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11/2016
Issue 26
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On the path to agility with HSBC

Embrace the cloud to become a digital enterprise

GE: Becoming digital industrial

Gathering Intel on a new reality

Bahrain: The pearl of a connected gulf

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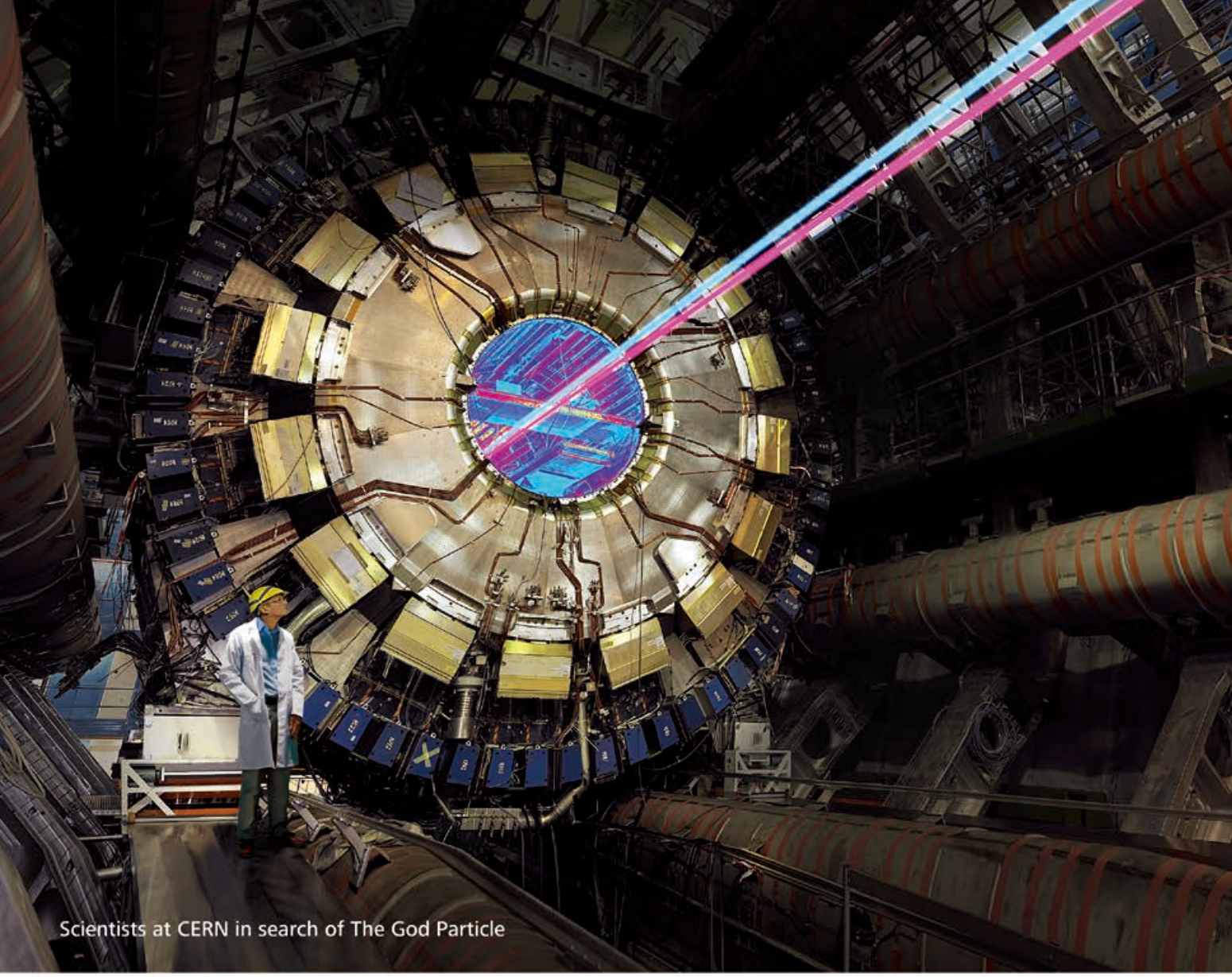

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Publication Registration No.:
Yue B No.10148

For electronic version and subscription, please visit www.huawei.com/winwin

A digital wakeup call for enterprises

The digital revolution has arrived. Impacting B2B and B2C enterprises in every vertical, the online world and sharing economy are creating unprecedented possibilities. However, these possibilities lie behind a wall of intense competition.

Powered by the Internet, things have never been better for consumers. Online shopping boosted by easily searchable buying tips and vendor ratings are eroding the business-centric consumer model that not so long ago saw enterprises shape demand. Mass production and mass marketing are falling short of consumers' expectations of individualization and markets of one, and economies of scale are losing relevance as digitalization takes hold.

Cross-industry integration and competition are becoming more common, blurring boundaries and giving rise to the sharing economy. Like the models employed by Uber and Airbnb, ownership of physical assets will decline across all verticals. Data mining and analytics will form the new tools for yielding market insights, while agility and scalability will be the fuel that propels enterprises to act on these insights quickly and at low cost.

This all sounds great, but traditional enterprises come with a lot of baggage. And for them digital transformation is disruptive. In August, we surveyed 30,000 enterprises about their digital transformation status. Our findings are nothing short of a wakeup call for enterprises: Only 17 percent of those surveyed could be considered digital and less than 50 percent had a clear digital transformation strategy. Moreover, the majority lacked the technical architecture, personnel, or processes for transformation.

At HUAWEI CONNECT 2016, Huawei's three Rotating CEOs were joined by 80 partners and more than 20,000 people from the ICT industry. Together, they explored how every vertical can achieve digital transformation collaboratively in the cloud era. One thing was clear: Enterprises require workable top-down strategies that transform operations, business models, processes, staff, and corporate culture.

Harley-Davidson in manufacturing, HSBC in digital banking, and Deutsche Telekom in the telco world are examples of enterprises that are ahead of the curve. It's our hope that collaboration will allow other enterprises to become agile, intelligent, and digital for a future that's bright because it's cloudy.

Sally

Sally Gao, Editor-in-Chief

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Connecting customers to opportunities
On the path to agility with HSBC

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HUAWEI CONNECT 2016 brought together big global names from multiple industries, including banking – the vertical that leads the pack when it comes to ICT adoption and innovation. We caught up with HSBC CIO and keynote speaker, Darryl West. He gave us the heads up on what's happening with the banking behemoth's transformation and how a traditional multinational can put some spring in its digital step.

By Gary Maidment, Linda Xu

Image from HSBC

The buyers take control

Established in 1865 and now active in more than 70 countries, HSBC is a veteran heavyweight in the banking arena. But in a world that's turning mobile, the pace of change is such that digital adaptability and speed are likely to trump size and experience when it comes to disruption, a fact that's not lost on West, "One of the biggest challenges for HSBC is to move at the pace our customers are moving." And customers are quickly moving into the service driving seat, expecting financial products to be on-demand, mobile, and personal. In response, "We need to be agile and flexible," states West, "with a much higher clock speed for delivering solutions."

> “I believe that traditional and digital business will not merge per se. There will only be digital businesses, or digital business models and digital ecosystems left.”
>
> — Darryl West, HSBC CIO

HSBC on the move

It’s no surprise that a major part of the bank’s agile technology strategy focuses on the mobile space. “I’m seeing a massive shift towards people consuming our services through applications on their mobile,” confirms West. From his standpoint this requires sufficiently flexible architecture to

Given that the mobile technological shift is firmly underway in banking, a multinational that serves over 47 million customers needs to frame agility within a feasible strategy that protects existing investment.

create compelling experiences for customers via the mobile form factor.

Given that the mobile technological shift is firmly underway in banking, a multinational that serves over 47 million customers needs to frame agility within a feasible strategy that protects existing investment. That's why HSBC isn't planning to rip out its existing IT infrastructure and start again at enormous cost. With some of its core systems approaching their fourth decade in use, it's as much about consolidation as it is revolution. HSBC's legacy platforms provide, in West's words, a "function-rich and very reliable" foundation that, with the right sort of planning, can act as a gateway to the omnichannel world: "The issue for us is to build a flexible architecture to leverage the quality and functional richness of the platforms...and build the mobile channels [and] browser channels that customers are expecting."

With pre-tax profits hitting US$18.9 billion in 2015 and revenues reaching US$57.8 billion, HSBC – the world's fourth largest bank – is packing some serious financial brawn, and West expresses confidence in a technology strategy that's backed by sufficient investment. So where will this investment go and how will HSBC fully utilize its legacy architecture? According to West, the bank is moving to a "service-oriented architecture" that will include a "sophisticated integration layer [between] the legacy back end and the front end that customers use on their mobile devices." In the age of app banking, the integration layer will be the key to getting services from the back end into the hands – or rather fingers and thumbs – of consumers quickly and securely.

A nudge in the right direction

A compelling experience isn't just about ticking the box of mobility; it's also about providing something innovative and useful. For individual customers, HSBC piloted its nudge app with 400 customers at Davos last February as part of the bank's commitment to encourage responsible money management. Working as an unobtrusive behavioral financial tool that has its roots in behavioral science, the nudge app analytics function warns customers if they're over-spending on items in more than 300 categories – in West's case, he knows from the app that he goes a little bit too heavy on Starbucks.

HSBC is looking at ways of integrating this data-driven tech into their product and service portfolio, with wider rollout expected over the next couple of years. By tracking spending habits over a very broad range of spending categories, the app can help keep people on point with the long-term financial goals they've set.

The building blocks of transactions

HSBC is also trying out new things on the business front. In a press release issued in August, the bank announced that it had teamed up with Bank of America Merrill Lynch and Singapore's Infocomm Development Authority to develop a prototype solution based on blockchain technology that "could change the way businesses around the world trade with each other." The application works like a Letter of Credit (LC) transaction by sharing information between exporters, importers, and their banks on a private distributed ledger, enabling trade deals to be executed automatically through a series of smart digital contracts. With the kind of speed, ease, visibility, and security that shifts the LC premise to today's digital world, blockchain has much potential as an unconventional yet effective way of completing transactions: "It's quite a different way of doing things in regards to the transfer of value, from a centralized database, clearing house model to a distributed model," states West. Though the technology is promising, he does add a caveat, "It will require a fundamental shift in thinking on the part of everybody, including regulators." Specifically, a critical mass of players will need to get behind blockchain tech for it to take hold under a standardized framework.

Security first

It's impossible to mention banking without referencing security, a key concern of consumers. After all, it wasn't so long ago when people were nervous about using their credit cards online, even though today's treasure trove of data wasn't at stake. West believes that HSBC's robustness in privacy and security is HSBC's "number one asset," with the bank taking a three-tiered approach: internal staff training, customer education, and technology. "We invest a significant amount of our budget on keeping at the forefront of protection and detection mechanisms for data protection and privacy," says West. It's also another area where the bank is getting innovative.

A word on tech partners

Despite HSBC's commitment to innovation, West acknowledges that, "We're not a technology company at the core, we're a bank," meaning that partnerships with tech companies with a proven pedigree of R&D and innovation is essential to move forward.

A company the size of HSBC has a large turning circle where change is involved, and so a focused infrastructure with built-in agility is necessary to re-engineer and digitize internal processes, recreate customer experience through digital channels, and explore forward-looking tech and solutions like virtual teller machines, cloud solutions, and big data.

West is realistic about HSBC's roadmap and what he expects to achieve with the bank's partners: taking the bank "from being in the position of a slow follower, to being a fast follower in some areas, to becoming a leader."

Fueled by agility, innovation, and partnerships, HSBC is confident about connecting its customers to opportunities and is taking decisive steps to raise its game with relevant, secure, and timely services.

Gathering Intel on a new reality

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Best known for the iconically accurate tagline "Intel Inside", the silicon giant is currently making some very exciting moves in the tech world. We recently spoke to Intel CEO Brian Krzanich to find out more about the partnerships and innovation that are propelling the company forward.

By Gary Maidment, Linda Xu

Team spirit

"The most successful collaboration comes when there's a shared vision," remarked Krzanich during his keynote speech at HUAWEI CONNECT 2016. "Customers are no longer looking for a platform; they're really looking for experiences." With a commitment to open collaboration underpinned by an understanding of what consumers want, Krzanich's words are reflected in a diverse product and solutions portfolio that increasingly focuses on providing compelling

experiences for users. According to Krzanich, "This requires multiple collaborations between companies. No one partner can deliver this."

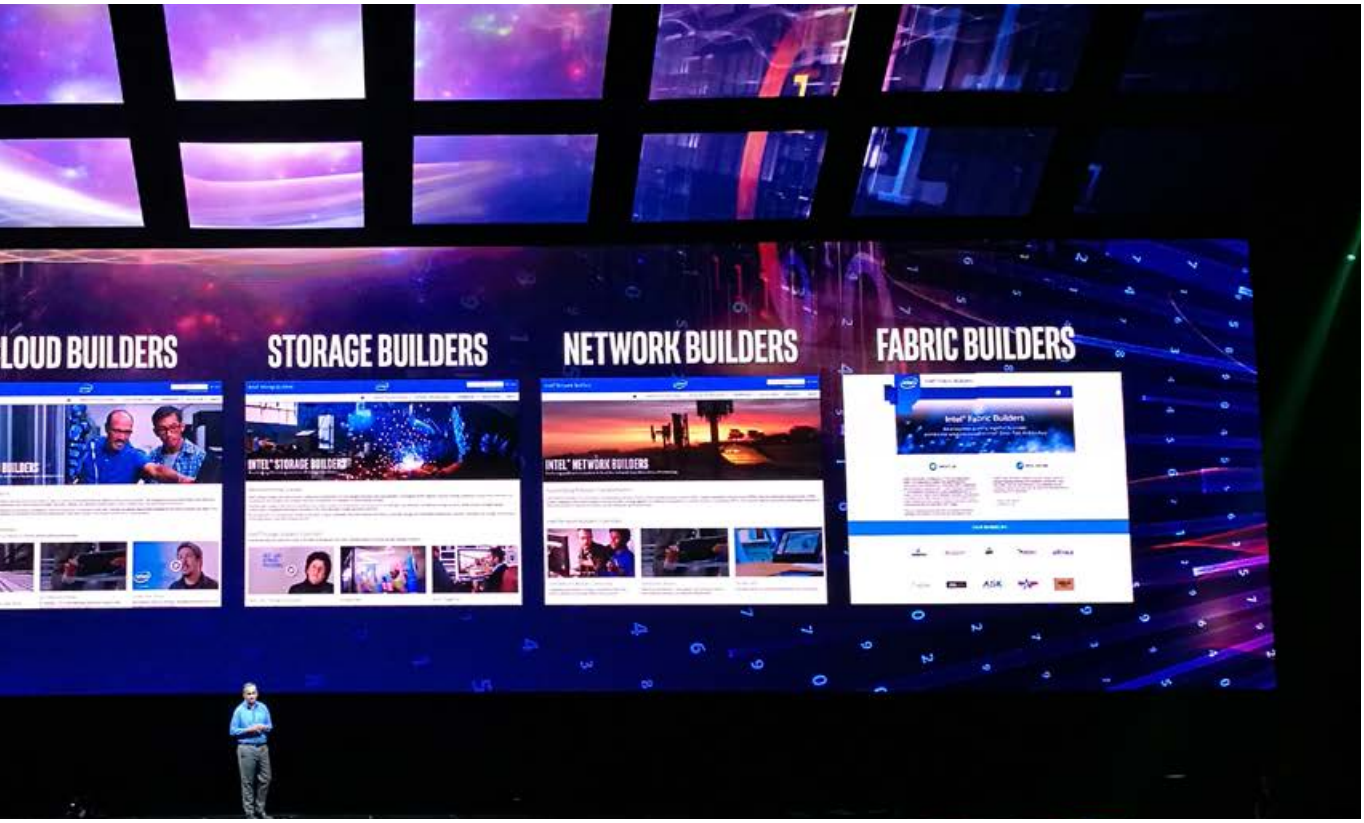
Changing reality

One of the most exciting ways Intel is appealing to users under a collaborative framework is with its merged reality (MR) offering. A bold concept framed within Project Alloy, MR is taking the augmented and virtual worlds to the next level. According to Krzanich, MR will "bring your physical world into the virtual world [so you] can choose when they mix and how they mix."

The hardware Krzanich talks of is as impressive as you'd expect, setting a high bar for others to follow. Unlike other headsets, the Intel prototype is a self-contained piece of kit completely unburdened by cables, external batteries, and the need for external computing or processing power.

Project Alloy employs Intel's RealSense perceptual technology, which uses three cameras – 1080p, infrared, and infrared laser projector – and 3D depth-sensing to enable a machine that "sees" in the same way as a human. These cameras act in concert and can, for example, scan and map a user's hands and insert them into a virtual space with which they can interact, tech that Intel engineers demoed at the IDF.

Intel plans to roll out products next summer, with open source development kits expected to be available in the second half of this year. "We've developed the hardware. We developed the software that rides on it. We've worked out the usage models," reveals Krzanich. "And we're going to let people build off that platform and really create an open ecosystem



so that it grows at a much faster rate."

Intel is thus providing the tools and setting the stage for developers to get creative, an approach the company has also employed with its perceptual computing strategy, which aims to augment the way people interact with computers. In 2013, Intel Software started running an annual developer challenge designed to foster innovation using Intel RealSense SDK for Windows.

Onwards and upwards

MR is just one example of how Intel is using its hardware expertise as a springboard into other areas, including cloud. "Our silicon capability has really let us expand beyond just PCs," states Krzanich, with the explosion of data arising from multiple channels helping fuel this paradigm shift, "We're really focusing on providing both the edge devices and clouds." To do so, the company is investing in edge devices like Curie, a button-sized computer designed for wearables, and products such as Xeon Phi, which provides cloud computing capabilities. He describes this strategic expansion as transforming from a "single cylinder engine" to a "multiple cylinder engine," an approach that's essential to spreading outwards into more fields.

Krzanich differentiates between today's cloud, which is built by people in the form of Facebook messages, WeChat messages, emails, and so on, and the cloud of the future: "The cloud of tomorrow is going to be built on the backs of machines," he asserts. "So it's going to be everything, [including] the wearables that you start to wear more and more, that transmit data. Your car is going to become a huge connected cloud device, and your factory, your home, everything we have." The expected explosion in data also explains why data centers are a core facet of Intel's business, alongside memory and IoT.

Intel predicts that, by 2020, the average person will generate 1.5 GB of data on average, up from 600 to 700 MB today. At the same time, hospitals will produce 3,000 GB per day and a single autonomous car 4,000 GB, the equivalent of 3,000 people. For Krzanich, this "is an opportunity, since we're doing the building blocks of the cloud."

Analytics and AI

Data, of course, has little value until it's collected, analyzed, and actioned. Krzanich believes that this provides an excellent opportunity for Intel's partners as well as itself: "We have analytical tools like Snap and TAP that are designed to allow users to really go and put analytics to the data." Crucial to this is AI, which he expects to play a bigger role in data analytics as IoT and data sets become more complex, "Over time we can start to combine data and use artificial intelligence to really start understanding [and] contextualize."

Intel has made decisive moves into the AI arena, having acquired the deep learning start up Nervana Systems and leading cognitive computing platform Saffron to boost its capabilities in this burgeoning area and, according to Krzanich, "provide algorithms to our co-partners to help them go faster in analytics."

To help the transition into the data-heavy world, Huawei is building end-to-end 5G infrastructure using Intel technology in preparation for global 5G trials.

With a strong commitment to partnerships, Intel has diversified its business segments on the way to becoming a major player in the globe's cutting-edge tech space, which will no doubt result in a reality that's as bright as it is merged.

Bahrain

The pearl of the connected Gulf

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Bahrain has been a trade hub since its origins in ancient history. But today's digital economies can no longer rely on geographical primacy – connectedness is the new currency. Bahrain's Transportation and Telecommunications Minister H.E. Mr.Kamal Ahmed tells us how he plans to make the nation a regional hub through digitalization.

By Julia Yao

The strongest link in the chain

Building a strong digital infrastructure is necessary for economic growth. According to Huawei's 2016 Global Connectivity Index (GCI), which measured how 50 nations are progressing on the road to digital transformation, a one-point increase in national GCI rating correlates with a 2.1 increase in competitiveness, 2.2 percent rise in innovation, and 2.3 percent jump in productivity. Thanks to its increasing technological prowess, Bahrain has made clear gains in competitiveness, jumping from rank 43 in 2015 to 39 in 2016 in The World Economic Forum's *Global Competitiveness Report*.

Today's average Bahraini consumer is no stranger to the latest tech hardware, software, apps, and services. Mobile phone penetration is one of the highest in the world at 92.7 percent as of June 2016, up from 694,000 in 2010. Approximately 800,000 of the island nation's 1.4 million people are Facebook users, reflecting a connectedness to social media that also extends to apps like Snapchat, Instagram, and LinkedIn.

> ICT is the enabler for all economic sectors in Bahrain – financial, tourism, manufacturing – they need a strong backbone, and that backbone is ICT.

Powering ahead with IoT

The archipelago is also a trail blazer when it comes to IoT, with machine-to-machine connectivity already having changed the way consumers manage their homes, health, cars, businesses, and entertainment. With transformation impacting every vertical, IoT touches the lives of local people in multiple ways, including finance, manufacturing, retail, hospitality, public safety, government, and transport.

VIVA, one of the nation's three mobile operators, launched its Connected Life suite earlier this year, a center point of which is sensor-activated solutions covering security and energy. Its car device, for example, creates a connected smart car within seconds of installation, unlocking functions like on-board entertainment with 4G LTE in-car Wi-Fi and app-based pairings for safety, security, directions, and vehicle diagnostics.

ICT-infused business

With its trading heritage and entrepreneurial spirit, Bahrain is home to many successful businesses, including Huawei's regional headquarters for the Middle East. Part of that success is down to an ICT infrastructure and business friendly policies that allow enterprises to flourish. For example, Bahrain ranks first in the GCC and 18th globally for economic freedom, a climate which helped the nation grow its GDP by 32 percent from 2010 to 2014. According to Kamal, "ICT is the enabler for all economic sectors in Bahrain – financial, tourism, manufacturing – they need a strong backbone, and that backbone is ICT."

Bahrain ranked 27th globally in the 2015 *ICT Development Index*, fifth for mobile broadband usage, eighth for Internet penetration, and third for government efficiency in providing ICT and online services, reflecting Bahrain's highly active ICT sector

> Bahrain might be small in comparison to its Gulf neighbors, but it has big plans (using ICT), with its economy shifting away from a reliance on petrochemicals.

and its role in driving business start-ups.

Powered by innovative technologies, many local entrepreneurs are focusing on digitally led business ventures – the Bahrain Award for Entrepreneurship (BAE), which has already seen an 8 percent increase in the number of applicants since it first launched in 2014.

Entrepreneurs will continue to reap the full benefits of the developing ICT sector in the region. One such company is BMMI, which is starting to digitalize its operations to allow full-scale e-commerce, including home delivery for its Alosra supermarket brand.

The decline in oil prices from June 2014 has put further pressure on businesses and government organizations to go digital, drive economies of scale, and seek new opportunities.

Small but ambitious

"We've achieved a lot in the past, but we want to make sure we do more to stay at the forefront in the future." Kamal says, aware that static or slow growth in economic digitalization means falling behind other nations in real terms.

Bahrain's fourth National Telecommunication Plan went nationwide in May. At the heart of this three-year initiative is the aim for "all homes, schools and businesses to be linked by high speed optical fiber," states Kamal. "This will create a ubiquitous high-speed broadband network that will help Bahrain become a Smart Kingdom." He recognizes the importance of partners in achieving this goal, "We're happy to be working with Huawei, one of the leading ICT solution providers in the world."

Huawei Bahrain has played a major role in inspiring the ICT revolution in the nation, successfully integrating innovative solutions like the region's first ever triple-beam antenna technology, which boosted online user experience and dealt with the high traffic from the 2016 Formula One Grand Prix held at the Bahrain International Circuit.

Bahrain might be small in comparison to its Gulf neighbors, but it has big plans, with its economy shifting away from a reliance on petrochemicals. Kamal believes that, "With the right investment in people and ICT technology, we're confident we can build a brighter future for the country and our people."

A better view from the cloud

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On the first day of HUAWEI CONNECT 2016 in Shanghai, Huawei's Rotating CEO Ken Hu revealed that the company aims to position itself as the enabler and driver of an intelligent world. As such, Huawei will hold true to its culture of customer-centricity, focus on ICT infrastructure, and provide innovative cloud technology.

By Ken Hu, Rotating CEO, Huawei

I feel like I could talk about connectivity all day long. Some say that Huawei lives for connections. In the 26 years I've spent with the company, I've come to realize that connecting people truly gives us a sense of mission. I've been to the Shanghai Telecom Museum on the Bund three times, and every time, I walk away with something new. From telegraphs to telephones, from beepers to Motorola's first DynaTAC mobile phone, from 3G to LTE, and on to research into 5G, humankind has been on a never-ending search for more intimate, faster connections.

The cloud, like the way we connect, has been in a constant state of development. It's always evolving. Every person, every enterprise, every industry – even every economy – has been shaped by the cloud in one form or another. At the same time, each of these entities has helped shape the cloud we know today. At Huawei, the ways we conceptualize and apply cloud technology are constantly evolving as well.

This is how we envision the future: an intelligent world.

> The intelligent world has three defining characteristics: All things will have the ability to sense, all things will be connected, and all things will be intelligent.
>
> – Ken Hu, Rotating CEO, Huawei

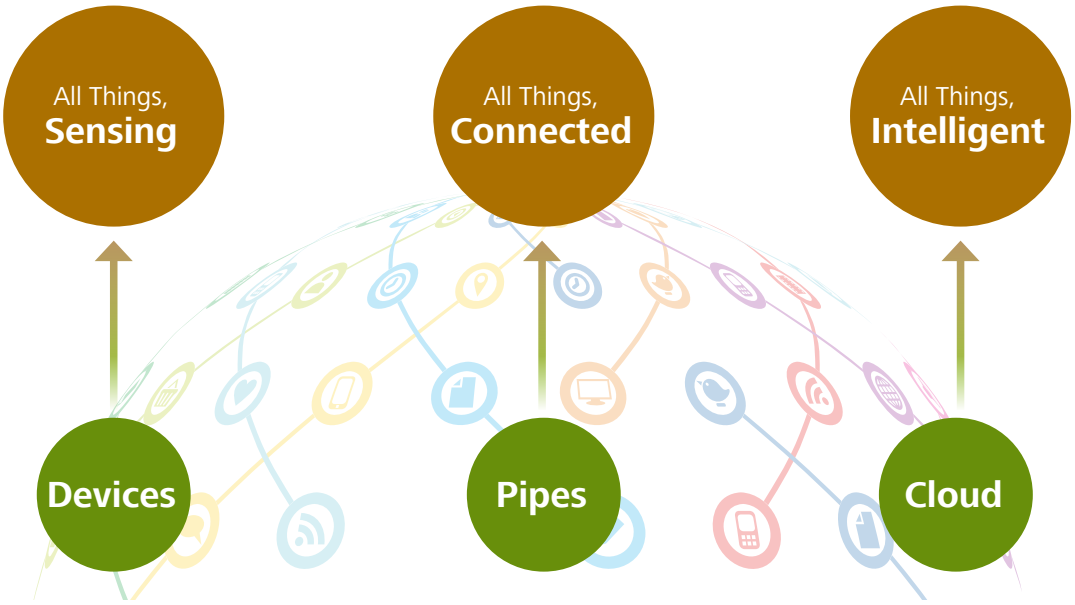
ICT is the cornerstone of an intelligent world

The intelligent world is here, and it will bring about enormous changes in society. We simply have no way of knowing how deep and far-reaching these changes will be. However, we can be sure of one thing: ICT will be the cornerstone of this intelligent world.

The intelligent world has three defining characteristics: All things will have the ability to sense, all things will be connected, and all things will be intelligent. The existence of these three defining characteristics depends entirely on advanced ICT. In an intelligent world, devices will play the role of "feelers" in an all-sensing environment. Networks will connect everything, and the cloud will be the source of intelligence behind all things. These three elements form a synergetic architecture of devices, information pipes, and cloud.

In the future, all people and all things will have the ability to sense their environments. Essentially, each device or physical node on a massive, ubiquitous network will serve as an entry-point to an intelligent world. In the meantime, computers and people are growing closer in proximity. From room-sized mainframes that were several kilometers away from users to the PC era where computers were at most a few meters away, we've now entered the smartphone era where we've got constant access to computing power within a few centimeters. Now we're in the age of wearables, which are just a few millimeters from our skin. Eventually, embedded smart chips will mark the beginning of true human-machine integration. In the next five to ten years, we will see all kinds of smart devices that automatically adapt to various use scenarios. Smartphones will only be one type among them.

In the future, optical fiber and wireless networks will provide us with ubiquitous, super-high bandwidth connections. With current 4G technology, for example, in theory we should be able to achieve latency of around 50 milliseconds. But this type of response time is simply not enough to support VR and AR applications that run on networks, which is one of the reasons why people can't always catch their Pokémon in Pokémon



Go. There's too much of a delay. In the 5G era, in theory we should be able to achieve network latency of 1 millisecond. At present, we don't have the ability to support a number of applications, but this will all be possible in the near future.

In an intelligent world, interconnected computers distributed all across the world will aggregate vast oceans of information and data, forming a "digital brain" in the cloud. This digital brain will evolve in real time and it will never age. The wisdom and insight it provides can be called upon at any time by people and machines with access to high-speed connections and smart devices. Autonomous vehicles, intelligent medicine, and practically everything that requires mental activity can be augmented by this massive digital brain – at which point we can employ intelligence more efficiently.

Based on this insight and set of assumptions, Huawei is committed to building the technological infrastructure that will harmonize devices, pipe, and the cloud. This will serve as the backbone of an intelligent world. As such, devices, pipe, and cloud technology are the strategic focus of Huawei's investment in the future.

Cloud is shaping everything, change is a process of rebirth

Like other major technological revolutions in human history, the cloud's impact on society has already extended far beyond the confines of technology. The cloud has affected business models and the way people think; it's responsible for a nonstop series of commercial transformations.

In the past ten years, companies like Google, Amazon, Didi Chuxing, and Airbnb were "born in the cloud". They were the driving force behind the Cloud 1.0 era, which was based on agile innovation, good user experience, and low costs. These companies leverage cloud technology and cloud architecture to more effectively share resources. They also leverage mobile Internet technology to connect their customers better, enabling them to adopt disruptive business models and create new value in otherwise traditional, difficult-to-enter sectors like hospitality and the taxi industry.

The success of these disruptors seems to have awakened all industries to the potential inherent in cloud technology. In the next 10 years, we will enter

> We estimate that, by the year 2025, all enterprises will employ cloud technology and cloud models, and 85 percent of enterprise applications will be deployed on the cloud.

the era of Cloud 2.0, in which enterprises are the main players and we will see the rise of countless industry clouds. We estimate that, by the year 2025, all enterprises will employ cloud technology and cloud models, and 85 percent of enterprise applications will be deployed on the cloud. Every company will integrate its core business with the cloud, and be on the look-out for the cloud solutions that suit them best.

Generating value from the cloud: Think big, act small. The cloud is important. However, what's more important is generating practical value from cloudification to create business value. If they hope to generate value from the cloud, companies need to think big and act small.

An about-face in the way we think: Enterprises need to change their mindsets about the role of ICT. Companies should start building awareness of ICT's evolution from a support system to a production system, and boldly employ ICT to drive innovation in their business and operating models. They should redesign their production processes around new technology-not passively adapt technology to serve existing processes. Huawei is proactively exploring how we can better incorporate a cloud mindset in our own operations.

Rethinking talent: The ability to work with cloud-based ICT should be a basic skill among all employees in a corporation. This is especially true of leadership teams, who need to be familiar with and apply new technology in the design and management of their businesses. For a company like Huawei, which has over 170,000 employees, figuring out how to refresh the knowledge structure of our teams is an extremely challenging task, and we're exploring the best ways to manage it.

On a global scale, talent is in short supply in the cloud computing, big data, and artificial intelligence domains. This situation will continue, if not become more acute. Companies need to plan for this ahead of time and start getting top talent on board as soon as they can; preparing your talent reserves in advance is no different from planning for a rainy day. At Huawei, we're proactively rolling out our talent strategy in the hopes that we can attract more of the world's best minds to come and work with us.

On the subject of talent, we have to talk about CIOs. In the cloud era, in addition to heading up technological initiatives, CIOs will play a key role in setting strategy and using ICT to drive business transformation. Those with a strategic vision and the ability to promote new ideas will be worth their

> In addition to a heavy-duty buildup of core technology and innovation capabilities that we've cultivated over the years, our greatest source of confidence is our customer-centric corporate culture.

weight in gold.

Small actions will get you where you want to go: When companies set their cloud transformation strategies, they need to think big and set long-term systematic strategies. And they need to act small – find small, tactical points of entry, and create value. Gradual, successful initiatives will build lasting confidence in new technology and the strategies that employ it.

Around the globe, Huawei has 80,000 R&D staff, 16 research centers, and more than 15,000 labs. In the past, it was difficult to share resources between teams, so resource utilization rates were rather low. Starting in 2013, we integrated R&D resources across the board, and managed to migrate coding and R&D to the cloud. We restructured our R&D processes and have already witnessed huge boosts in efficiency, like a 2.5-times increase in resource reuse, and an average reduction of 50 percent in workloads in all steps of the R&D process. We've also made significant improvements in product time-to-market.

Becoming the enabler and driver of the intelligent world: For any business, change means hope. And in the cloud era, those that act are the ones who will create the future.

Huawei aims to become an enabler and driver of the intelligent world. Specifically, Huawei's strategy is to:

- Stay customer-centric
- Provide innovative cloud technology
- Become our customers' preferred partner
- Proactively contribute to cloud ecosystem development

Providing innovative cloud technology

Cloud technology is constantly evolving, and customer requirements for this technology are constantly evolving as well. Against this backdrop, Huawei is confident in its ability to play a role as a great provider of great solutions. And where does that confidence come from?

In addition to a heavy-duty buildup of core technology and innovation capabilities that we've cultivated over the years, our greatest source of confidence is our customer-centric corporate culture. Over the past 28 years, customer-centricity has become part of Huawei's DNA – the most important guide for everything we

> In the cloud era, customers need more than just a vendor, they need a partner that will work closely with their teams. Huawei is ready and willing to enter this type of strategic partnership.

do. As technology providers, we can't always try to meet everyone's needs with a one-size-fits-all solution. Customer-centricity implies a down-to-earth approach, a willingness to learn from customers, and a willingness to truly build an understanding of the special requirements that arise from industry and business differences. Customer-centricity means developing innovative cloud technology and solutions that address those differences – that are customized and on-demand.

For example, an increasing number of large enterprises pay special attention to independence when exploring cloud solutions: the freedom to choose, and not get locked into one vendor's platform. They also place a lot of stock in interoperability: their ability to connect, exchange, and share data both internally and with other companies. So we went ahead and used mainstream open-source technology to build open cloud architecture.

Openness, security and data privacy protection are of the utmost concern when enterprises migrate to the cloud. In response to this concern, we released a hybrid cloud solution based on unified architecture so our customers can enjoy the independence of a private cloud with the flexibility and agility of a public cloud. We emphasize openness, security, and enterprise-grade performance in all of our cloud solutions, as well as providing an integrated one-stop environment. More and more customers welcome these solutions with open arms, which further reinforces our confidence in a customer-centric approach to technological R&D.

A partner, not just a vendor

In the cloud era, customers need more than just a vendor – they need a partner that will work closely with their teams. Huawei is ready and willing to enter this type of strategic partnership.

In June of 2016, Deutsche Telekom released the Open Telekom cloud, a complete set of cloud services that includes private cloud, public cloud, and software solutions designed for enterprise use. They chose Huawei as their strategic partner, to provide hardware and software solutions.

Our collaboration on this project was a perfect combination of strengths: Deutsche Telekom's strong digital infrastructure, deep insights, and long-term experience serving enterprises combined with Huawei's strong, continuous technological innovation capabilities in end-to-end hardware and software.

> As an ecosystem enabler, we aim to help all of our customers build all manner of clouds, and in doing so actively contribute to the development of the cloud ecosystem as a whole.

We believe the highlight of our collaboration is that Open Telekom Cloud was completely driven by customer needs. We discovered that customer concerns primarily centered on the standardization and agility of IT services, the ability to process and analyze big data in real time, and compliance with strict data security regulations. So the solution that we came up with for Deutsche Telekom also focused on these performance requirements: security, reliability, simplicity, and openness. This enabled Deutsche Telekom's public cloud services to meet enterprise customer needs far better than out-of-the-box public cloud services, which made them quite popular with enterprise clients.

After its launch, the Open Telekom Cloud received widely positive reviews. Deutsche Telekom's Open Telekom Cloud is an important new set of services for companies in the midst of digital transformation simplicity – not only in Germany, but in all of Europe. For industries and enterprises, this solution will set a benchmark for public cloud services.

Contributing to the ecosystem

Ecosystem is important to cloud development. Huawei isn't going to release a handful of clouds on its own. As an ecosystem enabler, we aim to help all of our customers build all manner of clouds, and in doing so actively contribute to the development of the cloud ecosystem as a whole.

As for what we're doing on that front, we're actively participating in the formation of industry alliances. Promoting openness, collaboration, and shared success, our goal is to make the pie bigger for everyone involved. In addition to industry alliances, we're also forging strategic business alliances with our partners like SAP, Accenture, Microsoft, and Intel. Together, we develop solutions that help our customers succeed. We've also invested in a huge platform for developers, and actively contribute to open source communities. We're trying to draw in as many talented players as we can to fully flesh out the value chain.

Behind these actions are two important tenets: First, we believe that the cloud ecosystem must be built around customer needs, and it must create value for customers. This is the purpose of developing the ecosystem, and it will also help guarantee its steady ongoing development.

Second, it's important that all organizations and enterprises involved in the ecosystem bring their own

> We hope that we can work together and explore the best way to shape the cloud – the best way to shape our world.

unique value to the table. We are Huawei. Our role is to make good products and serve our customers well. Achieving healthy, sustainable ecosystem development depends on the support of superior technology and products. Otherwise we've done nothing but carve out a river with no water to fill it.

A magnificent cloud era has only just begun

The cloud era means greater connectivity, more sharing, more freedom. If we truly want to make all this happen, we have to adopt a cloud mindset carve out an ecosystem, and approach this from a higher, more strategic perspective. In a manner of speaking, we need to get a better view from the cloud.

In China's Tian Shan Mountains, there's a place called Xiata Canyon. It has an old road that is part of the ancient Silk Road, the steepest part of the path between north Xinjiang and south Xinjiang. This is the same path that the famous monk Xuanzang took on his journey to obtain Buddhist sutras from India. These days, it's one of the most popular destinations for hiking expeditions in Xinjiang.

The second-highest peak in the Tian Shan mountain range at 6,995 meters above sea level is Khan Tengri. Nearby sits Muzhaerte glacier and a range of snowy peaks. Traversing these, will take you to the middle of the Nanjiang's lush grassland pastures, the sky an azure dome held aloft by herds of immaculate white clouds.

It's a long road and extremely dangerous. I can't imagine how our ancestors managed to traverse these types of distances, and in such harsh conditions. And then I stop and think: If you've got a sublime vision in your heart, no danger or hardship can hold you back. In fact, the name of the Xiata, which means "ladder", was coined by the monk Xuanzang during his famous journey.

On the Internet these days, you've probably seen the popular meme of the Olympian, Fu Yuanhui, who "calls upon all her superhuman strength" when she swims. But we all know that it's not superhuman strength; it's grit. The road to digital transformation is also long and hard, so we need to put one step in front of the other, and keep on pushing forward. The purpose of this event is to provide a platform where we can throw around ideas, share experience, and exchange thoughts. We hope that, through this process, we can work together and explore the best way to shape the cloud – the best way to shape our world.

Embrace the cloud to be a digital enterprise

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On the second day of HUAWEI CONNECT 2016, Huawei's Rotating CEO Eric Xu asserted that going digital is an essential strategic choice for every enterprise. The key goal of transformation is to provide a ROADS experience for customers, partners and employees. But, the road ahead isn't easy.

By Eric Xu, Rotating CEO, Huawei

At the Huawei Cloud Congress (HCC) 2014, I explained why Huawei stepped into the IT sector. It was because cloud technologies and mindsets would reshape enterprise IT architecture and telecom networks. This transformation would present a good opportunity for Huawei to establish a presence in the enterprise and government markets. This revolution would also be key to reinforcing Huawei's competitiveness in the carrier market. I said that in order for Huawei to become an ICT leader, it had to become an IT company first. A year later, at HCC 2015, I elaborated on Huawei's focus in the IT sector: what we do, what we don't, as well as our strategic choices. I also made it clear that Huawei would like to work with all industry partners to build our ecosystem and grow together.

At the HCCs in both 2014 and 2015, I shared

ideas from Huawei's perspective. But, today, I'd like to take a new perspective by looking from the viewpoints of enterprises. I'd like to discuss how we can address issues and challenges in the context of current economic dynamics, and how we can prepare ourselves for the future. My answer to these questions is well captured in the theme of my presentation for today: Embrace and Integrate with the Cloud to Become a Digital Enterprise.

Ken Hu called on everyone to work together to shape the cloud and shape the world. He also said that enterprises would be the main players in the era of Cloud 2.0. Enterprises should be committed to digital transformation and build themselves into digital enterprises.

Many people may ask: What exactly is a digital enterprise? What is the purpose of digital transformation? What value will it create? Today, I will share my thoughts; but, more discussion will be needed across the industry to delve deeper into better answers that are broadly agreed.

To become a digital enterprise, a company needs to build ubiquitous connections spanning its people and things, and at the same time link its employees, customers, partners, and suppliers together. The company's operations should be based on big data and artificial intelligence (AI). On top of that, it needs to automate its business processes with built-in real-time decision making so as to realize simple, efficient, and intelligent operations. A key goal of this digital transformation is to provide a ROADS experience – Real-time, On-demand, All-online, DIY, and Social – for customers, partners, and employees. This is the most difficult part of the journey, but it's a must, as both enterprise customers and consumers will be expecting a ROADS experience when they buy or use products and services from providers.

Harley-Davidson is a good example. It is one of the world's top brands, with the vision of creating unique motorbikes. Through digital transformation, Harley-Davidson has connected all its production lines and is able to assemble over 1,200 components into a motorbike in just 89 seconds. Its manufacturing assembly lines are precise to the second. Before the company embraced digital, the

> The key to becoming digital enterprise is to use cloud technologies and mindsets to innovate business and operating models and improve experience and efficiency.

whole process from online order to delivery took 21 days. After digital transformation, Harley-Davidson can process all orders online and give consumers the freedom to choose their favorite engine models and colors. Now, the order-to-delivery process only takes six hours.

Digital targets

For Huawei, we have a target for digitization. We hope that when consumers order a mobile phone in our online store, they can customize the device the way they like. The order will then be automatically transferred to our production line. After the phone is made, it will be automatically shipped to the consumer. Throughout the order-to-delivery process, only manufacturing and transportation will require time, while other procedures will be finished almost instantly. When this target becomes a reality, imagine how competitive we will be, and what the operating efficiency and customer experience will look like. Companies that are determined to go digital and ultimately become digital enterprises can greatly enhance their customers' experience, their efficiency, and every aspect of their operations; they are more likely to stand out from the competition. Conversely, companies that fail to take action are likely to die in the competition.

So the question is, how can companies become digital enterprises? From my point of view, embracing and integrating with the cloud is the key. The idea is to use cloud technologies and mindsets to innovate business and operating models and improve experience and efficiency. Over the past 10 years, Internet companies that were born in the cloud have delivered superior experience and disrupted the business models of many vertical industries. Just imagine, if traditional companies or industries innovated their business and operating models based on cloud technologies and mindsets, then some of them may not be disrupted. By then, it would be the same customers served and the same products offered, but the business and operating models would be redefined with cloud technologies and mindsets to achieve simple and efficient operations at lower cost.

When it comes to embracing and integrating with the cloud, the answer of how to do it is clear. But to actually get there is really difficult. There are many challenges to resolve: the availability of capabilities and talent, interworking between legacy and new

> Deployment is time-consuming, and automatic scaling is difficult. That's why, over the last couple of years, some large enterprises have been thinking of developing or introducing a PaaS platform for all the common functions.

applications, the changes required in processes and software, just to name a few. To tackle all these challenges as enterprises move to the cloud, the solution lies in the cloud itself. Enterprises should explore their implementation strategy from three dimensions: cloud deployment, cloud utilization, and cloud management. Huawei has identified ten issues with enterprise IT and network architecture. The list may not be exhaustive, but any company that intends to embrace digital will encounter these ten issues. Next, I will share my observations on five issues that I believe are critical.

The big five

The first issue is agile development of applications, and it's the biggest headache facing enterprises. How can IT application development evolve in sync with business changes? Yesterday, I learned that Huawei now has 3,000 in-house staff and many more contractors working on internal IT applications. In 2015, Huawei spent 1.5 billion yuan on IT outsourcing. This is a huge investment. I've talked with many companies, and their situation is similar – most have a large team, in-house plus outsourced, working on the development of IT applications. For every IT application brought on board, there's repeated development of the same functions. Deployment is time-consuming and automatic scaling is difficult. That's why over the last couple of years some large enterprises have thought of developing or introducing a PaaS platform for all common functions. However, if every company develops its own PaaS platform, they are again reinventing the wheel, and the PaaS architecture will become fragmented, quite likely with unsatisfactory performance. I think we'll be better off having a PaaS platform with unified architecture to offer both common, standardized services and industry-specific professional services. With a PaaS platform like this, all enterprises – including software developers and system integrators – can focus their efforts on application development.

The second issue is about security, a critical building block for private and public cloud services. Cloud services are widely seen by many as less secure from several aspects. Most important of all, with the cloud data storage is no longer distributed; it becomes centralized, leading to increased exposure to data breaches and illegal access. Resource-wise, applications used to run on different servers which were physically separated. With the cloud, all physical

resources are virtualized, so the security boundary is blurred and the impact of vulnerabilities grows. Building a great wall for segregation might be enough in the past, but now even virtual machines require layers of defense between themselves. Application is another dimension. We all want rapid and agile application provisioning, but that requires real-time security defense, which is not yet in place. In terms of management, flexibility in resource allocation is certainly desirable and is the biggest advantage of the cloud. But it naturally conflicts with pre-configured privilege management. These are the security challenges in the cloud era.

But it's not all bad news. Cloud also brings new advantages to deal with security challenges. It allows us to adopt a systematic, end-to-end response to security threats through comprehensive and deep analysis. In fact, a public cloud, with its huge security investment and rich portfolio of security services, is surely more secure for small and medium enterprises, because single SMEs cannot afford to build an equivalent stack. In my opinion, the key to post-cloud security is to build a full-stack security defense system, which covers physical layers, networks, hosts, applications, and data. End-to-end visibility in enterprise security is needed, and that's exactly what the cloud can bring to the table. Big data and AI will play a role to allow real-time and intelligent risk monitoring and prevention. Last but not least, it's always important to choose trusted partners to work with.

Data centers

Data center architecture is the third challenge. Data and traffic volumes are exploding. Existing DCs, with their multi-layer scale-up architecture, can hardly meet current needs. With existing architecture, DC capacity goes up to hundreds of terabits per second, and there are issues around single points of failure and high power consumption. Maintenance is also a big problem in a large DC with hundreds of thousands of pairs of fiber. These are not the data centers of the future capable of dealing with massive data traffic, storage, and computing. If the notion of cloud can be used to transform DC architecture from scale-up to scale-out, then petabit/s capacity can be realized and way less fiber would be needed. Such a solution is not in place yet, and I hope the industry will work together, adopt the cloud mindset, and scale-out to replace existing DC architecture.

The fourth issue is bandwidth on-demand. As enterprises migrate their data between private and public clouds, or from one public cloud to another, a pressing need is bandwidth on demand. A case in point is Amazon's Snowball, a service which I think the industry should feel embarrassed about. Through express delivery, enterprise customers ship a data-loaded appliance to Amazon, which charges customers US$200 for every 50 terabytes of data. Retrieving the data from the cloud costs between US$1,000 and US$2,000. This physical approach for data transport is neither secure nor convenient. So if we look from the perspective of enterprises, it is important that carriers provide bandwidth on demand so that huge amounts of data can be migrated fast enough between public and private clouds.

The last issue relates to campus network management. Campus networks today are rather complicated, and they need to be managed and maintained by certified professionals. Data configuration has to be done for each piece of equipment. That's the case with Huawei today. We have over 200 branch offices around the world. At every location, we need to assign IT professionals for data configuration. Imagine if we introduced the notion of cloud into campus networks. Network maintenance, policy management, and data

> Building a digital enterprise requires not only the commitment of the CEO and management team, but also renewed thinking about the future role and value of the Chief Information Officer (CIO).

configuration could be centralized in the cloud. Enterprises would only need to buy boxes to plug and play. Network O&M would be done either in-house or by suppliers or carriers. In any case, centralized and cloud-based management can significantly bring down the operating expenses of campus networks.

Building a digital enterprise requires not only the commitment of the CEO and management team, but also renewed thinking about the future role and value of the Chief Information Officer (CIO). CIOs used to be responsible for information only, but now they need to become a CI^{3}O who manages information, innovation, and interconnections. Of these three elements, innovation is the most important. As CIOs have the right ICT expertise and can embrace cloud technologies and mindsets over time, they will be in the best position if they glue technical knowledge to their business. So this is the first dimension of CIOs' triple role in the future: driver of innovation in operations and business models. In terms of information, the second I, CIOs have to become leaders in the cloudification of IT architecture. With respect to interconnections, CIOs should play the role of an enabler for interaction between the company and its customers, partners,

and employees.

Huawei aims to become an enabler and driver of the intelligent world. To this end, we will stay customer-centric, focus on ICT infrastructure, and provide innovative cloud technology. We strive to become an enabler and preferred partner for enterprise cloudification and digitization; actively contribute to the cloud ecosystem; and promote openness, collaboration, and shared success.

Shaping the dynamics of an open cloud ecosystem

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On the third day of HUAWEI CONNECT 2016, Huawei's Rotating CEO Guo Ping, shared Huawei's concept of a cloud ecosystem and the action the company has taken to contribute to its development. Borrowing a rich set of metaphors from the natural world, Guo described Huawei's role as the "soil" and "energy" in the ICT ecosystem of a budding smart society.

By Guo Ping, Rotating CEO, Huawei

A famous writer once said, "Everyone has their own patch of forest out there. Perhaps we will never find ours, but it will be there always."

I'm envious of Dr. Ma You and Li Mingguo. They have managed to find their own forests, and over the past 20 years, protected them and helped them flourish. This is a huge accomplishment – a testament to their strength of spirit.

In the cloud era, each enterprise has its own patch of forest too. I'd like to share my thoughts on how we can link up these scattered plots of forest into an open ecosystem that thrives on shared success. I'd also like to explore Huawei's positioning and responsibility as a member of this ecosystem.

Full disclosure: I'm not a biologist. However, I am an avid SCUBA diver – I have my PADI – and can remember one time when my instructor talked about the differences

> We're becoming a smart digital society. We don't know what that smart future will look like. However, one thing is certain: Industry systems will become more interconnected and complex.
>
> – Guo Ping, Rotating CEO, Huawei

between the marine ecosystems in Hawaii and Costa Rica.

He talked about how isolated Hawaii is, how it's out in the middle of the ocean, over 3,000 kilometers from any continent. Life in this region – whether it be animal, plant, or marine life – exists in a relatively closed ecosystem. When travelers arrive, they are subject to the world's strictest inspections concerning animal and plant matter. The purpose is to protect the existing ecosystem. Despite of this, only one new species is successfully introduced to its ecosystem every 20,000 to 30,000 years. Today, there are just over 20,000 different species in Hawaii.

Costa Rica is located at a critical juncture between North and South America, with Panama to the south and Nicaragua to the north. Although it's also surrounded by water, Costa Rica is not separated from either continent. As a result, the ecosystem there is open and dynamic, with a high number of species that coexist and thrive together. In Costa Rica, the average rate at which new species can be introduced to the ecosystem is about 10 times faster than Hawaii's. Today, Costa Rica has over 500,000 species, 25 times more than its marooned cousins to the West. Costa Rica has one of the highest rates of biodiversity in the world.

Today I'd like to talk about the ecosystem that we aim to cultivate: an ecosystem that is open and prosperous, similar to the one in Costa Rica.

Connected and complex

We're becoming a smart digital society. We don't know what that smart future will look like. However, one thing is certain: Industry systems will become more interconnected and complex.

A chart from a 2014 paper by management guru Michael E. Porter illustrates a simple scenario in an agricultural system where traditional tractors have become more complex. In the past, tractor manufacturers only needed to interact with farm owners. Today, they need to engage with many interactive systems and organizations such as meteorological data systems, seed companies, and irrigation systems.

As big data, the Internet of Things (IoT), mobility, and cloud services develop, business entities that were not formerly connected begin to have more interactions with each other. In this greater context, proceeding alone is no longer a viable option. It doesn't matter if you're a tractor, irrigation, or ICT company, it's nearly impossible

> Advantages will not only come from within an organization, but also from the effective use of external resources.

for a single company to establish a whole set of systems on its own.

Of course, this is only one example, and a relatively simple one at that. Complex scenarios in all aspects of our lives, including education, transportation, and healthcare, will develop and evolve in the same manner as the marine ecosystem in Costa Rica.

Controlling resources

Enterprises in traditional value chains are adept at building core competencies, and the key to this is owning and controlling core resources. As industries integrate and consumer demands evolve, however, enterprises have to become more open and flexible, and future-proof their businesses with advantages that derive from being part of an ecosystem – what we can call "ecological advantages".

In other words, advantages will not only come from within an organization, but also from the effective use of external resources.

The same principle applies to the ICT industry. In the cloud era, ICT has grown from a vertical industry into a tool that enables the digital transformation of all industries. Vertical integration across the value chain has already become an action from the past, and the time is ripe for the ICT industry to establish a new, cohesive ecosystem.

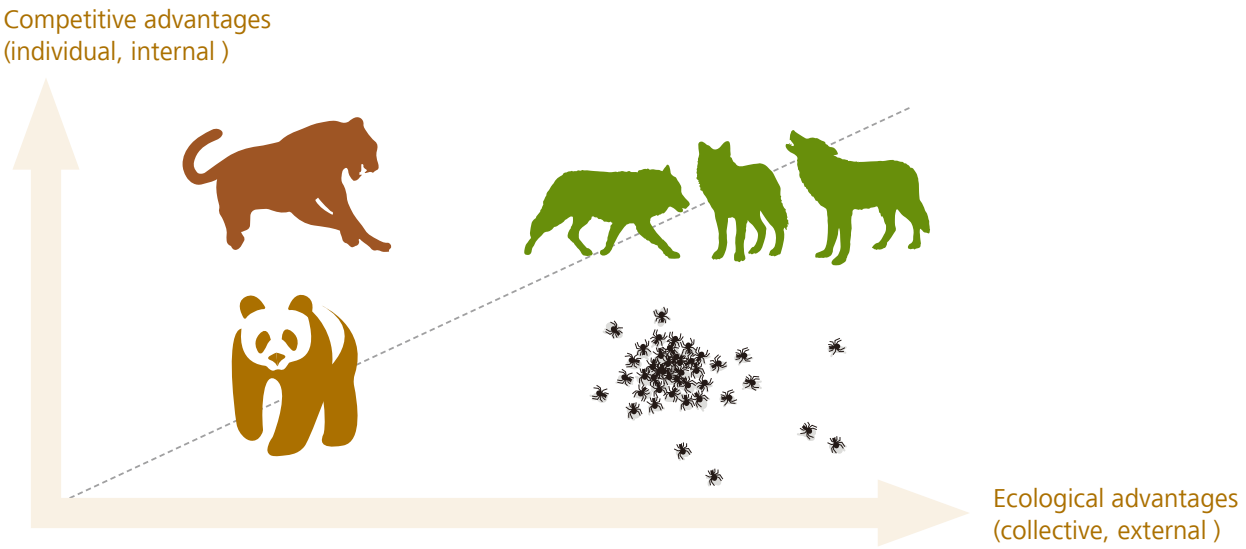
The ecosystem must be open. Compared with closed value chains, the new ICT ecosystem should be open and dynamic, and welcome new entrants.

The ecosystem must be diverse. The ICT demands of industries the world over are changing and becoming more complex, and there are many uncertainties in the times ahead. We thus need a diverse ecosystem to properly confront them.

Value creation in the ecosystem must be exogenous. Value creation will be largely driven by external rather than internal factors. In this sense, value will be derived from the entire value network, rather than from a single value chain.

Resources need to be integrated across the entire ecosystem. Competitive advantages in traditional value chains are derived from the effective management of resources that an individual company owns. In contrast, establishing competitive advantages in the future ICT ecosystem will depend on a company's ability to effectively manage resources that don't necessarily belong to it.

The ecosystem must be built on symbiotic



A Full view of competitive and ecological advantages for enterprises

relationships. Competition between traditional value chains is a zero-sum game, where some win because others lose. In contrast, the new ICT ecosystem must be symbiotic and promote shared success. Every enterprise, big or small, can become part of a symbiotic, interdependent, and regenerative community of common interests, as long as it has its own unique value and makes its own unique contribution.

An article in the Chinese version of the Harvard Business Review describes the advantages of different types of enterprises from two dimensions: competitive advantages and ecological advantages.

In the lower left-hand corner of the matrix are enterprises that lack both competitive and ecological advantages. We call these "pandas". Pandas in the wild are inept at adapting to their environment and can only survive in natural reserves. Panda-like enterprises refer to those that lack their own core resources and the ability to mobilize the capabilities of their partners in the business ecosystem.

In the upper left-hand corner of the matrix are "tigers". Tigers are extremely ferocious and are undeniably the true kings of the jungle. They come and go alone and have no companions. Tiger-like enterprises have strong core competencies and can innovate ceaselessly to make breakthroughs in established domains. However, these enterprises are not good at connecting with external resources, including partners, and as a result, their ability to optimize the ecosystem is relatively weak. The kings of the jungle might look majestic, but it's important to remember that even tigers can become prey when they're out of their element.

In the lower right-hand corner of the matrix is the third type of enterprise, the "ants". Ants are weak and small, but they're exceptionally adept at coordination and organization. As a group, they're strong and shouldn't be underestimated. The same applies to enterprises of this type: As individuals, their core competencies are not strong. However, they are exceptionally sensitive to industry trends and excel at mobilizing external resources for their own purposes. Even so, an ant colony built on alliances between weak individuals is, in the end, also weak, and cannot maintain its strength over the long term. It can be readily trampled, and when disaster strikes, ants often scatter in different directions.

Making a bigger pie, growing the industry, and enlarging the market – these are more important than fighting for a larger share. This is the first core concept in Huawei's vision for the cloud ecosystem.

In the upper right-hand corner of the matrix are "wolves". Wolves have a keen sense of smell, they're quick, and are known for their patience. More commendably, they're extremely collaborative. These characteristics make wolves highly adaptive, so they can survive in all sorts of environments, including mountains, grassland, deserts, and even tundra. Wolf-like enterprises often have both competitive and ecological advantages. These days, the turbulent and uncertain environment we work in necessitates a wolf-pack approach.

Competition in nature is cruel, but nature can also be full of vitality and hope. The survival of a species is the result of natural selection. In ICT, the robustness of our cloud ecosystem is the result of market selection, which thrives on creating value for customers. In the future, marketplace advantages might come from within an organization, but they might also come from the outside. Enterprises of the future will have a combination of both competitive and ecological advantages. Some use external resources to compensate for a lack of internal capabilities, whereas others leverage their internal strengths to compensate for the lack of a larger network. How can enterprises effectively manage resources that don't belong to them? How can they establish what we call exogenous or externally derived advantages? Where should they draw the lines between competition and cooperation? All this depends not only on leading technologies and disposable resources, but also on inclusiveness, organizational elasticity, and institutional innovation.

On this subject, I can't help but think of Tencent. Back before 2010, Tencent was a company that worked and fought alone. One article, "Damned Tencent", drew the company and its CEO Ma Huateng into a whirlpool of disputes.

Since that time, Tencent has begun to open up the interfaces of its platforms, especially its games. Now any entrepreneur can enjoy the benefits of Tencent platforms, like QQ and WeChat, for free. This enabled the company to transform from a game developer into a platform operator. Through alliances and cooperation, Tencent essentially handed out half of its livelihood to its partners. As a result, we bore witness to the rise of an entirely new Tencent – one that creates far greater value. Its market value jumped from US$40 billion to US$200 billion.

Making a bigger pie, growing the industry, and enlarging the market – these are more important than fighting for a larger share. This is the first core concept in Huawei's vision for the cloud ecosystem. This is the only way forward if we hope to establish

> We're leveraging our core businesses, which are competitive in their own right, along with our larger user base, to make a bigger pie for everyone – that is, to grow our industry as a whole.

ecological advantages in the future, and it is also our responsibility as an industry leader.

At Huawei, what we're doing is leveraging our core businesses, which are competitive in their own right, along with our larger user base, to make a bigger pie for everyone – that is, to grow our industry as a whole. By doing so, we're forming a symbiotic, interdependent, and regenerative community of common interests. In this ecosystem, we aren't set on owning every single resource. Instead, our goal is to establish more lasting connections with the outside world and leverage external resources to support us in our business efforts, thus fostering an ecosystem that will benefit everyone in the future.

We hope that Huawei can evolve from a big company into a great company, and set up a platform that will enable global connectivity.

Over the past three decades, Huawei's greatest contribution has been to make communications services more widely available to people in all parts of the world. In 1990, the phone penetration rate in China was only 1 percent. Today, the global mobile phone penetration rate exceeds 100 percent. Over one-third of the world's population uses Huawei products and services. Access to telecommunications was limited to the social elite in the past two decades, but now we've put the power of connectivity into hands of the general public everywhere. Back in the day, going from big to bigger meant unbridled growth, which required us to brace ourselves through thick and thin. Going from bigger to great is a more rational type of growth, one that calls for a sense of responsibility and mission.

In the future, we aim to become a core enabler of digital transformation, a movement driven by innovation. One report from the World Economic Forum shows that the value created by the digital transformation of vertical industries will amount to US$100 trillion over the next decade. These days, all types of new applications are emerging left and right, and over 70 percent of today's data traffic comes from video. In the future, many other sectors, such as industries, security and prevention, healthcare, and entertainment, will embrace VR/AR.

A good example is Pokémon Go, which has recently taken the world by storm. The size of the game's active user base has already surpassed Twitter's. The popularity of VR and AR around the world is generating huge amounts of data traffic. This poses great challenges to information pipes in terms of bearer capacity, transmission, and customer

experience, and at the same time, presents numerous opportunities to different industries. Huawei is ready to work with our partners to make the most of a bigger and better digital transformation pie.

Collaboration is the key

Our second concept in cultivating a healthy cloud ecosystem is that managing cooperation is more important than managing competition.

Competition and cooperation are two closely related concepts in an ecosystem. In the era of "coopetition", competition is fierce. If you don't excel, you're out. But cooperation is a must. If you walk alone, you can walk fast; but if you want to walk far, you have to walk together with others. Huawei is a company that grew up under fire in a fiercely competitive global market – and I have to say, we're quite good at competing with others. However, as we begin to establish an ecosystem, we find that managing cooperative buddy-buddy relationships is way more difficult than managing competitive relationships where one person wins because someone else loses. Cooperation requires all parties to bring their unique advantages to the table and deliver collective value to customers.

Building new ecological advantages alongside competitive advantages in the traditional sense requires us to have the courage to reinvent ourselves. More importantly, it requires the whole organization to fundamentally change the way it thinks, its cognitive patterns, and its behavioral models. This is a massively difficult undertaking for a mature organization.

In certain business scenarios, Huawei strives to play the nourishing role of "soil and energy" in the ecosystem. We hold fast to our pipe strategy and don't compete for profit with our partners.

That's what we've stressed time and time again: Collaboration leads to shared success. A good example of mutually beneficial cooperation is an industry video solution that Huawei put together for China Mobile Taizhou.

The solution is a platform supported by video technology for use by different industries. It not only serves the industries themselves, but is also available to the public.

Suppose that a family wants to go to park on the weekend. They want to know which park has the fewest people. With the industry video solution, they can use a mobile app to check out the situation at their favorite park and see whether any parking spaces are available. Before they leave home, they can also choose a route with the least amount of traffic. Once they've arrived at the park, the parking lot attendant can use video to ensure their car remains secure. This is an interesting feature of the solution, and can be used to identify different behavioral patterns. For example, before making a move, car thieves often circle their target vehicle several times. This video system is smart, so it can determine whether or not a suspicious party is likely to engage in illegal activity based on his or her behavior. If the analysis yields positive results, the system can automatically alert the parking lot attendant to keep a closer eye on suspicious people.

In this example, the platform requires different functional modules, which can be developed by different vendors. Only developers with domain-specific skills can develop an app for the park itself, a module that monitors and calculates road conditions, a video surveillance system, and other modules. Modules that can be used to identify behavioral patterns, for example, need to be developed by ISVs with a professional background in public security.

The most remarkable aspects of this solution are

> We will stick with an open approach for the long haul, give back to open source communities, and proactively involve ourselves in their ongoing development.

that its entire architecture is open to customers, its functionality is modular, and each module can be swapped out or replaced with another one.

To start out with, this is a cloud-based system. It was developed on OpenStack, an open source platform, so the system is fully open and can be interconnected with or replaced by other cloud platforms developed on OpenStack. This completely eliminates the risk of users being locked into one system.

Second, all components in the system are modular. Customers can choose to use Huawei modules if they like, or other vendors' if they aren't a fan of Huawei's. For example, Huawei might not be the best supplier of behavioral pattern recognition systems, so customers can choose to work with ISVs that have a professional background in public security. Even at the infrastructure layer, including computing, storage, and data center networks, customers can choose their preferred vendors or replace components that aren't up to the task at hand.

Finally, I want to emphasize that we will stick with an open approach for the long haul, give back to open source communities, and proactively involve ourselves in their ongoing development.

Benefit sharing is Huawei's third concept for shaping the cloud ecosystem. There is a popular saying online: "You might think that industry peers are your competitors, but your true competitor is the era in which you find yourself." Therefore, in the face of our most unpredictable competitor – a smart society – Huawei's strategy is to unite as many people as we possibly can. And how we do this is through sharing benefits.

Over the past two decades, Huawei has developed formidable organizational capabilities by establishing a unique benefits-sharing mechanism that values dedicated employees and inspires a fighting spirit in everyone.

This benefits-sharing mechanism has extended beyond Huawei to include the entire ecosystem. There are internal Huawei documents, which demonstrate our stance on sharing benefits and the direction we aim to take. We will continue to share benefits with our customers and suppliers.

To cultivate a strong and healthy ecosystem, we will share benefits more expansively with academic institutions, research institutes, and industry organizations, among others. These are the targets of symbiosis – the people we hope to unite!

> Through 5GVIA, we've partnered with a number of respected global vendors, especially automakers, to build a test field that includes facilities like expressways, indoor parking lots, and test sites for business centers.

We hope to bring all manner of talent, capabilities, and resources together from all corners of the earth. Even if we don't own these resources, we can make full use of them and share the wealth along the way. I firmly believe that the key to achieving success in the future is not who you defeat, but who you unite.

Sharing benefits is the driving force behind the evolution of the ecosystem – and the result of its successful development. We've only got our sights set on 1 percent of a huge digital transformation pie. Our partners can have the rest. Think that's going to be a tough decision for Huawei? Not even remotely. In fact, our founder Mr. Ren has been doing this all along with our employee stock ownership plan over the past 20-plus years.

Next, I'd like to tell you about what we're doing to develop the cloud ecosystem development. We're approaching this initiative from four angles. First, we've been establishing industry alliances to lead industry development and grow the industry together. Second, we've been establishing strategic business alliances to ensure our customers' success. Third, we're proactive in open source communities, promoting collaboration and innovation in these communities. Fourth, we've established a developers' platform, through which we aim to introduce more players to innovate and help our ecosystem prosper.

As for industry alliances, one important area for us is the industrial Internet.

Huawei is a member of many industrial Internet organizations, including the Industrial Internet Consortium (IIC) in the US and the Alliance of Industrial Internet (AII) in China. The IIC was established in the US in 2014. It has over 250 members and has initiated 26 test bed projects. Huawei is part of its Steering Committee.

5GVIA

The 5G Vertical Industry Accelerator (5GVIA) is an industry alliance set up by Huawei. Through 5GVIA, we've partnered with a number of respected global vendors, especially automakers, to build a test field that includes facilities like expressways, indoor parking lots, and test sites for business centers. We have plans to connect our 5G Internet of Vehicles (IoV) system with automaker factories in real time, helping them integrate and test new 5G IoV services more efficiently. Industry partners, or our competitors in the traditional sense, will also work with Huawei to take

these alliances to the next level.

At the commercial layer, Huawei has established many strategic partnerships to ensure our customers' business success. I'd like to share some examples of partnerships we've formed.

As a cloud service provider, Huawei supports the Open Telekom Cloud (OTC) of Deutsche Telekom (DT) in Germany. DT's subsidiary, T-Systems, has many enterprise customers and millions of private lines for enterprises. Huawei's technical solutions are perfectly positioned to meet DT's service development needs. This is the basis of cooperation between our two companies. DT's OTC is a good example of the type of strategic cloud alliances that Huawei seeks to form.

Huawei has established a joint innovation center with SAP, Europe's most influential software company. Together, we've launched a series of Industry 4.0 solutions, which successfully serve a number of leading multinationals – companies like Sinopec. The foundation of Huawei's partnership with SAP is that we complement each other – one is strong in hardware and the other in software.

Another example is Hexagon. With our own ICT infrastructure and Hexagon's computer aided dispatch (CAD), Huawei launched a Safe City solution for Saudi Arabia, which has promoted the stable and organized progression of the annual pilgrimage to Mecca, ensuring safety at Hajji.

Last but certainly not least, Intel has been Huawei's strategic business partner for many years, and we have countless examples of successful collaboration, for example, KunLun Mission-Critical Servers.

Huawei is proactive in open source communities for ICT, pushing industries to open up, integrate, and innovate. We are an active contributor to open source communities like ONOS, OPEN-O, OpenStack, and Carbon.

Since 2010, OpenStack has become the most influential open source project in cloud computing. Over 600 Huawei R&D engineers are contributing to its development. In recognition of our ongoing hard work and contribution to the foundation, OpenStack granted Huawei a gold director title in 2016.

Last year, Huawei announced a five-year Developer Enablement Plan with a budget of US$1 billion, which will be used to build an enabling platform for developers and promote joint innovation. When it comes to technologies and solutions, Huawei provides developers with open ICT capabilities in the most cutting-edge domains, including cloud computing, big data, the IoT, mobile broadband, software-defined networking (SDN), and mobile offices.

We hope all of you present here today will join us in this open ecosystem. We look forward to your participation in industry alliances, open source communities, and our developers' platform.

In the past, heroes were more likely to emerge in times of trouble. And they were often lone heroes. But that's no longer the case. In the cloud era, an open, dynamic, and symbiotic ecosystem will provide heroes with vast swaths of fertile soil in which they establish their roots, grow, and develop. This is an era of broad alliances where heroes will emerge in great numbers.

In the upcoming digital, smart society, Huawei aims to serve as the soil and fertilizer of the ICT ecosystem. Through the strong, strategic alliances of heroes, we will push our industry forward, and promote ongoing social progress.

This is our responsibility, and it is also our mission.

KPN Business transformation the Dutch way

Scan for mobile reading

Recognized for its digital business best practices and standards at this year's TM Forum Live, KPN took home the 2016 Business Transformation of the Year Award. KPN CIO Bouke Hoving let us in on what the Dutch company has been doing to stay ahead of the curve, particularly with its simplification strategy.

By Kyra Mi

Happy customers

WinWin: Congratulations on the award at the TM Forum. Why do you think you won?

Bouke Hoving: We were very excited to hear that we'd won. I think the best answer is because of the proof points we've created in transforming our business. We went the extra mile within our transformation to become the best service provider in the Netherlands, and I can name a lot of exemplary projects, including Future of Mobile with Huawei. The best proof point is probably the significant increase in customer satisfaction. We took our Net Promoter Score from negative territory to not only positive, but to double-digit positive in the last quarter. That's the ultimate proof point – happy customers.

Deep dive into simplification

WinWin: You've shifted your corporate strategy from Strengthen-Simplify-Grow to Simplify-Grow-Innovate. What's behind that shift?

Hoving: After working for a few years on those strategic objectives, we felt that we'd made so much

> We still have some challenges. We're the best telco in the Netherlands and we raised the bar by starting the simplification program.

progress, especially on 'strengthen'. Of course, we will keep on working on the strengthen pillar, but not to the extent that justifies a separate strategic objective. As we felt we were strong enough, we took the strategy to the next level, and summarized it again as three pillars: Simplify, Grow, and Innovate. This is because we're strong enough to take innovation to the next level and make it a primary strategic objective.

Simplifying customers' lives

WinWin: Let's zoom in on the simplification aspect. How has it made life simpler for customers?

Hoving: If you look at the impact the Simplification Program on customer experience, you basically have to go back to where we started. Back in 2013, customers were experiencing a lot of product siloes, and the company was still organized and structured from a process and system perspective along product siloes. Customers were experiencing a lot of friction once they moved from one product silo to the other, or when they moved from one channel to another.

We basically reorganized a very complete operating model for processes and systems, putting the customer at the center. We redesigned processes from being product and channel dependent to making them independent, basically making customer experience seamless across channels and products, giving them a much better customer journey.

WinWin: How far have you progressed with that?

Hoving: We still have some challenges. We're the best telco in the Netherlands and we've raised the bar by starting the simplification program. To become the best service provider, we still need to take it to the next level. From a digital customer journey, we made substantial progress, migrating the full customer base to a future set of products, processes and IT systems.

Networks and IT: Decoupling and holistic transformation

WinWin: How much have you simplified your IT and network infrastructure?

Hoving: We started simplifying our processes and IT in our customer touch points – channels, shops, digital channels, and call centers – by bringing in only one CRM system and one order entry system.

> We really took transformation seriously by making it a company-wide program, covering products, processes, IT, and our way of working in a holistic transformation approach.

We decoupled the channels from the backend, and simplified the backend for fixed and mobile. We did so by consistently applying a very holistic transformation approach, starting with simplifying our product portfolio, then looking at processes and systems, including the way we work.

WinWin: What business benefits did you receive?

Hoving: We got a lot of positive feedback from the channels, from colleagues working in the shops, and people working in the contact center. Back in 2013, the channels were complaining about having to enter orders for multiple products. We were successful in our quad-play products, but customers were experiencing really slow order handling times, because the shop floor had to enter orders in multiple systems under multiple processes. We've now reduced handling times by 80 percent, and so both customers and channel employees see the benefits of transformation.

WinWin: One of the pitfalls of changing IT is the risk of lowering customer experience. How did you avoid that?

Hoving: One of the crucial elements of our design was to decouple the frontend and backend. This delivers short-term results to customers and employees at the frontend, but finds room to maneuver at the backend. Secondly, by starting with a simplified portfolio, we removed complexity, migrating and rationalizing a lot of the legacy price plans and products so we could smoothly migrate customers from legacy systems to our new processes and IT stacks.

Centralized and agile

WinWin: Have you changed the way you're organized

internally to effect changes in your IT structure?

Hoving: Yes, we had to. First, we centralized all the change programs inside the company to ensure they were well aligned and focused on the primary transformational objectives. Second, we embraced agility as our primary way of working. We felt that's the only way we could deliver quarterly benefits to customers and employees, and in that sense, keep the company confident about transformation.

WinWin: How does KPN orchestrate different departments to ensure transformation is coherent and integrated?

Hoving: We centralized the roadmap and architecture functions, breaking down the old transformative work into manageable pieces and put them in the right sequence.

For example, we decided to simplify fixed and mobile in parallel to simplify our backend. Why? Because, to a certain extent, you have to put a break on all incremental product innovations and quad-play. So, if you put a break on product innovations for both fixed and mobile, you can create a window for completing transformation, which would have been impossible sequentially.

Past secrets and future prospects

WinWin: The award shows you're ahead of the curve. What is the secret of your success?

Hoving: First, we really took transformation seriously by making it a company-wide program, covering products, processes, IT, and our way of working in a holistic transformation approach. Second, we designed a very consistent roadmap based on quarterly results, so from the start we were able to prove to our customers and the organization that we were on track. We had our low points and setbacks as well, but we were able to deliver strong quarterly results to the organization, channels, and customers.

WinWin: You're in a fast-changing marketplace. You've got quite nimble, digital competitors out there. How will KPN stay ahead of the curve?

Hoving: A very good question. It's a very competitive market on various levels. Way more challenging than 10 years ago. We believe that by moving forward with our simplification program and investing in innovation, we can stay ahead of the competition.

For the next phase of the Simplification Program, we see substantial room for improving customer journeys and efficiency from various angles. One is merging the fixed and mobile backends even further. We've now hidden most backend complexity from our customer side, but we still have to merge the backends to deliver a fully integrated fixed and mobile customer experience. Secondly, we believe that integrating the backends from various brands can deliver a better customer experience and de-duplicate the backends out of the operating model. So that's the way into the next phase of our program.

Into the partnership together

WinWin: Let's take a look at your partnership with Huawei. 2016 marks 10 years together. How's the partnership going and how do you see it evolving?

Hoving: I believe we have a strong and successful partnership. Recently we launched another big transformation project on our mobile domain. During transformation, you can never really predict what the real challenges will be. With Huawei we're able to manage and overcome these challenges and succeed with transformation. And that's the key to successful collaboration.

GE: Becoming digital industrial

Scan for mobile reading

Born in the Industrial Revolution's second wave, the manufacturing giant GE is set to lead a productivity revolution in global industry by combining physical machinery and analytics. Denzil Samuels from GE Digital urges companies to go digital. The alternative is to perish.

By Denzil Samuels, Global Head of Channels & Alliances, GE Digital

The Industrial Internet is here

From 1990 to 2011, productivity gains in industry averaged about 4 percent. The main drivers were 6 Sigma, lean manufacturing, and the just-in-time supply chain. The last five years, however, has been characterized by almost zero productivity gains. Why? Because technology hasn't changed. Not all that much, anyway.

Our Chairman and CEO Jeff Immelt has been telling the market for the last few years that if we can find ways of increasing productivity in industry by even 1 percent, it will drive trillions of dollars of value to the market. That's how big this is. And the way to do that is to digitize industry.

We believe this at GE, so much that so we've invested billions of dollars over the last five years to demonstrate what digital industrialization will mean for the world, much like the industrial revolution transformed everything.

We're actually a manufacturing company – we build

> We have an approach that's very, very simple. We name it Digital Twin – that's when physics and analytics work together.
>
> – Denzil Samuels, GE Digital

jet engines, gas turbines, oil refineries, and so on. We have 420 manufacturing factories around the world, so we know how to build stuff, we know the physics, we understand the domain, and we have the expertise. That gives us a right to show the world how to digitize industry.

We have an approach that's very, very simple. We name it Digital Twin – that's when physics and analytics work together. Let me give you the example of a jet engine. Jet engines consist of blades inside the engines that drive the jet engine. Each blade is manufactured with a sensor. That sensor is transmitting real-time data to us every minute of every day, if that's the way we decide to connect it. And that information is giving us the ability to build what we call a digital twin – when you have an avatar or a cyber copy of the engine that goes with the engine itself. With that, we can simulate what the engine is experiencing, whether it's flying over the sandy skies of Saudi Arabia or the less corrosive skies of North America.

The blade within the engine is going to wear at different rates, depending on where it's flying and how often it's flying. And by simulating this, we can move from reacting to an engine failure. It allows us not only to be proactive, but also predictive. The engine that's now being simulated, can take over the pain of major aircraft engine maintenance by replacing a single blade that's worn as soon as we know about it. Or better still, predicting when it'll get worn to the point when it needs replacing, so we can minimize the amount of time that the engine is actually out of commission. This minimizes downtime for the airline, which is obviously a good outcome.

Not only that, but we can give the airline digital information in real time. That can help them with flight operations like scheduling crew and handling cargo. We can also provide data in a whole bunch of other areas by just selling them a jet engine.

That's taking this digitalization of industrials to a whole new level. Can you imagine if we're doing that with cars, what possibilities will it bring to consumers, manufacturers, distributors, or the dealership? That's what the digitalization of industry can do.

It takes an ecosystem

We have a three-pronged digital industrial strategy – GE for GE, GE for our customers, and GE for the world. Because we're in industry, we have to start with ourselves. We have to prove that we can extract

The consumer Internet by 2020 will be home to about 200 billion products and services and the enterprise Internet home to about 225 billion. The estimate for the industrial Internet is half a trillion.

savings and productivity within GE. Actually, GE has already made US$500 million in productivity savings in 2016 by using smarter machines, and that number is expected to grow to US$1 billion by 2020. If we can do that, then we can take it to our customers and show them how to do it, too. Once we're taking it to our customers, we're designing an operating system for the digital industrial world that we'll take to the world.

The industrial Internet is built on a number of things. In the days of ERP systems, the ecosystem was about the customer, a software vendor like SAP or Oracle, and the systems integrator. In the world of the industrial Internet, it's so much bigger. The ecosystem for a single solution could involve a hundred different players, so we need to make that architecture open so everyone can use it. Whether you're a device manufacturer or a player in the telecom space, software, or data cleansing world, it doesn't matter. Everyone plays in that space and everyone is as important as each other. So that's what we've done with the digital industrial Internet, and that's our collaboration strategy.

If I ask you who heads up the consumer industry, you'd either say Amazon or Alibaba. If we talk about the B2B space, we might ask who owns the enterprise Internet? You'd probably say Salesforce or Oracle or SAP. But, if I ask who owns the industrial Internet, the answer is no one. There is no one in that space today. That's why we want to own it, because we have the right to own it. But, the barrier to entry is huge.

The consumer Internet by 2020 will be home to about 200 billion products and services and the enterprise Internet home to about 225 billion. The estimate for the industrial Internet is half a trillion.

Think about the companies that are doing something very disruptive in the marketplace. You know who they are: Uber, Airbnb. What do those companies have in common? They've found a way to make someone else's assets more productive than the people who own those assets. If you think that the move to the industrial Internet and the management of those assets is a few years away, you're wrong. The leaders in vertical industries are already working with us and many of our partners today. This is here and it's now. And if you don't find a way to do this, someone else will and they'll steal your business. This is not just "hey this is a great technology, let's just move to it"; it's 100 percent about defending your business and finding ways to revolutionize and grow it.

The industrial Internet is here today. You've got to get on board, because if you don't in the next 12 months, you'll be a follower, not a leader. You'll lose market share and you'll lose business.

ICT 2020: STC's new focus

Saudi Arabia has one of the world's highest penetration rates when it comes to smartphones, social media, and online platforms. As the nation's largest carrier, STC is evolving from a traditional telco into a full-fledged digital enabler. The company is creating value for different verticals with innovative ICT solutions under the belief that an intelligent, flexible, and agile network infrastructure is the key to digital transformation. STC Group CEO Dr. Khaled Hussain Biyari told us what the carrier's ICT 2020 transformation strategy is all about.

By Linda Xu

Forging ahead with Network 2020

Transformation is a must

One of STC's aims is to become the leading ICT player in the region. At the start of its transformation journey in 2013, STC introduced major programs to improve its corporate culture and work environment. It also initiated one of its largest ever projects: transforming their IT and business support systems. In 2015, despite an industry-wide slowdown, STC's consolidated revenue and EBITDA were up 11 percent and 3.8 percent respectively over 2014, confirming the success of their transformation programs. Over the next three or four years, operators will be delivering technologies that fundamentally change society. 5G coupled with a world connected by the Internet of Things will see operators become more important to enterprises and consumers. By 2020, networks will inevitably face a level of demand and strain that they've never seen before. Telcos also need to worry about how to stay relevant in 2020.

“With 4.5G networks and the major role they play in pushing video content to customers, video services will become even more popular in Saudi Arabia – the nation already ranks first in the world for YouTube views.”

From infrastructure to apps

Moving towards Network 2020, operators are transitioning to an All-IP world where they will provide more relevant and enriched communications services for customers, create revenue opportunities, and secure long-term shareholder value by leveraging the interconnectivity of an All-IP network.

The transformation process exists in four layers. At the bottom sits the innovation layer, which can link you with your R&D centers. The second layer is infrastructure. Next you have what they call the enablement layer, which consists of all enablement platforms, including cloud, machine to machine, IoT, and cyber security. Finally, the fourth layer houses applications for different industries.

STC has invested heavily in the first three layers, with a clear focus on partnerships, especially on the application layer to ensure it finds the best partners for every vertical. So, the company is marching along well and the CEO believes it will become a major player in the digitization era.

Setting the pace of new tech

When 4.5G is ready

In STC’s largest market, Saudi Arabia, the take-up of the latest technologies is unmatched. It witnessed exponential growth in data consumption when it introduced 3G, and then 4G, largely due to social networking. Now, STC is deploying 4.5G.

With 4.5G networks and the major role they play in pushing video content to customers, video services will become even more popular in Saudi Arabia – the nation already ranks first in the world for YouTube views. So, it’s crucial to work with partners to deploy new technologies like video, which consumes huge amounts of network resources; for example, installing CDN is extremely important if you want to optimize where traffic is going through the network. STC is planning to aggressively promote M2M applications now that latency is no longer a bottleneck, and its looking at more advanced technologies to enable these applications for customers.

For digitally savvy young people

Around 65 percent of Saudis are under the age of 30, and the population is getting younger. This has led STC to adopt new approaches to better meet the evolving needs of young, digitally savvy customers.

The millennials of today's Saudi Arabia exemplify the ongoing shift in consumer behavior and expectations. They live in an always-on, real-time world, and expect companies to cater to them in the same way.

In May, STC launched Jawwy, a new digital mobile experience that places it as one of the first telcos in the world to design and develop a new mobile experience that uses online and social media. Jawwy features its own SIM, app, and freshly designed digital channels for sales and customer care. A key differentiator of the service, the Jawwy app will allow users to build, share, and manage their plans in real time, instead of buying fixed plans. The app also offers many unique features including real-time contextual offers and notifications, and a simple way for customers to activate services without calling customer support or visiting a store.

The app will be available for both iOS and Android. The service has been in private beta testing since December 2015. Jawwy is a significant part of STC's current digital transformation. It believes this initiative will set the pace for the telecom sector in KSA and beyond, predicting that it's the future of mobile.

Clouds above the new blue ocean

According to IDC, more than a third of Saudi organizations have invested in cloud services. The cloud market in Saudi Arabia is expected to grow 44.5 percent year on year in 2016 to total US$63 million. This will be the result of an increasing number of end-user organizations migrating non-core workloads, including productivity, collaborative projects, sales, marketing, and human capital management to the cloud.

STC developed and began executing its cloud strategy in late 2014. The telco's cloud services enable customers to log on and choose the kind of services they want. STC has mainly promoted cloud services to SMEs because cloud is the logical choice for them to optimize IT operations, both from a cost standpoint and efficiency perspective. Moreover, STC signed an MOU with one of the region's leading government departments to provide cloud services for the public. As a result, it sits at the forefront of cloud services in the region.

STC has launched cloud marketplace as a platform for other ICT players to host and sell their services, creating an ecosystem of cloud services provided by a network of local and international partners.

All-round support

A word on regulatory bodies

Competition in Saudi Arabia's mobile market has increased significantly, and the nation is seeing a rise in data consumption of more than 250 percent in a year. It's very important to reduce regulations that don't add much value, particularly during network transformation. Although the huge expansion of network infrastructure requires the right level of spectrum allocation, the regulatory framework shouldn't constrain telcos in terms of how they can package and sell their services.

With Huawei

STC has partnered with Huawei on a number of development fronts that aim to enhance customer experience and optimize OPEX by better understanding customer needs and wants. This will ultimately win customer loyalty by creating more value than ever before.

Over the years, Huawei has proven to be a valued strategic partner of STC. That's why STC is teaming up with Huawei to implement its greatly ambitious ICT 2020 plan.

Better Connected Living with GSMA

Scan for mobile reading

To fully unlock the value of the IoT, GSMA is working closely with operators to establish a robust IoT ecosystem. Its Connected Living program is a key initiative for helping operators to make connected devices and services a reality. GSMA CEO John Hoffman told us how the Connected Living programme is helping to mobilize IoT.

By Linda Xu, Gary Maidment

More than connectivity

GSMA's Connected Living programme aims to promote a world in which consumers and businesses can access rich new services on an intelligent and secure mobile network. "We aim to achieve this through industry collaboration, optimizing networks, and encouraging the development of appropriate regulations," states Hoffman. "We're also working to develop key enablers that will support the growth of M2M in the immediate future and IoT in

> The GSMA's IoT Security Guidelines ensure best practices for securely connecting and managing IoT devices on any mobile network.
>
> – John Hoffman, CEO, GSMA

the longer term." The program mainly covers five areas:

Mobile and trusted IoT: According to Hoffman, "We're collaborating with mobile operators and ecosystem partners to develop Low Power Wide Area (LPWA) solutions that will enable IoT to scale."

IoT security: The GSMA's IoT Security Guidelines ensure best practices for securely connecting and managing IoT devices on any mobile network.

IoT connection efficiency: The GSMA works with its IoT ecosystem partners to establish guidelines for how machines should communicate on a mobile network in the most intelligent and efficient way.

IoT big data: Hoffman reveals that the GSMA are establishing the "IoT Big Data Ecosystem (BDE) by delivering harmonized data sets and APIs."

Remote SIM provisioning: The GSMA has encouraged the industry to implement a single, robust and interoperable global remote SIM specification for M2M devices with an evolution path to connect all devices. "We're also enabling the natural evolution of the SIM from physical to digital, simplifying connections on a wider range of consumer devices that are connected by secure mobile networks," says Hoffman.

He believes that, "To bring IoT to the masses, collaboration is the way to solve the various issues affecting IoT," of which there are quite a few.

Security

The predicted massive growth in IoT devices and applications will create big challenges for the IoT ecosystem, a major one being the risks caused by the mass deployment of inefficient, unsecured or defective IoT devices. These have the potential to create serious problems, including local issues in mobile networks like cell congestion, and capacity and performance problems in core networks such as signaling storms that can disrupt wide areas. Declining IoT service performance that causes delayed communications and even complete service outages could be disastrous in scenarios like healthcare, where constant monitoring is needed.

> We've identified three major focus areas to develop IoT: smart cities, connected vehicles, and health.

IoT is dependent on the efficient and intelligent use of secure mobile networks. "The GSMA has delivered a set of security guidelines to promote best practice for the secure design, development and deployment of IoT services," states Hoffman. "A secure IoT market will create trusted, reliable services that can scale as the market grows."

Big data analytics

IoT is generating a huge amount of data that's currently retained in vertical silos. However, Hoffman feels that, "A true IoT is dependent on the availability and confluence of rich data sets from multiple systems, organizations, and verticals." This, he feels, will usher in the next generation of IoT solutions.

GSMA is working with the mobile industry to establish an IoT BDE to make harmonized data sets from multiple sources available to developers and third parties through common APIs. This will enable the industry to remove the commercial and technical barriers to capitalizing on the wealth of opportunities that IoT offers.

A common, collaborative and interoperable approach to big data will usher in a new era of IoT solutions that help the market scale.

Three prioritized segments

"We've identified three major focus areas to develop IoT: smart cities, connected vehicles and health," says Hoffman, when talking about GSMA's priorities. In the area of smart cities, GSMA is working with mobile operators, governments, public venue managers, and city councils to highlight joint deployment approaches and deliver technology enablers for smart city solutions that can deliver real, long-term benefits to businesses and citizens. The connected vehicle market will be worth US$358 billion by 2020. GSMA has been working with mobile network operators and automotive original equipment manufacturers to accelerate the growth in this market, such as advancing car connectivity through billing and charging as well as through the GSMA Embedded SIM Specification which has become a de facto standard.

According to PwC, the use of IoT technology in healthcare could reduce costs by US$99 billion in the EU and add US$93 billion to the region's GDP. GSMA's health project under the Connected Living Program focuses on three main enabling factors:

> According to PwC, the use of IoT technology in healthcare could reduce costs by US$99 billion in the EU and add US$93 billion to the region's GDP.

evaluating existing and emerging interoperability standards, ensuring clarity, and formulating regulations for digital health while developing cross-sector partnerships.

Economies of scale

Hoffman is convinced that "fragmentation within IoT industry leads to a lack of economies of scale, resulting in closed ecosystems that don't work." Last year, the GSMA founded the GSMA NB-IoT Forum with its partners, including Huawei. According to Hoffman, "The forum will provide all industry and wider ecosystem stakeholders with market representation to accelerate the widespread adoption of 3GPP-based NB-IoT technologies."

The GSMA NB-IoT Forum aims to facilitate demos and proof-of-concept trials that strengthen the NB-IoT solution to meet LPWA requirements; lead partners to build a strong end-to-end industry chain for NB-IoT's future growth; drive NB-IoT applications in vertical markets to create new business opportunities; and promote collaboration between all NB-IoT industry partners to ensure solution interoperability. "This represents our efforts to address interoperability for economies of scale,

the key to long-term success," says Hoffman.

The first NB-IoT network trials are already in place, with pre-commercial launches planned for the latter half of 2016, and commercial launches scheduled to take place globally in early 2017.

As one of the leading lights in the industry, GSMA is taking a holistic approach to the field of IoT, from policy and regulations to solutions and standards, establishing the GSMA's ambitions to, in Hoffman's words, "be out at the forefront" when it comes to IoT.

2degrees of closeness: Staying on top by staying on trend

Scan for mobile reading

New Zealand operator 2degrees arrived on the scene in 2009, soon ranking second in the prepaid market and then growing via post pay to more than 1.3 million customers. Living by the slogan "It's 2degrees of closeness, not 6 degrees of separation," company CEO Stewart Sherriff believes that bringing simplicity to product and service plans is the secret to sustainable growth.

By Linda Xu

Not just speed

Reaching more than half of all Kiwis

2degrees covers 96 percent of New Zealand and has brought 4G network coverage to almost 60 percent of the nation's population over the past year. We're planning to roll out 4G in the following eight locations in 2016 to bring coverage to 70 percent: Christchurch, Cambridge, Huntly, Kapiti, Masterton, Motueka, Oamaru, and Whakatane.

Continuing our 4G rollout across the country, new 2degrees customers can expect fantastic services and high data speeds. We're seeing huge data throughput, especially video, which is fast becoming the main data-hungry service.

Content is king

Buying the ISP Snap last year has allowed us to accelerate our entry into the broadband market using Snap's incredible national network infrastructure. By providing both mobile and broadband services for our customers, we're well positioned to compete in all segments of the market. This will let us support our customers' growing digital needs. We aim to deliver a reliable connection, quality customer service and, most importantly, make the choice and process simple for our customers.

Last year, 2degrees partnered with Sky NEON, a premium content provider, to give customers unlimited access for six months to a world of movies and TV on-demand. Whether our customers are fans of Disney movies and HBO TV series or whether they're looking for some fun, there's something for all tastes on NEON.

Taking on high-tech

Virtual reality (VR) becomes commercial

When people speak of VR, they only think about gaming where you put on a headset to get

> According to a McKinsey survey, IoT will be worth US$11 trillion annually by 2025. Health, transportation, agriculture and infrastructure in New Zealand will be impacted the most.
>
> – Stewart Sherriff, 2degrees CEO

immersed in a game. But I see the wider commercial opportunities. For example, New Zealand is very environmentally minded, with many regulations covering the fishing industry, including the size of nets and catch quotas. Currently, the only way the government can enforce this is to put inspectors on vessels. To simplify the process, we're working with companies that have developed 360-degree cameras with memory storage on board to capture what's going on in a given boat. The data is then transferred over our 4G network to a central server. Administrative officers can sit in comfort in their office with a VR headset on and look around the fishing boat to see what's happening.

Cashing in on Internet of Things (IoT)

According to a McKinsey survey last year, IoT will be worth US$11 trillion annually by 2025. Health, transportation, agriculture and infrastructure in New Zealand will be impacted the most.

2degrees is working with a number of different partners. We're looking at narrowband IoT, LTE-U, and so on. The usual application scenarios are electric, gas, and water meters, and there are over a million sensors installed in New Zealand at the moment. But, people are still using the old 2G technology. So, there's a huge opportunity now.

We've also found that in some cities in New Zealand, 30 percent of all traffic on the roads is actually people looking for a parking spot. So by having a simple sensor on empty parking spots, you can go directly there. We're also working with a company that examines the water quality of harbors in New Zealand. Real-time signals will mean people can know when they can swim in safe, clean water. I think city life and safe city management is a great opportunity for IoT.

IoT in agriculture definitely has a promising future. Sensors have already been placed across some large farms to send data to irrigation systems, saving many man-hours and preventing costly mistakes through lack of water. Some vineyards have also introduced

2degrees serves some of New Zealand's largest businesses, including district health boards (DHBs), tertiary providers, and national retailers. We bring innovative mobile and fixed network solutions to our enterprise customers.

sensors to measure the sugar levels of vines, so they can be made from grapes with perfect sugar content.

Health at full throttle

2degrees serves some of New Zealand's largest businesses, including district health boards (DHBs), tertiary providers, and national retailers. We bring innovative mobile and fixed network solutions to our enterprise customers. Recently, 2degrees was appointed to the Government's Telecommunications as a Service (TaaS) provider panel, meaning we can now provide updated mobile services and new fixed connectivity services for the government.

Canterbury District Health Board is the main planner and funder of health services in the district. 2degrees' healthcare solution, HealthBridge, securely connects care providers with multiple healthcare applications and data sources, ranging from public and private hospitals, radiology departments, and labs to Primary Health Organizations, individual GPs and district nurses. 2degrees also manages the Southern Health WAN that connects three South Island DHBs and affiliated care providers. 2degrees provides high availability bandwidth, which is now an essential part of hospitals for patients and staff. For example, we're replacing written materials with online modules and live video for use in staff training.

In-patients want to continue their lives outside as much as possible, and this often requires Internet access to stay in touch with friends and family or pay household bills online.

2degrees also offers mobile, voice, and data services to the University of Waikato, with 1,500 staff spread over the campuses in Hamilton and Tauranga. Staff are free to move onto flexible plans tailored to their particular usage habits, and each user can share data with five other devices or people.

Students, friends, and family can also access competitive data plans through the university's partnership with 2degrees. As a result, the university has reduced its mobile costs by 48 percent, saving about US $ 200,000 per year.

VDoR: Video for all with Download on Request

Scan for mobile reading

On-demand video streaming has enjoyed a rollercoaster ride across the globe in terms of both user numbers and revenue. It's now common for communication service providers (CSP) to offer VoD, either on their own or under partnerships that generate revenues from data usage and, sometimes, content sales.

By Marcelo Rego, Bijun Han

However, what about customers who won't pay a premium for the instant delivery of videos or operators who lack the required network resources to deliver a true on-demand experience? Is it still possible to profit from video content?

This answer perhaps lies with a new network-centric video delivery model: Video Download on Request (VDoR)

VoD: Rise and shine

Since 2007, video on demand (VoD) services and their business models – subscription VoD, transactional VoD, and ad-supported VoD – have

By looking at the financial and operational results of these mobile operators, it's clear that subscribers who opt for their video bundles consume much more data and often upgrade to a higher usage tier compared with those who don't.

blossomed worldwide. Companies such as Netflix, Hulu, and Amazon Prime stream million of hours of videos daily. Complementing this, most pay-TV providers have some sort of pay-per-view option so customers can enjoy the latest blockbusters for a fee.

All these services require stable, low-latency, and fast broadband that can cope with the stringent demands of streaming video. The higher the resolution, the faster the broadband must be – Netflix recommends 3 Mbps for DVD quality and 5 Mbps for HD quality.

Most users don't know that parameters like network latency and jitter also play a crucial role in delivery: If latency and jitter aren't minimized, user experience may suffer with choppy audio and video even with fast broadband networks. Obviously, large communication pipes with low latency and low jitter require heavy investment from CSPs.

One or two bills

In this ecosystem, two models emerge: The simplest is when the CSP is or appears to be the owner of the movie the user wants to watch. In this case, users don't want to be charged both for content and delivery, and expect to pay a single fee.

The second model is when the video is delivered by an Over The Top (OTT) third-party content provider. The customers must ensure their broadband service is good enough for the quality they wish to enjoy. Such separation of services has led many CSPs – in particular mobile operators – to partner with OTT-video service providers. This partnership, which often involves a subsidy for a monthly membership fee, is now sweeping the world. Two examples are Vodafone, which grants a free one-year Netflix subscription to people in the UK, and Tele2 Sweden, which allows its customers to choose between a two-month free subscription to Viasat or HBO Nordic. By looking at the financial and operational results of these mobile operators, it's clear that subscribers who opt for their video bundles consume much more data and often upgrade to a higher usage tier compared with those who don't. Thus, even if these operators have to spend money subsidizing OTT video providers on behalf of their customers and invest in their networks, the total business scenario seems to be positive.

> To increase data usage, lower churn, and raise brand awareness, there are many examples of mobile operators across the world that are pushing video services to their customers.

Not everyone can join the party

To increase data usage, lower churn, and raise brand awareness, there are many examples of mobile operators across the world that are pushing video services to their customers: Turkcell is offering Turkcell TV+ subscriptions to its mobile-only customers in Turkey. Verizon in the US is strongly promoting its video applications NFL, Indy, and Go90. Telia in Sweden and Claro in Brazil offer subscriptions with zero-rating for video-intensive applications such as Facebook.

These are all examples of convergent or mobile operators promoting video-streaming applications that place a heavy burden on the network but which instantly deliver a smooth video experience in the user-selected resolution and without delay. This arrangement works because users are prepared to pay for this privilege, while the operators have the deep pockets required to make the necessary CAPEX investments to prepare the networks in advance. But what about operators whose customers do not have the financial resources, network connectivity or willingness to pay a premium to ensure this instant-on video experience? And what about operators that only provide wireless broadband or have limited FBB coverage? They may not want to promote video services, because too many customers at the same time will require lots of bandwidth, which may congest their networks and ultimately result in unsatisfied customers.

Is VDoR the new black?

The VDoR solution proposes a third business model: Operators can bundle a new video-service that's on-request. While traditional on-demand services are both chosen and delivered instantly, this new service is a compromise. Users must place a request for a video in advance which is then downloaded – not streamed – to their devices at the network's convenience over a maximum timeframe that was previously agreed upon, for example, 24 hours.

From the operator's perspective, bandwidth and latency requirements are greatly reduced, and providing this service is much less risky and lucrative. Although the experience is not truly on-demand for users, they can still choose the movies and TV shows they want to watch. It's up to the operator (or operator and video content partner) to package

> VDoR suits customers who can't afford the double charge of video content plus instant delivery and customers served by CSPs whose business doesn't really benefit from providing VoD.

this service in such way that makes "the wait" worthwhile. Certainly, there will be plenty of room to create a compelling offer, especially compared with the previous two resource-heavy on-demand services that are more expensive.

Network-driven video

One interesting feature of this proposed service is its network-centricity. If the download occurs instantly, many benefits and savings for operators are lost because devices will attempt to pull all the data at once. As video services tend to peak during evening hours, there's a high probability that network congestion will occur with streaming services.

Under the VDoR model, the customer requests a video, and the network pushes the content downstream in the most effective and economical way. Thus, the network and operator are central to the service. OTTs cannot go it alone because a technical partnership between the operator and content provider is essential for this new service to work.

Filling a void

VDoR suits customers who can't afford the double charge of video content plus instant delivery and customers served by CSPs whose business doesn't really benefit from providing VoD. But, this new service will only be successful if it provides enough advantages for the customer. Of course, the number one advantage should be price, which isn't difficult to demonstrate because CSPs' data charges would be substantially lower, and probably zero-rated. Another advantage is smoother play. Even the best networks may suffer video playback issues from time to time, including freezing, distortion, interruptions, and sound issues.

Application scenarios

We've already mentioned the most obvious case of wireless broadband coupled with price-sensitive customers, but the VDoR model can be extended to other cases:

Scenario 1: No Fixed Broadband

One scenario is a middle-class home that lacks

> The network pushes the content downstream in the most effective and economical way...VDoR fills the gap when VoD is prohibitively expensive to the customer, the operator, or both.

high-speed fixed broadband or only receives low-speed ADSL due to the lack of infrastructure in the area where they live – a common scenario in many developing countries. Using wireless technology to power the family's large 46" TV set with HD content for two to three hours every night is possible but not practical. Even if this customer has a relatively high data allowance of 5 Gb to 8 Gb, they can only watch a handful of movies before running out. They need a solution for unlimited movies, but upgrading to 50 Gb to 80 Gb is not financially viable.

Scenario 2: Limited Fixed Broadband

Imagine a retired couple on a fixed income in a developed country. Their current 2 Mbps fixed broadband service is well-suited for their intake of Facebook, banking, and news, but it isn't enough for them to watch HD movies. They could upgrade to 5 Mbps, but they feel that doing so is a waste of money because they're not avid movie watchers. The VDoR model would allow them to keep their existing subscription and pay an extra fee for only the videos they choose to watch, delivering income to the operator and content to the couple that neither would otherwise get.

Scenario 3: Good Fixed Broadband

On the high-end side of the scale, 4K, 8K, and 3D movies require customers to subscribe to very fast networks – 100 Mbps or even 1 Gbps – which may be much more than the user needs or is willing to pay. VDoR would let allow these customers to watch advanced content without an overly expensive monthly subscription, which most people aren't prepared to pay for anyway.

The lowdown: It's all about the download

VDoR fills the gap when VoD is prohibitively expensive to the customer, the operator, or both. Huawei has helped operators around the world design and implement video solutions and believes this idea has strong market potential. Huawei is ready to take VDoR from the drawing board to implementation in a triple partnership between Huawei, local video-content providers, and operators.

U900 & 4.5G

The perfect match for Turk Telecom

Scan for mobile reading

Mobile operators want to quickly boost mobile broadband (MBB) coverage, ramp up user experience, and accelerate ROI. The UMTS 850M/900M (U900) ticks all three boxes, explaining why U900 deployment is on the rise on a global scale. Turk Telecom is a example of telcos who have deployed U900 and respectively made gains in 4.5G, 900 MHz, and high-interference scenarios.

By Zhang Yu

On April 1, 2016, Turk Telecom announced the nationwide commercial launch of 4.5G with two other major Turkish operators, kicking-off a high-speed MBB development phase in the nation of nearly 80 million.

After acquiring the 900 MHz spectrum, Turk Telecom teamed up with Huawei to commercially deploy its U900 network. U900 uses a low-frequency 3G band that delivers outstanding network performance in the areas of 4.5G voice fallback, MBB coverage, and data service experience.

Hi U900, meet 4.5G

Turk Telecom's 4.5G network uses the 800, 1800, and 2600 MHz frequency bands, as well as the UMTS 2100 MHz band U2100 and GSM 1800 MHz band G1800.

VoLTE services haven't yet been rolled out to most of Turk Telecom's 4.5G terminals, so the operator's 4.5G users fall back to UMTS or GSM networks to make or take calls. Falling back from 4.5G low-frequency bands to high-frequency GSM and UMTS bands can lead to fallback failure due to differences in signal coverage. U900 provides the perfect solution, giving the same coverage as 4.5G 800 MHz.

Rolling out U900 has also helped Turk Telecom solve MBB coverage and user experience issues caused by too few 3G base stations, enabling the operator to build a better MBB service experience.

Fast U900 overlay

In 2015, Turk Telecom began modernizing its 2G and 3G networks. With Huawei building the core areas, the operator also started on its new 4.5G network, the construction of which needed to be fast to keep pace with its competitors.

The U900 network's role was to keep the MBB service experience consistent between

> The global number of U900 networks has continued to rise. As of Q3 2016, 217 of these networks had been commercially launched around the world.

its 3G and 4.5G networks, for which Huawei proposed a two-step network construction solution. The 4.5G and U900 networks would be constructed first, and then overlaid on the existing U2100 network, which another vendor was deploying. This would be followed by the step-by-step completion of the comparatively complex and time-consuming U2100 transformation.

Huawei overcame Turk Telecom's concerns about the U900 regarding load control on the overlay network and Iur interface compatibility with two strategies: a customizable anti-ping pong networking strategy, and a preferred carrier residence strategy. These strategies would reduce the impact of interoperability issues on network loads like signaling interworking and RNC reselection. Huawei's two-way Iur interface policy covered the other vendor, ensuring user experience and compatibility.

Test results showed that Huawei's overlay network solution enabled main services and processes to operate normally in terms of compatibility, dispelling Turk Telecom's concerns over Iur interface compatibility.

Overlay for better MBB

Deploying the U900 resulted in outstanding network performance in Istanbul. 4.5G voice fallback was three seconds lower than G1800, and data connections could be maintained for simultaneous voice and data fallback, greatly increasing user experience. The coverage signal was boosted by more than 9 dB across the whole 3G network; for data services, downloads for 3G users increased by 1.3 Mbps, a 50 percent jump. Lur interface compatibility was normal, with no ping-pong switching.

Turk Telecom now had a competitive advantage in the Turkish MBB market.

The global number of U900 networks has continued to rise. As of Q3 2016, 217 of these networks had been commercially launched around the world, among which 155 were built by Huawei. The growing number of networks shows how operators are improving user experience by deploying the U900 solution to boost MBB coverage. And with MBB growing in popularity around the world, this number will continue to soar.

MTN Nigeria

Let me entertain you

Scan for mobile reading

Nigerian operator MTN has pledged to add digital services developed in-house to its digitization portfolio, a move that will help solidify the operator's value and industry chains, position MTN as an ecosystem architect, and create new revenue streams.

By Li Chenwei, Guo Jun

> Low smart phone penetration makes it difficult to deliver content to over three-quarters of Nigerians.

While the Internet of Things and virtual reality have landed in the developed world, operators in emerging markets are struggling to find new ways to grow and generate profits. Caught in the trough of a U-shaped recovery curve, for them the economic and industry outlook remains stubbornly sluggish.

Rough digital terrain

With a penetration rate of less than 20 percent, smartphones have yet to reach the masses in West Africa. Despite the dominance of feature phones and relatively low individual disposable income, users still want the same digital entertainment experience as smart phone users get – a demand that's tough to deliver on for a number of reasons.

The first major obstacle is that low smartphone penetration makes it difficult to deliver content to over three-quarters of Nigerians. The second is that although the nation has a strong entertainment culture, with Nollywood coming in as the second largest film industry in the world, very little homegrown content is carried by mainstream OTT platforms. And third, only 10 percent of Nigeria's population of 180 million has a bank account, meaning that content and service providers lack convenient and secure payment and monetization channels. The broken industry chain also means that many artists and content partners are unable to monetize their content, and distribution is poor on traditional sales channels such as CDs, VCDs, and film.

However, the opportunity for operators to provide their own digital services exists. Certainly, being the first mover to enrich people's communication and entertainment lives will inevitably pay huge dividends both in revenue and branding.

MTN's 2020 Digital World strategy seeks to do exactly that by becoming the continent's first digital entertainment brand.

You can't go it alone

MTN Nigeria teamed up with Huawei to set out a unified strategy for creating new digital entertainment platforms to house the entertainment triangle: music, videos, and games. Each of these platforms will help MTN

and its partners enter a US$600 million industry.

MTN's unique position in the industry chain gives it two strengths to overcome market obstacles: one, copyright protection; and two, a simple and smooth payment channel with credible billing capabilities.

Music+

MTN Nigeria and Huawei jointly launched Music+ in July 2014. Thanks to a team effort involving all partners in marketing the service and optimizing how it's delivered, Music+ has since become Africa's largest legal music distribution platform and the most profitable of the digital offerings in the market.

Strong on marketing

MTN has built its own high-quality, efficient offline and online marketing channels by working with and managing channel partners. One of its offline channels includes cross-marketing with a caller ring back tone (CRBT) service, which promotes Music+ with a capacity of 5 million text messages and cross-markets by selling songs that can be used as CRBTs.

Online marketing channels include official Facebook and Twitter pages for Music+, which allows deep interaction between users and the service. Channel partners include EasyTaxi, KFC, and Africa's largest online shopping site, Jumia. Music+ and the partners benefit each other's customers, and thus each other.

Channel management involves close contact with partners to understand resource allocation trends and discover signs of new activity, bundling brands that can cross-promote each other and jointly launching offerings.

As a result, Music+ has gained an average of 100,000 subscribers a month.

Adding appeal with local content

The rich culture of West Africa means that people tend to prefer local digital entertainment content, a genre that's rarely provided by international OTT providers. Music+ fills this niche, using its localized content as market entry and unique selling points. The platform so far features 90 percent of local mainstream copyrighted content, debuting on average 200 exclusive new songs every month. In total, 2,000

> To encourage use, the packages provide zero-rated data for specific services and a number of other benefits, such as 150 MB of zero-rated data on first login and 50 free song plays per month.

new songs are added per month, while user generated content (UGC) accounts for almost 10,000 songs. MTN's belief that content is king, especially local content, has proven to be true.

MTN complements Music+ and boosts its interactivity potential with reality TV shows, silent concerts (where people listen through headphones), celebrity meet and greets, public MTN events, and a UGC platform.

Drilling down to segments

Feature phone dominance prevents 80 percent of West Africans from accessing digital music through apps. Music+ responds to this with a WAP platform, through which users can access the service's enormous library of high-quality music.

MTN has also developed a number of packages of various lengths for both smartphone and WAP users. To encourage use, the packages provide zero-rated data for specific services and a number of other benefits, such as 150 MB of zero-rated data on first login and 50 free song-plays per month.

MTN continually improves Music+ with measures like free login, one-click orders, a constantly evolving UI, exclusive content ads, and fewer ad banners on the WAP service.

Not forgetting the network

The surge in user data from Music+ has increased the load on MTN's wireless pipeline, which will only climb higher with the recently launched digital games platform and upcoming video service.

To push forward with digital transformation, MTN began deploying an xMbps network with precise site expansion in 2014, increasing network construction standards from an initial 0.6 Mbps to 2 Mbps in 2015. The operator is continuing to raise network quality, construction standards, and user experience in 2016.

MTN Nigeria and Huawei will soon launch the video platform, which will combine with the digital games and Music+ services. The three platforms will continue to help MTN expand its presence in the digital entertainment market, drive new revenue growth, and encourage the creation of content by local people for local people.

Touching the sky with China Unicom

Scan for mobile reading

China Unicom calls its Wo-Cloud service "a base in the cloud for all your data." With the construction of a new cloud data center in Guian set to underpin this service, the Chinese telco has sealed its commitment to stimulating change through innovation and services that create value for customers.

By Wang Yang, Han Jiaan

> Since its launch in December 2013, China Unicom's Wo-Cloud is increasingly regarded by government and enterprise clients as a solution that offers unique strengths in automation, cloud-network integration, and controllable security.

Keeping standards high

Jiao Gang, GM of China Unicom's Cloud Data Company, believes today's explosive trends to be mobile Internet and smart city applications in the areas of governance, transport, healthcare, education, and travel. Enriched by virtual reality, artificial intelligence, and robotics, a new crop of technologies, services, and applications are producing massive amounts of data every day, which requires high-standard cloud data centers to host. To meet the burgeoning demand for cloud data services, China Unicom has shifted its focus to cloud data centers.

Since its launch in December 2013, China Unicom's Wo-Cloud is increasingly regarded by government and enterprise clients as a solution that offers unique strengths in automation, cloud-network integration, and controllable security.

Designated by Guizhou's local authority as a hub for developing big data and cloud services, Guian New Area will be home to China Unicom's new cloud data center, adding to the ten that the telco runs in nearby Guiyang. Thanks to good air, a temperate climate, and a reliable power supply, the region is a solid geographical choice for deploying this tech.

The Guian cloud data center is set to be a core node in China Unicom's southwestern cloud computing platform. As well as becoming China Unicom's largest data center in the south of China and Asia's largest single modular data center, it will also take a spot in China's top ten largest cloud computing centers and top three cloud resource pools. Covering 300,000 square meters with 32,000 racks and 400,000 servers, the data center will provide cloud computing and big data services for Guizhou and the south of China.

Short and green

Designed to meet international standards in performance, clustering, response, and energy efficiency, the data center project is divided into three phases. Already completed, the first phase saw 1,108 cabinets deployed and 22,288 physical frames planned – the latter will be used as the basis of renting Guizhou Unicom's data center server room.

To generate revenue as quickly as possible, China Unicom laid down two construction requirements: keep the time short and the

scheme green. Although these goals align with the rapid growth of the data center sector and government mandates on protecting the environment, China Unicom couldn't meet either using traditional methods; however, Huawei's modular data center solution could.

One-stop shop

Strong on simplicity, energy efficiency, and reliability, Huawei's modular data center solution can easily scale capacity and density to meet services needs. Thus, China Unicom deployed 62 micro-modules in six months to rapidly deploy the first-phase cabinets and swiftly roll out services.

The data center meets national A-class standards and international Tier 3+ standards for server rooms by virtue of 2N configuration for power distribution, N+1 configuration for cooling, and 2N configuration for critical loading in other server rooms. Huawei ensures 99.999 percent power system safety and reliability via 52 high-power modular UPS5000-E units. Featuring industry-leading topology, this UPS series provides back-up power for IT equipment and key auxiliary equipment, while the modular design supports hot-swapping between modules, thus minimizing maintenance and service outages.

Energy-efficient

In-row air conditioning, aisle-containment technology, and modular UPS combine to reduce power usage effectiveness (PUE) across the data center to less than 1.3 PUE. Installing the air con system and cabinets side-by-side for near-end refrigeration prevents localized over-heating and precision cooling, which saves energy. Moreover, separating the hot air and cold air increases cooling efficiency, improving PUE and slashing OPEX.

China Unicom chose the Huawei UPS5000-E because of its high efficiency at low-load: efficiency is 95 percent with a 20 percent load and 96 percent with a 40 percent load.

Given that the industry average for UPS efficiency in megawatt data centers is just 90 percent, Huawei's UPS5000-E will save China Unicom at least 3 million yuan in electricity costs annually and make a real difference in energy savings and emissions.

Looking ahead

With the first phase completed, the Guizhou branch deputy GM Chen Jinghua commended Huawei on its rapid progress and excellent results, stating that the "Guian cloud data center is a perfect real-world example of Huawei's modular data center." The solution will help China Unicom on its mission to keep rolling out high-value, innovative services for users.

Huawei's is consolidating its extensive experience in this domain by increasing R&D investment in global data center solutions, with further successes anticipated. To date, Huawei has constructed more than 660 data centers around the world, making a clear contribution to growing the industry.

MCT

When three isn't a crowd

Scan for mobile reading

The Malaysia-Cambodia-Thailand (MCT) undersea cable project is an ambitious foray into expanding Internet coverage and boosting speeds for three power players in the ASEAN. To find out more about the 1,300-km scheme, we spoke to senior executives from Telekom Malaysia, Telcotech in Cambodia, and the Thai telco Symphony Communication.

By Gary Maidment

A tale of three cities

"The basic thing for any development in this region is that you need to be connected," says the GM of Telekom Malaysia, Mohamad Izani Bin Karim, when explaining the rationale behind the project. With a pool of affordable labor, ASEAN has competitive advantages and great potential, but "you need to be connected to bring investors into the region," he states. "It's no longer a luxury – it's a basic necessity for any industry looking to house a hub in this region."

To this end, the MCT cable system is designed to provide connectivity between Cherating in Malaysia and Rayong in Thailand, and run a branching unit from the main trunk into Sihanoukville in Cambodia. But the scheme is bigger than three cities; in fact, what it connects into makes it bigger than the three nations that give the project its name: "There are also terrestrial links into Laos, and even Myanmar. And then the existing network that links to Thailand and Vietnam," says Izani, "So from that perspective, it helps make ASEAN an attractive region for investors." Given the strong GDP growth in the region – Myanmar, for example, has recorded a very impressive 8.4 percent growth so far this year – a state of the art digital infrastructure can, and is necessary to, unlock the door to sustained growth in the ASEAN.

Supornchai Chotputtikul, Executive VP for Thailand's Symphony Communication, mentions that for Thailand, the MCT system is necessary to meet the increasingly digital lifestyle of its 68 million people, where mobile penetration is more than 100 percent: "Thailand has 80 million mobile subscribers. MCT will help meet this demand and support our economy, which is one of the objectives

> Currently, Cambodia is very much reliant on its terrestrial network, and they need to access Thailand or Vietnam to get out to the rest of the world.
>
> – Mohamad Izani Bin Karim, GM, Telekom Malaysia

that our government is pushing right now."

Cambodia is less connected than either of its larger neighbors, with less than 40 percent of the nation's 15 million people using the Internet, but with mobile as the preferred access path. Prakash Velayudhan, the CTO for Telcotech in Cambodia, points out that MCT represents the nation's first cable, and will be a game changer because high-speed access on a larger capacity network will be affordable, "This will help us to develop the market by reducing costs for end users," he explains. "It will also help us by improving our connectivity to the rest of the world. And overall it's expected to boost the economy."

The figures back up what Prakash says: "Research by the World Economic Forum holds that a 10 percent increase in broadband connectivity correlates to a 1.4 percent increase in GDP in emerging economies."

Going broader

Izani is well aware of the strategic importance of a connected Cambodia: "Currently, Cambodia is very much reliant on its terrestrial network, and they need to access Thailand or Vietnam to get out to the rest of the world. So from that perspective, [Cambodia] is far behind the other countries in this region," he acknowledges. "MCT was built because Cambodia needs to be connected." Prakash goes on to explain how using the networks of Symphony Communication and TM will benefit Cambodia, "We will be able to, first, better integrate with ASEAN, and second, have a better reach outside ASEAN."

That's not to say that Cambodia's economy hasn't performed extremely well since the start of the century, averaging an impressive 7.9 percent growth in GDP over the past 15 years. In 2015 and so far this year, the nation

> Research by the World Economic Forum holds that a 10 percent increase in broadband connectivity correlates to a 1.4 percent increase in GDP in emerging economies.
>
> – Prakash Velayudhan, CTO, Telcotech, Cambodia

has enjoyed sustained growth at 7 percent, more than double the global average. Further robust growth, though, will still be led by traditional industries like garments, footwear, and construction. However, this isn't enough – Cambodia needs to diversify its economy to raise incomes and create the type of jobs that will lay the foundation of a digital economy. The MCT undersea cable project is one tool that will help it do that.

Though showing slower GDP growth than Cambodia at a still respectable 4.2 percent, Malaysia offers the region significant geographical advantages. Symphony's Chotputtikul, for example, refers to Malaysia as "one of the gateways to the world", because it joins the east and west and opens up north Asia, Europe, and North America to the ASEAN. "[Malaysia] will help the region expand the value of our trade and our technology, and enhance our attractiveness to the rest of the world," says Chotputtikul.

Choose your partners strategically

Already possessing experience in the undersea cable field, Telekom Malaysia is a strategic heavyweight in the scheme, a fact that Chotputtikul recognizes, "We believe that the potential of TM is interesting for the whole region, because the Malaysian government has very close ties with Singapore, and they have existing connectivity to the rest of the world, including to Singapore itself." Though Symphony Communication and Telcotech are relatively new to the undersea cable arena, Telcotech has some experience working with TM on the Asia-America Gateway project. Prakash is confident that the partnership benefits Cambodia directly as well as the region as a whole: "In terms of our partnership with Symphony Communication and TM, we're seeing improvements in our terrestrial market."

Chotputtikul agrees, mentioning that from

> Thailand has 80 million mobile subscribers. MCT will help meet this demand and support our economy, which is one of the objectives that our government is pushing right now.
>
> – Supornchai Chotputtikul, Executive VP, Symphony Communication, Thailand

Thailand's perspective, Telcotech (via Ezecom) and TM open up key routes to two of Asia's economic giants: Singapore and Hong Kong. "If you want to go to Singapore, TM is a good partner. We can ask for a competitive price, because our partnership has set up a team for pricing and charging back and forth. Similarly, if we want opportunities from Thailand to Hong Kong, Ezecom Data would be the first partner we would consider."

A partnership on this scale will always be a complex beast, but TM's Izani is clear on the two major seeds of success. "It's important to understand the needs of your partners and for these partners to have a common goal." The three men are confident that the undersea cable sector will grow, both replacing legacy systems and rolling out new solutions to cope with the region's increasing hunger for bandwidth: "In Japan, people are talking about 1 gigabit to the home. In Malaysia we're moving towards 100 Mbps, 500 Mbps," says Izani. "In Cambodia, they have about 40 gigs of capacity, and that's expected to grow fivefold. So, obviously there will be a need for additional capacity to get all this Internet bandwidth."

Partnerships also extend to the right vendors. It's the second time that TM has worked with Huawei Marine, and Izani is clear on the importance of a collaborative approach: "They have actually gone beyond what they were supposed to do in terms of helping our partners in Cambodia and Thailand."

The importance of the MCT scheme in the ASEAN region cannot be underestimated, especially as the world is entering a time of rapid digitalization that relies on ubiquitous, high-speed broadband as the foundation of economic digitalization.

Without digital transformation, economic stagnation is inevitable. Without collaboration, building a strong digital infrastructure is impossible. As Prakash puts it, "The submarine cable business is not an investment for one company alone. It's the result of good partnerships at the regional level and international level."

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