



## **Embracing the Revolution: Success in a Better Connected World**



Scan for mobile reading

Our Better Connected World is a smart world, one that is driving the emergence of a new business landscape. Digital and network technologies are developing much faster than predicted. Smart connectivity between people, between people and things, and between things and other things, is propelling our world on a new journey, one that will see profound integration of the digital with the physical. The result will be revolution, of all that we once knew.



**A**s social progress accelerates, what direction will it take? What rules will govern how technology evolves? What new trends will redefine the business landscape? In a world of infinite possibilities, we must embrace change as it happens, and our insights must be accurate, if we are to adapt and flourish in this new era.

## **Technological revolution: Infinite possibilities through integrated disciplines**

A new technological revolution, powered by interdisciplinary integration and innovation, is underway. In materials science, great progress has been made in graphene and nanotechnology. These advancements will reshape the world and bring game-changing technologies, just as silicon did. In the energy domain, renewable energy and energy storage technologies, as core disruptive technologies, will become our fundamental source of power. In genetics and biology, the continuing infusion of biotechnology and computer technology will power the storage, analysis, and interpretation of the genetic code. Genome sequencing, genetic medicine, disease prediction, diagnosis, and treatment will remake healthcare.

In robotics, enhanced computing capabilities coupled with new sensors and software development tools will make robots smarter and more affordable. Artificial intelligence (AI) will combine with cloud computing and Big Data technologies to match or even exceed human intelligence in certain areas. In manufacturing, 3D printing will advance dramatically and be widely adopted in various sectors, making “factories in a box” a reality.

But none of these quantum leaps will take place in a vacuum. They will depend on interdisciplinary integration and innovation, which in itself is the product of integration, particularly the convergence of IT with

“

Information and communications technology (ICT) is becoming the basis for innovation in almost every field, and is now integral to national competitiveness as well.

”



The 19th and 20th centuries saw three industrial revolutions – mechanization, electrification, and automation. The 21st is seeing the fourth revolution – digitization.



other forms of technology, most notably communications. In fact, information & communications technology (ICT) is becoming the basis for innovation in almost every field, and is now integral to national competitiveness as well.

### **Industrial revolution: Empowerment through ubiquitous connectivity**

The 19th and 20th centuries saw three industrial revolutions – mechanization, electrification, and automation. The 21st is seeing the fourth – digitization. And in any field, whether electricity, transportation, manufacturing, or healthcare, the crux of this revolution lies in the smart functionality of ubiquitous networks, smart devices, smart applications based on Big Data, and other core systems. These will change both how industries produce, and how they do business. With the reach of broadband expanding, and everything else smartening up, new industry ecosystems are being created, thus reshaping the business landscape to suit the needs of the information era.

All technologies, networks, and industry transformations aim to deliver a superior user experience. User-centric smart hardware is a technological concept that has emerged in the wake of the smartphone. Smartness can come in the form of a watch, TV, refrigerator, or air conditioner. It can also digitize appliances that were previously analog, such as door locks, cups, vehicles, and buildings. After their smartening, such devices can connect with each other, and with the cloud itself, thus forming the building blocks of a Better Connected World where everything is smart.

The Internet of Things (IoT) and Big Data are the key drivers of this world, but what industries need from networks is vastly different from what consumers need. The IoT will represent an unprecedented number of network connections, which will grow at an exponential rate. It will also place greater demands on network response times. Many applications, from industrial control to automated driving, will require much lower latencies than are generally available today.

5G, as the core building block of future wireless

communications, is the answer, and its development path must be considered in relation to both the information era and this new industrial revolution. 5G will enable 100 billion connections, ultra-low latency (1ms), and a 10Gbps data rate. But achieving these innovations will require new cloud-based architectures, new air interfaces with cutting-edge modulation techniques, massive MIMO antennas, and once-marginalized high-frequency and even unlicensed spectra.

And finally, software-defined networking (SDN) and network function virtualization (NFV) are reshaping communications networks, and creating smart, flexible network products and architectures. But these achievements depend on the placement of cloud data centers at the heart of the network, and this makes data center layout and planning fundamental to ICT infrastructure construction and future network architecture, and thus the competitiveness of all telcos.

### **Business model revolution: Broadened Services (DevOps)**

Development and operations (DevOps) emerged as a software development methodology that facilitates communication and collaboration between software development, technological operations, and quality assurance departments, thus enabling fivefold to tenfold improvements in both efficiency and time to market (TTM).

More recently, a business model has started to take shape which has a basis in DevOps. We dub this model “Broadened Services,” and anticipate that many industries will adopt it. Such adoption might involve equipment manufacturers selling manufacturing services as opposed to manufactured equipment, or cloud customers purchasing services instead of products. This represents a revolution in the customer-supplier relationship, made possible by Broadened Services.

Cloud computing is another revolutionary force, reshaping not only technology, but the global business landscape as well. With cloud the new normal in IT, and with broadband



With the Internet, IT, and telecom industries all looking to be market disruptors, cloud services will be the killer apps for all who provide information, making them must-haves in a Better Connected World.



networks extending towards every corner of the earth, services are usurping products. Thanks to the business model revolution being fueled by cloud services, a huge strategic opportunity has presented itself for the telecom industry. Enterprise customers are adopting public clouds as part of their ICT efforts, allowing carriers to move beyond their traditional connectivity roles, creating a new market worth trillions.

But the transition from private IT infrastructure to public cloud will be slow. This makes hybrid cloud an enterprise demand for the foreseeable future. And while the ability to deliver hybrid cloud is important, delivering networks and services at the local level is vital, especially if a superior user experience is to be realized.

With business models transforming, and with the Internet, IT, and telecom industries all looking to be market disruptors, cloud services will be the killer apps for all who provide information, making them must-haves in a Better Connected World.

## **Lifestyle revolution: Digital natives leading the way**


Over the last 20 years, the first generation to grow up with the Internet has come of age. They are known as the connected generation or “digital natives.” Their ways of consuming, communicating, socializing, working, playing, and learning are vastly different than what came before. They rely on the Internet and the digital devices that access it as you rely on air and water. And what’s more, they demand that their Internet services be ROADS – Real-time, On-demand, All-online, DIY, and Social.

They had also better be in HD, because video is now the dominant form of content on the Internet, accounting for 70% of all traffic (soon to exceed 90%). For digital natives, video is a basic telecom service, as important as voice or text. And instead of the broadcast services of the past, digital natives prefer a video experience on demand, and often bidirectional, thus making video a medium as opposed to mere content.

This two-way, on-demand approach will soon extend to new forms of human-machine interaction, and Ultra-HD video will be a major part of it. This will redouble the drive to modernize traditional networks, as resolutions of 4K and beyond will become the norm. Carriers must transform rapidly, both their network architecture and operational models, with network performance also optimized. If they can do this, carriers will have a strong position in a trillion-dollar video industry.

Beyond video, a new Internet-based mindset and consumption pattern has emerged amongst digital natives. Each business, telco or not, must respond by reassessing the value and positioning of its operations system. A mere support system or online marketing interface will no longer do; a value-creation system is what is needed, one that connects ecosystems, carriers, customers, and partners with networks, applications, and content. As this takes hold, traditional brick-and-mortar service centers will be phased out, in favor of customized real-time online services, available on demand. Carriers, specifically, must leverage Big Data analytics better understand customers and market more precisely, so that their services are pleasing, profitable, and smart.

## **Building a Better Connected World**

We are now in an era of revolution. Industries are integrating. User behavior, best practices, technologies, and business models are all experiencing upheaval. These changes have taken humanity from the industrial era to the information era so far, and now we are moving towards a Better Connected World that is smart. But success in this world can only happen by embracing change. Huawei, as an enabler of the information age, is doing just that, having pledged massive investment in future-oriented technologies, solutions, and business models. Alongside our partners, we are committed to building this Better Connected World – a world of great prosperity, and a nice place to live. 

**Editor: Gao Xianrui** [sally@huawei.com](mailto:sally@huawei.com)