US\$15.8 million). CEB’s branch IT infrastructure was reduced in size by a staggering 86 percent, with the number of servers cut from 1,620 to 228 and cabinets from 274 to 38. In addition, the number of IT maintenance staff in branches was reduced from 110 to around 60, with freed-up

staff able to focus on non-routine work.

At the same time as IT downsizing, CEB integrated DR bank-wide through resource integration and branch application migration, bringing significant cost savings. Upgrading branch DR to network-based DR enhanced the efficiency and effectiveness and cut costs tenfold, from an estimated 3 million yuan for a traditional location-based solution to 300,000 yuan for a network-based solution.

In just 80 days, CEB evolved smoothly from Centralization 1.0 to Centralization 2.0, laying a solid foundation for the bank to move forward as a competitive digital player. The private cloud solution has unified the management and centralized the supply of its resources and centralized the operations of branch application systems. It enables IT costs to be managed bank-wide, and centralized DR for branch systems.

But, banking on success with the right solution is not confined to the financial sector. With FusionCube at the helm, any enterprise looking to upgrade its IT infrastructure can raise its game in today’s increasingly competitive digital playing field. [www.fusioncube.com](#)



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