Huawei Investment & Holding Co., Ltd.

# 2019 ANNUAL REPORT

Building a Fully Connected,
Intelligent World

HUAWEI

## Who is Huawei?

Founded in 1987, Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices. We are committed to bringing digital to every person, home and organization for a fully connected, intelligent world. We have more than 194,000 employees, and we operate in more than 170 countries and regions, serving more than three billion people around the world.

## Who owns Huawei?

Huawei is a private company wholly owned by its employees. Through the Union of Huawei Investment & Holding Co., Ltd., we implement an Employee Shareholding Scheme involving 104,572 employees. Only Huawei employees are eligible to participate. No government agency or outside organization holds shares in Huawei.

## Who controls and manages Huawei?

Huawei has a robust corporate governance system. Shareholding employees elect 115 representatives to form our Representatives' Commission. This Commission then elects the Chairman of the Board and the remaining 16 board directors. The Board of Directors elects four deputy chairs and three executive directors. Three deputy chairs take turns serving as the company's rotating chairman.

The rotating chairman leads the Board of Directors and its Executive Committee while in office. The board exercises decision-making authority for corporate strategy and operations management, and is the highest body responsible for corporate strategy, operations management, and customer satisfaction.

Meanwhile, the Chairman of the Board chairs the Representatives' Commission. As Huawei's highest decision-making body, the Commission makes decisions on major company matters, like profit distribution, capital increases, and the elections of members of the Board of Directors and the Supervisory Board.

## Who does Huawei work with?

Externally, we rely on our customers and partners. Customers are at the center of everything we do, and we create value for them with innovative products. Internally, we rely on our hard-working and dedicated employees. At Huawei, those who contribute more get more.

We work with stakeholders including suppliers, partners, industry organizations, open source communities, standards organizations, universities, and research institutes all over the world to cultivate a broader ecosystem that thrives on shared success. In this way we can help drive advancements in technology and grow the industry as a whole.

We create local employment opportunities, pay taxes, and comply with all applicable laws and regulations in the countries where we operate. We also help local industries go digital, and openly engage with governments and the media.

## What do we offer the world?

**We create value for our customers.** Together with our partners, we provide telecom carriers with network products and solutions that are innovative, simplified, intelligent, secure, and trustworthy. We also open up our ICT capabilities for industry customers, providing them with products and services that are intelligent, secure, and trustworthy. With our smart devices, we improve people's digital experience in work, life, travel, and entertainment.

**We ensure secure and stable network operations.** Cyber security and privacy protection are and will always remain our top priorities. We believe strongly in the power of openness and transparency. We will keep working to improve our software engineering capabilities and business continuity management systems, while enhancing the resilience of our networks.

For more than 30 years, we have worked closely with our carrier customers to build over 1,500 networks in more than 170 countries and regions. Together, we have connected more than three billion people around the world, and we have maintained a solid track record in security throughout.

**We promote industry development.** Huawei advocates openness, collaboration, and shared success. Through joint innovation with our customers and partners, we are expanding the value of ICT to foster a healthy and symbiotic industry ecosystem. Huawei is an active member of more than 400 standards organizations, industry alliances, and open source communities, where we work with our peers to develop mainstream standards and lay the foundation for shared success. Together, we are driving the industry forward.

**We enable sustainable development.** Huawei is committed to bridging the digital divide and promoting digital inclusion. We have helped connect places as remote as the highest peaks in the Himalayas and the frigid depths of the Arctic Circle. We are keenly aware of the importance of telecommunications during emergency situations. In response to cataclysmic events like the massive earthquake in Wenchuan, China, the nuclear accident triggered by a tsunami in Japan, and Ebola in West Africa, our people hold fast in disaster zones to restore communications networks and ensure the reliable operations of essential telecom equipment. To further promote sustainability, we prioritize a low-carbon footprint and environmental protection. We are also helping develop the next generation of local ICT talent to boost the digital economy.

# Contents



# Message from the Rotating Chairman

**Over the past year, we have faced unprecedented challenges across the board. It's been difficult. But thanks to the unfailing trust and support of our customers and partners, backed by the solidarity and dedication of our employees, we have managed to stay afloat.**

**The external environment will only get more complicated going forward. We need to keep enhancing the competitiveness of our products and services, promoting open innovation, and creating greater value – both for our customers and society at large. This is the only way we can seize the historic opportunities presented by the digital and intelligent transformation of industries, and maintain robust growth in the long run.**

2019 was an extraordinary year for Huawei. Despite enormous outside pressure, our team forged ahead with a singular focus on creating value for our customers. This helped us earn their respect and trust, as well as that of our partners around the globe. In 2019, our sales revenue rounded off at 858.8 billion Chinese yuan, up 19.1% year-on-year. Our net profits reached 62.7 billion Chinese yuan, and our operating cash flow topped 91.4 billion Chinese yuan. Business remains solid.

Our carrier business has been leading the commercial rollout of 5G networks worldwide. In 2019, in order to further commercial adoption and promote new innovation in 5G applications, we established 5G joint innovation centers together with carriers in Europe. At the same time, our RuralStar base station solutions are now being used in over 50 countries and regions, bringing mobile Internet to more than 40 million people living in remote areas.

Our enterprise business continues to support the digital transformation of customers across industries as we help lay the foundations for the digital world. Globally, more than 700 cities and 228 Fortune Global 500 companies have chosen Huawei as their digital transformation partner.

Our consumer business continues to see robust growth, with more than 240 million smartphones shipped throughout the year. We have made further progress in optimizing the Seamless AI Life strategy across all scenarios and devices, including personal computers, tablets, wearables, and smart screens.

I want to take this opportunity to thank every one of our customers, partners, and Huawei employees. Your trust means the world to us; we will keep on providing more competitive products and services to create greater value for everyone.

## The intelligent world is fast approaching, bringing both challenges and opportunities

Digital technology is reshaping everything. It's setting the stage for a world where all things can sense, all things are connected, and all things are intelligent. By 2025, 5G will serve 58% of the global population, and it will combine with technologies like 4K and higher-definition video, VR/AR, AI, and cloud to transform our personal lives, homes, and industries in ways we have never imagined.

A set of truly immersive experiences will emerge, allowing us to transcend the boundaries of time and space in domains like ultra-high-definition live broadcasts, smart classrooms, remote education, online healthcare, and virtual entertainment. 5G will also allow industries like manufacturing, electricity, transportation, finance, and many others to go digital, embrace artificial intelligence, and deliver new value for their customers. All told, these technologies will have a much broader spillover effect because ICT has become a new economic force, sparking a new wave of global economic growth.

Mankind is poised to enter an intelligent world within the next two or three decades. Digital and intelligent transformation, now in full swing across all industries, will open up abundant opportunities for growth. At the same time, the global community also faces an enormous set of challenges in areas like climate change, uneven social development, and cyber security. It's safe to say that, moving forward, the global macro environment will become more uncertain than ever before, and downward pressure on the global economy will continue to intensify.

And yet, as people, we all want a better life. Prosperity is an innate human pursuit. We need to put development first, embrace global, open collaboration, and rely on technological innovation to address the myriad challenges before us. This is how we create greater prosperity.

At Huawei, we are looking to the distant future as we set up our business to fully harness the opportunities brought about by the digital and intelligent transformation of industries.

## Driving technological breakthroughs to advance the industry and create greater value for customers and society

- 5G promises ultra-high bandwidth, ultra-low latency, and massive connectivity. It will provide a superior experience for consumers, speed up the digital and intelligent programs of industries, and fuel both social progress and economic growth. Huawei will continue driving the global development of 5G and seize opportunities in network deployment. To enable every industry with 5G, we are working with leading companies on targeted 5G applications that can be replicated at scale. We aim to build a dynamic 5G ecosystem that facilitates the commercial success of carriers and industry partners. Together, we can create greater business and social value.

Businesses are going digital faster than ever before. During this process, demand will continue to grow for intelligent IP networks that provide higher bandwidth, committed service level agreements, and intelligent O&M. In 2019, we released a series of AI-based solutions, including 5G converged transport networks, intelligent and lossless data center networks, and fully-wireless campus networks. We also unveiled our all-new series of products, the four engines: AirEngine Wi-Fi 6, CloudEngine data center switch, NetEngine router, and HiSecEngine firewall. Moving forward, we will continue to invest in innovation, and innovate together with our customers, to maintain a lead in intelligent IP networks and help relevant standards mature.

Huawei is taking part in an industry-wide effort to transform fiber networks from being bandwidth-driven to experience-driven. Following intensive discussion and broad consensus across the industry, definitions and standards have been set for the Fifth Generation Fixed Network (F5G). F5G features full-fiber connections, ultra-fast broadband, and a reliable user experience.

In 2019, we announced our Intelligent OptiX Network strategy with the goal of bringing a superior fiber experience to every home and providing every industry with faster, more reliable fiber connections. The integration of 5G with optical technology is set to accelerate the digital journey of all industries. As a global leader in optical communications, Huawei is committed to long-term investment in key technologies while actively contributing to standardization.

- Cloud service platforms and AI are the new key drivers of computing – our stepping stones to the intelligent world. Huawei aims to meet diverse computing needs in the future world. In 2019, we announced our computing strategy that combines Kunpeng and Ascend, outlined our business strategy for what Huawei will and will not do in the computing domain, and began investing in an open ecosystem. We also consolidated our storage, computing, and cloud service teams to form the Cloud & AI Business Group designed to better serve our customers in these domains.

We are working hard to ensure that our public cloud services and hybrid cloud solutions deliver strong stability, reliability, security, trustworthiness, and sustainability. These offerings capitalize on greater synergy between our cloud, AI, and 5G. We will work with our partners to help different industries more effectively navigate their digital and intelligent transformations. Our goal is to better support our partners' applications and help customers do more with their data, creating fertile soil for the intelligent world to flourish.

In addition to promoting the shift towards heterogeneous, diversified computing, we are leveraging AI to build a full-stack, all-scenario AI portfolio. We launched several new offerings in 2019: the Ascend 910 AI processor; the world's fastest AI training cluster, Atlas 900; HUAWEI CLOUD Ascend-based cluster services; and a new AI computing framework, MindSpore.

To increase the usability and value of data throughout its lifecycle, we launched our new-generation OceanStor all-flash storage and OceanStor distributed storage solutions, which we developed through extensive optimization, innovation, and convergence of our big data, storage, and database products.

In 2019, we announced the Huawei Developer Program 2.0. We backed this program with an initial investment of US$1.5 billion dedicated to driving the development of the computing industry. With the help of communities and universities around the world, this program is designed to cultivate five million developers over the next five years.

- With a fully connected, intelligent world fast approaching, we are committed to delivering an inspired, intelligent experience to consumers across all devices and scenarios. Our strategy for this is called "1 + 8 + N", which involves the seamless integration of user experience across an entire ecosystem of devices, centered on our smartphones.

  We are innovating in several domains, particularly all-scenario device chipsets and operating systems, to enable multi-screen collaboration across devices for smart homes, smart offices, and other scenarios. And we will continue working closely with our software, service, and hardware ecosystem partners on systematic integration and innovation to make this consumer-focused vision a reality. We will further empower our ecosystem partners with HarmonyOS, Huawei Mobile Services (HMS), our smart assistant Celia, HiLink, and AppGallery. These partnerships allow us to more effectively meet the diverse app needs of our smartphone users. To this end, we have also revamped our Shining-Star Program, increasing its budget to US$1 billion to better support developers. In 2019 this program expanded to include developers from both China and other parts of the world.

- Electric, intelligent, connected, and shared: These four trends are reshaping the automotive industry. The ongoing integration of cars with ICT is transforming our very concept of vehicles, with ICT gradually overtaking the importance of purely mechanical systems.

  Huawei brings over three decades of ICT capabilities to the intelligent automotive industry as a new added-component provider for intelligent connected vehicles. Our business portfolio covers smart driving, smart cockpits, mPower, Internet of Vehicles, and vehicle cloud services. As part of our strategy to help car OEMs build better vehicles, we officially established the Intelligent Automotive Solution Business Unit in May 2019.

- Huawei delivers ubiquitous connectivity and AI to government and enterprise customers. We are actively working with our customers, partners, developers, industry alliances, and standards organizations to build industry-specific digital platforms and ecosystems. Together with our customers, we continuously explore and implement best practices for digitization in government, as well as in the finance, energy, transportation, manufacturing, and education industries. Our goal is to build a foundation for the digital world.

## Nonstop R&D investment, evolving towards Innovation 2.0

Innovation has been fundamental to Huawei's survival and development over the past three decades. In this time we have continuously invested over 10% of our annual revenue back into R&D. In recent years, our spend has exceeded 14%. And it's with long-term R&D investment that we have been able to lead the pack in multiple technology domains, and continue to earn the respect and trust of our customers despite significant external pressure.

Huawei itself is shifting from an Innovation 1.0 model to Innovation 2.0. In Innovation 1.0, we focused on innovation in technology, engineering, products, and solutions to meet our customers' needs. Innovation 2.0 means breakthroughs in basic theory and developing new basic technologies, driven by our shared vision for the future. To help smooth the transition into a fully connected, intelligent world, we need to break through the theoretical limits impeding ICT development, as well as bottlenecks in basic technology.

## Ensuring business continuity

Over the course of a decade, Huawei has built out and continuously refined a strong business continuity management system. This system covers all of our end-to-end processes, from suppliers to Huawei, and then on to our customers. The fact that we have kept growing despite being added to the US Entity List

is a testament to the effectiveness of this system. We have and will continue to adhere to a long-term multi-sourcing and multi-channel procurement strategy. We have diverse supply solutions for all key products. No matter what changes come our way, we are fully confident in our ability to sustain supply, delivery, and services for our customers.

## Enhancing cyber security and privacy protection, and complying with all applicable laws and regulations

- Growing adoption of new technologies like cloud computing, big data, 5G, IoT, and AI has led to more open business ecosystems, faster service rollout, and more diversified solutions. These developments are redefining the traditional boundaries of networks, and dissolving the borders between the digital and physical worlds. As a result, we face new challenges in terms of cyber security and privacy protection.

  Ensuring cyber security is a shared responsibility, requiring unified standards, independent verification, and a whole-of-society approach. Both trust and distrust should be based on facts. Facts must be verifiable, and verification must be based on unified standards. This will ensure fair and objective assessment, and enable organizations to choose products that have passed required security verifications.

  As the world goes digital at an ever-growing rate, Huawei recognizes our growing responsibility in cyber security and privacy protection, and we have made these our top priority. We build trustworthiness and quality into all of our ICT infrastructure products and solutions. In response to cyber security and privacy challenges, we have and will continue to take comprehensive measures to play our part, ranging from technological innovation and standards setting to improving management. We do everything in our power to help customers build resilient networks and mitigate risks. As a provider of smart devices, we embed privacy protection into the entire product lifecycle, giving consumers full transparency and full control over their privacy.

  At the same time, we have been actively engaging in public discourse on these subjects, because only through greater transparency can we show the world what Huawei is truly about.

- At Huawei, compliance with all applicable laws and regulations has always been one of our core principles and the foundation of our global operations. Strengthening cyber security and user privacy protection is at the absolute top of our agenda, and we will continue to adhere to all related laws and regulations in the markets where we operate.

Our vision and mission is to bring digital to every person, home and organization for a fully connected, intelligent world. To make this goal a reality, we will keep focusing on ICT infrastructure and smart devices, collaborating openly with partners to enable the digital and intelligent transformation of industries. Together, we will create greater value for our customers and society, extending the benefits of digital technology to everyone.

**Xu Zhijun**
Rotating Chairman

# Business Highlights in 2019

## Driving Ubiquitous Connectivity

- A leader in the global commercial deployment of 5G: We established 5G joint innovation centers with carriers in Europe, aiming to continuously drive the commercial deployment and service innovation of 5G. In addition, we worked with carriers and industry partners worldwide to explore the application of 5G in more than 300 projects, spanning over 20 industries.
- Connecting the unconnected: Our innovative RuralStar Lite solution provides effective coverage for rural villages with 500 to 1,000 residents. Meanwhile, our RuralStar series solutions have provided mobile Internet services for more than 40 million people living in remote areas of over 50 countries and regions.
- Ubiquitous IoT: The HiLink smart home platform has accumulated over 50 million users, while the total shipments of IoT devices that support the HiLink protocol exceeded 150 million units. We partnered with more than 600 home appliance brands, including BSH, Philips, Panasonic, Toshiba, Allegion, Canon, Kärcher, Blueair, Legrand, Sonos, Bose, Haier, Gree, and Midea, to provide our consumers with a greater variety of quality options for smart living.


## Enabling Pervasive Intelligence

- We launched the Arm-based CPU, the Kunpeng 920, and the TaiShan series of servers and cloud services powered by the Kunpeng 920.
- We launched the world's most powerful AI processor – the Ascend 910 – as well as an all-scenario AI computing framework, MindSpore. We also launched Atlas 900, the world's fastest AI training cluster, and HUAWEI CLOUD Ascend-based cluster services. 2019 also saw the broad adoption of Huawei's mobile data center (MDC) intelligent driving computing platform, HUAWEI CLOUD Ascend-based cloud services, and a wide array of Atlas series AI accelerator modules, accelerator cards, servers, and clusters powered by Ascend series AI processors. We have partnered with more than 100 independent AI software vendors to serve over 500 industry projects, and we have worked extensively with 18 leading automakers and integrators on autonomous driving and applications for other related domains.
- We expanded from mobile device chipsets to all-scenario device chipsets. In 2019, we launched multiple processors for different devices, including the world's first 5G System-on-Chip (SoC) Kirin 990 5G and the industry's first BT 5.1 & BLE 5.1 SoC Kirin A1.

## Delivering a Personalized Experience

- An open Huawei Mobile Services (HMS) ecosystem: We provided HMS Core capabilities like Maps, Machine Learning, Scan, Account, Push, In-App Purchases, and Ads to developers based on our open chip-device-cloud capabilities. We also launched Quick App and HUAWEI Ability worldwide, helping app developers deliver innovative app experiences to 600 million Huawei device users around the world. In addition, over 55,000 apps have been integrated with HMS Core.
- Operating systems: We leveraged our breakthroughs in underlying software technologies, such as compilers and other distributed technologies, to shift from upper-layer user interface (UI) optimization to all-scenario device operating system development. This provides strong operating system capabilities that can achieve multi-screen collaboration and deliver an intelligent experience to consumers across all devices and scenarios.


## Building a Digital Platform

- We built the cloud-based Horizon Digital Platform by integrating multiple new ICT technologies including IoT, AI, big data, video, converged communications, and geographic information system (GIS). This platform enables data integration, business collaboration, and agile innovation, aiming to lay the foundations for the future digital world.
- We ramped up our efforts to drive industry digitization, and focused on creating customer value. More than 700 cities and 228 Fortune Global 500 companies – 58 of which are Fortune 100 companies – have chosen Huawei as their partner for digital transformation. The scenario-based solutions we have developed based on the Horizon Digital Platform have seen large-scale commercial use in multiple areas such as cities, campuses, and transportation. Prime examples include the adoption of our solutions by China's Lanzhou New District, Soochow University, and Shenzhen Airport.

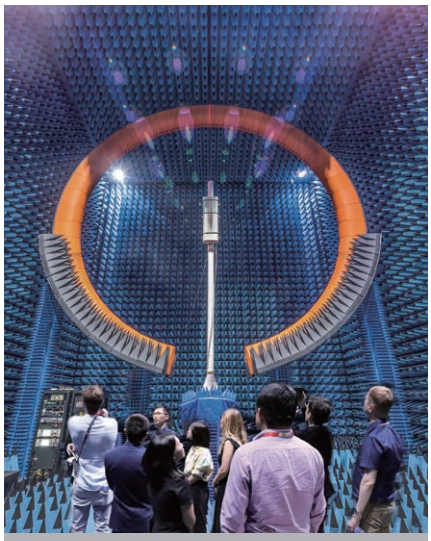
# Openness & Transparency

**2019 was an extraordinary year for Huawei. Nonstop pressure from the US government, in a deliberate attempt to spread disinformation, has put our company under the spotlight. In response, we have made a concerted effort to enhance transparency and communicate more proactively with the world. We remain committed to the facts and open information sharing. Over the past year, we have invited numerous stakeholders, including journalists, researchers, experts, and government officials around the world, to come and see with their own eyes what Huawei is truly about.**

## Open Communication

There are no backdoors in Huawei products, and our front door remains wide open. In 2019, we hosted over 4,500 journalists, over 3,000 experts and researchers, and over 1,000 government delegations from around the world at our headquarters in Shenzhen. They visited our labs, production lines, our Shareholding Room, and countless other facilities. Huawei executives gave nearly 300 speeches and interviews, reflecting a sharp increase in proactive engagement.

African and Middle Eastern media outlets interview Ren Zhengfei on October 20, 2019



Media delegation from Eastern Europe visits the Huawei Antenna Innovation Center on June 5, 2019


Huawei announces lawsuit against the US government for unconstitutional provisions in the NDAA on March 7, 2019

## Safeguarding Our Legitimate Rights and Interests

Faced with an unprecedented smear campaign by the US government, we have resorted to defending our legitimate rights and interests through legal action.

- On March 7, 2019, Huawei filed a lawsuit in a US federal district court, challenging the constitutionality of Section 889 of the 2019 National Defense Authorization Act (NDAA).
- On December 5, 2019, Huawei mounted a legal challenge to the unconstitutional sales restrictions imposed by the US Federal Communications Commission (FCC).

Justice will always prevail, and Huawei will continue to protect its legitimate rights and interests through the proper channels.

## Sharing Ownership & Governance Information

In 2019, we opened our Shareholding Room to outside scrutiny, and invited more than 300 journalists, officials, and researchers from over 20 countries and regions to come and understand how our business is structured. We went into meticulous detail on our ownership structure, shareholding files, and registry of shareholding employees. We also held in-depth discussions on Huawei's Employee Shareholding Scheme, the design of our governance structure, and our process for electing members for governance bodies.

Huawei was created by its employees, and is owned by its employees. Our Employee Shareholding Scheme lays the foundation for how we distribute ownership and design our governance system. This framework has helped create a system under which the company shares both value and risk with employees, which brings our people together to drive the company forward.

Journalists from Northern Europe examine Huawei's shareholding archives and registry of shareholding employees

Japanese journalists go through Huawei's employee shareholding files

> **Some people think we are not transparent because we haven't gone public, but this doesn't make sense to me. Huawei adopts a new model under which its funds are collected from its employees. This may even become a model for most companies in the future. How is this model different from those of Northern Europe? There is no difference at all. In other words, we embrace employee capitalism, and there are no zillionaires at our company.**
>
> —Excerpt from Ren Zhengfei's Northern European Media Roundtable on October 15, 2019


Huawei Cyber Security Transparency Centre officially opens in Brussels on March 5, 2019. Since opening, the Centre has received more than 160 groups of visitors from governments, customers, the media, industry organizations, and standards organizations. In the meantime, it continues to offer a number of verification and testing services.

## Regular Press Conferences

Over the past year, we have held 20 press conferences to pass on first-hand information to our customers, partners, the media, and the general public. Some of these gatherings include:

- The unveiling of our Kunpeng and Ascend processors, including an in-depth analysis on the trillion-dollar computing industry.
- Press conferences for the release of our sustainability report and white paper on intellectual property, demonstrating Huawei's confidence in the company's sustained operations and commitment to fulfilling its social responsibilities.
- Huawei Innovation Days in Europe, Asia Pacific, and Latin America, where we shared our thoughts and innovations with regard to future technology.
- The opening of the Huawei Cyber Security Transparency Centre in Brussels and the release of *Huawei's Position Paper on Cyber Security* to elucidate our approach to, and policies on, cyber security.

# Five-Year Financial Highlights

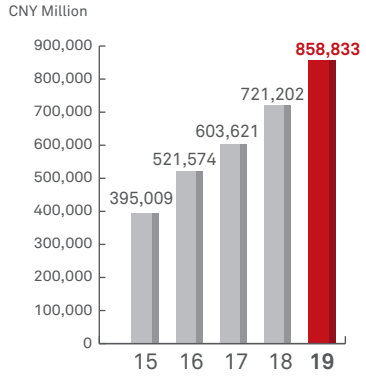
| | 2019 | | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|---|
| | (USD Million) | (CNY Million) | (CNY Million) | | | |
| Revenue | **122,972** | **858,833** | 721,202 | 603,621 | 521,574 | 395,009 |
| Operating profit | **11,145** | **77,835** | 73,287 | 56,384 | 47,515 | 45,786 |
| Operating margin | **9.1%** | **9.1%** | 10.2% | 9.3% | 9.1% | 11.6% |
| Net profit | **8,971** | **62,656** | 59,345 | 47,455 | 37,052 | 36,910 |
| Cash flow from operating activities | **13,085** | **91,384** | 74,659 | 96,336 | 49,218 | 52,300 |
| Cash and short-term investments | **53,127** | **371,040** | 265,857 | 199,943 | 145,653 | 125,208 |
| Working capital | **36,890** | **257,638** | 170,864 | 118,503 | 116,231 | 89,019 |
| Total assets | **122,947** | **858,661** | 665,792 | 505,225 | 443,634 | 372,155 |
| Total borrowings | **16,060** | **112,162** | 69,941 | 39,925 | 44,799 | 28,986 |
| Equity | **42,316** | **295,537** | 233,065 | 175,616 | 140,133 | 119,069 |
| Liability ratio | **65.6%** | **65.6%** | 65.0% | 65.2% | 68.4% | 68.0% |

Notes: 1. Converted into United States dollars ("USD") using the closing rate at the end of 2019 of USD1.00 = CNY6.9840

2. Starting from January 1, 2019, the Group has applied IFRS 16 in preparation of its financial statements. Details about the changes to related accounting policies can be found in note 4 to the consolidated financial statements summary. As permitted by the standard, the Group has used the modified retrospective approach for transition. Comparative information has not been restated.

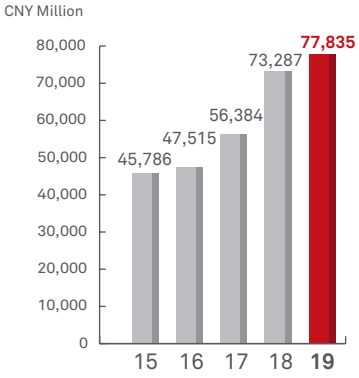
Revenue

CAGR: 21%



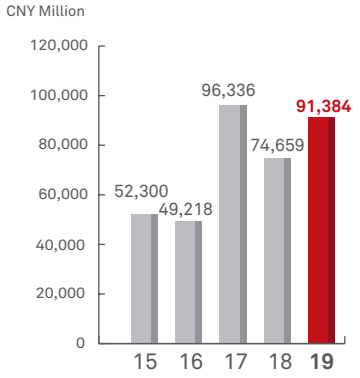

Operating profit

CAGR: 14%




Cash flow from operating activities

CAGR: 15%



# Message from the Chairman

**2020 may prove to be an even greater challenge. We will need to further adapt to the long-standing restrictions imposed by the Entity List, while also addressing the impact of the ongoing COVID-19 pandemic. Nevertheless, we are fully confident in what the future holds. We will stay the course and continue creating value for our customers and the broader global community.**

## Creating value for our customers and the global community

In 2019, we faced challenges the likes of which we have never seen. And we stood strong. Since the US government added us to its Entity List, we have worked day and night to patch up the holes in this embattled aircraft of ours, ensuring business continuity and timely delivery for our customers.

Our operations have remained stable, and our organization is as sound as ever. With effective management, we have been able to achieve an excellent performance across all financial indicators, and our business has remained robust throughout 2019.

I'd like to take a moment here to thank our customers and consumers for their ongoing trust, our partners for their strong support, and express our heartfelt gratitude for everyone who has helped us along the way.

Right now, almost every country around the world is fighting the spread of COVID-19. At the first signs of the outbreak, Huawei immediately took a series of measures to contain and prevent its spread. First and foremost, to ensure the safety and well-being of our employees, and then to make sure that production and delivery

continue as usual for the customers that need us. We have also turned outward to help combat the spread of the virus with digital technology.

2020 may prove to be an even greater challenge. We will need to further adapt to the long-standing restrictions imposed by the Entity List, while also addressing the impact of the ongoing COVID-19 pandemic. Nevertheless, we are fully confident in what the future holds. We will stay the course and continue creating value for our customers and the broader global community.

## Global operations and shared success

Digital technology is reshaping our lives. We will soon enter an intelligent world where new opportunity abounds. As we begin to explore the order and rules of this new space, however, a great cloud of political and economic uncertainty looms over global markets.

The world is in flux, but no matter what changes await us, Huawei will stay committed to open collaboration. We will continue to work with our global partners to build out industry ecosystems that thrive on *shared success*.

We believe that open collaboration leads to a better future. For the past year, we have been working closely with our ecosystem partners to build a more fully connected and intelligent world. Specifically, we have been proactively engaging with emerging industries and contributing to standards in domains like AI, data security and protection, consumer-facing businesses, and intelligent vehicles. Our goals are to ensure rapid commercialization of new applications and sustainable industry development.

We continue to invest in joint innovation, breaking through technical bottlenecks, and enabling industry upgrade with our partners. Together, we will drive the digital economy forward.

Despite the challenges ahead of us, we won't succumb to isolationism or close ourselves off from the outside world. We believe that collaboration leads to shared success, and openness to progress. This is the only way forward. We will continue to embrace global supply chains. To the extent that we are allowed, we will continue working with our US suppliers to create greater value for our customers and give back to the world.

## Technology for all and digital governance

Digital transformation and the broader application of artificial intelligence have become major driving forces behind global progress. To bring the benefits of digital technology to more people, all countries need to work together across domains – including industry, technology, standards, and policy – to build a digital economy that is more readily accessible to all people.

At Huawei, we want to help till the soil for this digital world to take root and flourish. We are opening up our ICT capabilities and creating digital infrastructure that is both affordable and accessible in order to help more countries succeed in the digital economy. Our ultimate goal is to help every country in the world create greater value and benefit more from the digital economy.

AI is ushering in a social and economic transformation. It will play an active role in future wealth creation, but we need to have rules in place to govern and standardize how it's used.

We believe that technology is fundamentally good, and that it should be used *for* good. Instead of widening the gap between the haves and have-nots, technology should be used to promote social inclusion and protect people. Ultimately, we should use technology to help ensure a better environment and bring greater benefits to society as a whole.

This is our guiding principle. And to this end, we have launched a global digital inclusion program called TECH4ALL, which is designed to bring the benefits of digital technology like AI to every person, home, and organization.

In terms of governance, our aim is to build inclusive and responsible AI for the social good, and we are committed to weaving security and trustworthiness into the very fabric of all of our AI products, services, and processes. We are actively engaging with governments, industry partners, and academia to explore how we can work together more effectively to build a thriving intelligent world that everyone can trust.

Cyber security and privacy protection are the foundation of this shared future. They present challenges that governments, carriers, network equipment providers, and a broad range of third parties need to work together to address.

Cyber security and privacy protection are, and will always be, our top priorities. We have a robust cyber security assurance system in place, and we continue to invite third-party security organizations to independently evaluate our products. At the same time, we remain committed to improving our software engineering capabilities so that we can deliver trustworthy and quality products.

## 5G, AI, and cloud: Enabling industries and driving the economy forward

Digital transformation is accelerating, powered by emerging technologies like 5G, AI, and cloud computing. This trend will soon propel the digital economy into a new phase of development, where AI-powered industry plays a leading role.

5G is converging with technologies like AI, cloud, 4K/8K video, VR, and AR. These technologies are being tightly integrated into enterprise production systems, changing the way we work. Together, they help traditional industries go digital, making things like smart ports, telemedicine, remote office work, and robotic inspections a practical reality.

These technologies are also reshaping the consumer domain. With support for applications like high-definition live streaming, smart classrooms and distance education, smart travel, and other forms of immersive experience, they are taking people beyond the boundaries of time and space.

We are beginning to see the effects of technology spillover. ICT technology has become a new driving force behind economic growth, pushing the digital economy into a new era. We estimate that the digital economy will grow to account for 25% of global GDP by 2025, up from the current 15%.

Huawei works with its partners to adapt 5G, AI, and cloud capabilities to meet the specific needs of different industries, enabling digitization and driving the digital economy forward.

We are building sustainability into the lifecycles of all of our products. Our products and solutions help many industries reduce emissions and develop circular economy processes. We are actively working with all industry partners to build a low-carbon society, contributing to a greener and fully connected world.

For example, with our PowerStar network solution, base stations typically use between 10% and 15% less energy, cutting around 2,000 tons of $CO_2$ emissions annually for every 1,000 sites. Huawei's PowerStar solution has been verified and deployed in multiple countries, including China, South Africa, and Morocco.

## Enhancing corporate governance and ensuring operational compliance

A robust corporate governance system is the cornerstone of sustainable development. It is also the basis for our long-term cooperation with external stakeholders. Building on a clearly defined corporate governance structure, we continue to enhance the design of governance-related organizations and roles, and streamline our corporate governance operation mechanisms.

In January 2019, Huawei's shareholding employees elected new members of the Representatives' Commission, producing 115 Representatives and 18 Alternate Representatives. The Commission exercises rights on behalf of all shareholding employees.

We have also made further progress in streamlining and standardizing how authority is delegated and exercised throughout the company. In particular, we have been implementing contract review and conclusion at the rep office level, and are exploring better ways to incorporate governance mechanisms into everyday business operations.

At Huawei, we believe that legal compliance is a bulwark against the uncertainties of international politics. We comply with all applicable laws and regulations in the countries where we operate. This is the cornerstone of operational compliance at Huawei, and it's also a core principle of our management team. We require all subsidiaries and departments around the world to strictly comply with local laws and all other applicable regulations.

## Showing the real Huawei

In 2019, we made a concerted effort to enhance transparency and communicate more proactively with the world. Over the past year, we welcomed more than 4,500 journalists, more than 3,000 experts and researchers, and more than 1,000 government delegations from around the world to visit our headquarters in Shenzhen. They visited our labs, production lines, our Shareholding Room, and countless other facilities. At the same time, our executive team has continued to engage with the global community through a number of external events and speaking opportunities.

We have gone into great detail with the public about our ownership and governance, subjecting our ownership structure, shareholding files, and registry of shareholding employees to outside scrutiny. We have also walked the media, academic experts, and government representatives through our Employee Shareholding Scheme, as well as our governance structure and mechanisms.

Journalists from around the world have taken the time to get to know us, writing a wealth of material that has helped more people understand what Huawei is all about.

Beyond proactive engagement, we have also turned to the courts to defend our legitimate rights and interests through legal action. Through the subsequent discovery processes and court hearings, we presented hard facts and evidence to back up our claims.

We will continue to openly communicate with the world, and we welcome all stakeholders, including governments, the media, researchers, and experts, to come and see who we are with their own eyes.

Moving forward, we will continue creating value for our customers and for the wider global community. We will work together with our ecosystem partners to promote shared success, and use that success as the foundation for sustainable development. No matter how bumpy the road ahead may be, we will stay the course and remain committed to our vision and mission: To bring digital to every person, home and organization for a fully connected, intelligent world.

**Liang Hua**
Chairman of the Board

# Industry Trends

## The Intelligent Decade Ahead

The first two decades of the 21st century saw the Internet, particularly the mobile Internet, progress by leaps and bounds. The next decade is when evolving networks and breakthroughs in computing power will drive wide-scale adoption of cloud computing, commercial 5G networks, and pervasive AI services.

These trends are ushering us into a fully connected, intelligent world: a world of massive connectivity, real-time and always-on networks, and an explosion of new smart devices and equipment. This is also the decade of Globalization 4.0 as the goods and services of the digital world merge with those of the physical world. Enormous changes are sure to follow, in the way we live and work, our business models, industry ecosystems, and the way technology evolves.

### An Intelligent World for an Intelligent Life

Digital technology is remaking the world. It is setting the stage for an intelligent world where all things can sense, all things are connected, and all things are intelligent. The Global Mobile Suppliers Association (GSA) reports that, as of the end of 2019, more than 60 carriers have rolled out 5G networks, more than 50 have launched commercial 5G services, and over 180 5G devices are now available. Huawei predicts that, by 2025, 5G will serve 58% of the global population and that China will be the largest 5G market in the world.

5G can be combined with technologies like 4K/8K video, VR/AR, AI, and cloud to deliver a truly immersive experience everywhere, at any time. We will find it in things like high-definition live broadcasts, smart classrooms, remote education, virtual museums, and smart tourism. The way we work will also be transformed when 5G combines with cutting-edge technologies in telecommuting, online medical consultation, and robotic patrolling. These technologies will have a much broader spillover effect because ICT has become a new economic force and is sparking a new wave of global economic growth.

#### The Zero-Search Experience: Seamless Response to User Needs

There are more than four billion Internet users in the world today, and that number could rise to six billion within the next five years. This vast user base will generate massive amounts of data – data that businesses can use to deliver products and services tailored to the interests, preferences, and personalities of their customers.

AI functions – trained on vast amounts of data – are quickly embedding themselves into every aspect of how we live and work. AI is making a particular difference in human-machine interaction, as using voice and gestures to engage with machines has made this interaction more natural than ever before. We will also enjoy new levels of convenience with smart assistants, smart home appliances, and autonomous vehicles. These technologies will provide us with the assistance we need, when and where we need it, without having to give explicit commands. New collections of smart devices, along with more effortless communications between people and machines, will deliver a zero-search experience where what we need simply comes to us.

Huawei's Global Industry Vision (GIV) report predicts that, by 2025, smart personal assistants will be available to 90% of people, and there will be 6.1 billion smartphones and 470 million smart speakers worldwide.

### Vehicle-to-Everything (V2X) Connectivity for Intelligent Mobility

Ubiquitous connectivity allows for constant flows of data, making "always-on" the new default for the exploding number of connections around us, particularly people-to-thing and thing-to-thing connections. 5G networks, smart devices, and edge computing will support vehicle-to-everything (V2X) connectivity, and it's estimated that 15% of cars will have 5G-based V2X capabilities by 2025.

Intelligent connected vehicles will give us greater freedom by anticipating our needs and automatically adjusting to their surroundings. According to a McKinsey report, the global autonomous vehicle market has the potential to reach US$1.9 trillion by 2025. Autonomous driving will bring additional benefits: a reduction in the number of traffic accidents, 10% lower fuel consumption, and 20% less air pollution.

Even streets will see an upgrade. Traffic management systems and virtual emergency lanes will eliminate congestion through tailored streets. Traffic systems will combine data from pedestrians, drivers, vehicles, and roads in a unified network for real-time data analysis. These systems will dynamically plan road resources to improve their utilization and give emergency response vehicles the right of way.

### Accelerated Innovation and Augmented Creativity

Computers' perception and inference capabilities are growing exponentially thanks to two things. The first is AI algorithms, especially deep learning algorithms, that are trained on vast amounts of data, and the second is an abundance of computing power made possible by cloud and quantum computing. These enhanced capabilities are helping innovation happen faster than ever before. When AI takes care of time-consuming and repetitive work, we can focus on more creative, knowledge-intensive jobs. AI is poised to deliver enormous benefits to all industries:

- Scientific research institutes often have to perform the same experiments multiple times. If they can offload that work to intelligent machines, they will see much faster breakthroughs in research.
- Cities can improve governance and provide widespread public services in everyday life, such as transportation, education, healthcare, and public safety.
- Carriers can build autonomous networks that are less costly to operate and maintain than traditional networks. AI also helps carriers innovate more rapidly.
- Factories can enhance quality control efficiency, improve yield rate, and transform into flexible manufacturing.
- Car manufacturers can save the time it takes to obtain road test data and to create, train, and deploy AI models, and develop multi-scenario intelligent driving solutions.
- Any business can work more efficiently with AI. They can use knowledge graphs to gather experience and intelligence to better inform innovation.

Huawei's GIV report predicts that 97% of large companies will be using AI by 2025.

## Intelligent Infrastructure: Launching the Age of Intelligence

Intelligent infrastructure is the foundation for the intelligent world and a core enabler of modern industry. Intelligent infrastructure can be created either by adding AI to conventional ICT infrastructure or by building new networks with new ICT technologies. No matter how it's created, intelligent infrastructure will be fertile ground for innovation in all industries as we launch into the age of intelligence.

## Networks: More than Just Connectivity

The ICT industry is advancing towards intelligent connectivity. Networks are going beyond people-to-people communications to enable communications between people and things, and among things themselves. Going forward, networks will serve autonomous systems that operate on their own within human-defined rules.

Against this backdrop, networks will have to deliver more than simple connectivity. Network metrics will shift from quality of service (QoS) to quality of experience (QoE). Best-effort performance will be upgraded to deterministic performance. Networks must ensure not only bandwidth and reliability, but security and trustworthiness.

In computing, centralized architecture will give way to a distributed model where a three-layer collaborative structure – from smart devices and edge computing to central clouds – guarantees the most efficient use of scattered computing resources. Networks are evolving away from basic broadband connections to ultra-broadband networks and deterministic all-IP networks. Intelligent networks with an agile, open, all-cloud architecture will be able to support the elastic computing of enormous datasets. Examples include lossless data center networks for distributed AI computing, 5G E2E deterministic networks, all-optical ultra-broadband networks, and computing-first networks.

## Digital Transformation: Integrating Deeper into Every Industry

Digital technology is an integral part of how we think, work, and live in the modern world. For businesses, digital transformation is a way to meet new consumer needs and adapt to the workforce of the future.

5G will support hundreds of billions of connections, high bandwidth (up to 20 Gbit/s), and ultra-low latency (down to 1 millisecond). This means 5G is almost as fast as fiber and more real-time than industrial fieldbus systems. In combination with technologies like cloud computing, edge computing, VR/AR, AI, IoT, big data, and blockchain, 5G will upgrade dumb pipes into intelligent network infrastructure, enabling the digital transformation of every sector: smart government, smart finance, smart energy, smart transportation, smart manufacturing, and smart education, etc.

## Collaborating Across the Ecosystem for a Symbiotic Economy

In the intelligent world, no single company will be able to succeed on its own. Open source is a crucial element in a vibrant software ecosystem. Open-sourcing hardware and chipsets will allow businesses to unlock the full potential of technological innovations, and to explore more possibilities with their partners. Pervasive intelligence will help eliminate technical barriers to innovation. Open source gives everyone a chance to be their own developer.

The ICT ecosystem is shifting from bilateral cooperation to full-ecosystem collaboration. The new model features openness (via open source), sharing benefits with partners, and a collaborative approach to exploring new untapped markets. Full-ecosystem collaboration will ultimately lead to a symbiotic economy, and one of the key pathways to the symbiotic economy is through cloud.

Cloud enables open, diverse ecosystems to share successes. Cloud-native (born in the cloud) and cloud-enabled (growing with the cloud) models are essential for businesses to enhance their innovation and efficiency.

## A Massive Eruption of New Theories and Technologies as the Intelligent World Approaches

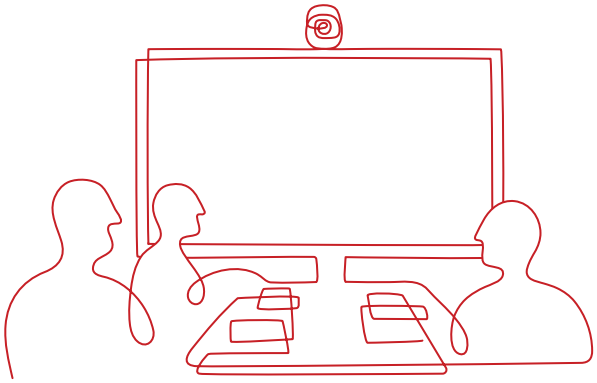
We are on the verge of another massive eruption of new theories and technologies. Advances in one domain will spark chain reactions across different disciplines. ICT is now a fundamental tool for research and innovation in every domain, and ICT infrastructure is as fundamental to life and industry as electricity.

In this era of change, there is the potential for great advances, but there are also many unknowns. As the industry struggles to keep up with Moore's law and the Shannon limit looms, there is an urgent need for theoretical breakthroughs. The device ecosystem is diversifying with an ever-expanding array of smart devices and equipment, and open source operating systems are booming. AI continues to revolutionize computing, with architecture becoming more heterogeneous than ever, and innovation accelerating in x86 processors, Arm processors, GPUs, and NPUs. Data has become vital in a way that it has never been before because it is now a core resource and a valuable asset. For data to create maximum value, digital trust and data protection mechanisms are essential. Against this backdrop, the only certainty is uncertainty.

Mankind is poised to enter an intelligent world within the next two or three decades. Exploration is an eternal human pursuit. In the bold days ahead, let's work together to make this vision a reality.

# Management Discussion and Analysis





## Our Vision, Mission, and Strategy

Huawei's mission is to bring digital to every person, home and organization for a fully connected, intelligent world. To this end, we will:

- Drive ubiquitous connectivity and promote equal access to networks
- Provide the ultimate computing power to deliver ubiquitous cloud and pervasive intelligence
- Build digital platforms to help all industries and organizations become more agile, efficient, and dynamic
- Redefine user experience with AI, making it more personalized for people across all scenarios, whether they're at home, in the office, or on the go

### Building a Fully Connected, Intelligent World

| Ubiquitous Connectivity | Pervasive Intelligence | Personalized Experience | Digital Platform |
|---|---|---|---|
| Connectivity is a basic human right – the foundation for human progress and economic growth. Connections will soon become a natural and ubiquitous resource, provided by networks that proactively sense changes and user needs. These networks will offer intelligent, seamless, and secure connections to people and things whenever and wherever they want. With the advent of 5G, we begin a new chapter in this story. | In the digital economy, computing power is a new driver of production. Data itself is a core asset, and cloud and AI are the new tools of productivity. Moving forward, AI computing will account for more than 80% of a computing center's capacity, providing the muscle for practical AI applications in all areas of life. To deliver ubiquitous cloud and pervasive intelligence, we will need to provide the ultimate computing power. | With the continuous evolution of smart devices, a seamless experience across all scenarios will become the foundation of an intelligent life. Using AI, cloud, and big data technologies, businesses can better understand their customers' needs and innovate with greater agility to craft a more personalized experience. Coordination and collaboration across industries will drive innovation at scale. | A new digital wave is sweeping the globe. Digital and AI technologies are helping all governments and businesses become more agile, efficient, and dynamic. Open, secure, flexible, and easy-to-use digital platforms are facilitating innovation and transformation in all industries. They will be the bedrock and the fertile ground for our digital society to flourish. |

## Ubiquitous Connectivity

We are moving towards an intelligent world where all things will be able to sense and connect. Connectivity is the prerequisite for – and foundation of – this world. It is also a basic human right.

Huawei is committed to connecting all people, homes, and organizations that are still offline, while driving the adoption of broadband and ultrafast broadband for those who are already connected. In addition, we are infusing connectivity with AI so that networks can adapt to the changing needs of people and connected things. Going forward, intelligent networks will need to adjust their bandwidth and latency in real time in order to deliver the user-centric experience that people have come to expect.

In the three main areas (individual users, homes, and organizations), Huawei enables ubiquitous connectivity, whether it's person-to-person, person-to-thing, or thing-to-thing. With a focus on user experience, we power networks with artificial intelligence that can proactively sense changes and user needs. These networks will offer intelligent, seamless, and secure connections for everyone, whenever and wherever they want.

We are innovating nonstop to make this a reality. We have developed a range of cutting-edge connectivity technologies that work in any scenario and over any media – 5G, Wi-Fi 6, 200G/400G optical transmission, optical cross-connect (OXC), and 5G microwave. We are also leveraging big data and AI to develop intelligent connectivity solutions for individual users, homes, and organizations. Examples include our SmartWiFi and Autonomous Driving Network (ADN).

## Pervasive Intelligence

In a fully connected world, we will see explosive growth in data creation, generating endless demand for mass storage and intensive computing. Meanwhile, existing computing architectures are struggling to keep up with this demand as Moore's law slows down.

Huawei is working to change that. Through ongoing innovation in technological architecture and engineering, we want to provide the ultimate computing power to deliver ubiquitous cloud and pervasive intelligence.

For the past 15 years we have been investing in the development of a chipset family built with our Kunpeng and Ascend processors at the core.

Our converged, intelligent, and open data infrastructure helps break down silos between storage, databases, and big data systems. These solutions enable our customers to integrate and optimize every step of the data lifecycle, from storage and computing to management and data utilization. This helps maximize the value per bit and reduce cost per bit to unlock the full potential of data.

Our solutions enable greater synergy between cloud, AI, and 5G. This synergy, coupled with full-stack technological innovation, translates into several layers of added value in our public cloud services and hybrid cloud solutions, especially in terms of stability, reliability, security, trustworthiness, and sustainability.

We are working with our partners to help industries more effectively navigate their digital and intelligent transformations. Our goal is to better support our partners' applications and help customers do more with their data, creating fertile soil for the intelligent world to flourish.

## Personalized Experience

The physical and digital worlds are converging, and the process is speeding up. Mass production is giving way to mass customization, leading to greater business innovation, collaboration across ecosystems, and a richer user experience.

Using AI and cloud technologies, businesses can better understand their customers' needs and innovate with greater agility to craft a more personalized experience. Coordination and collaboration across industries will drive innovation at scale.

In the past, differences between personal devices and between ecosystems left us with a fragmented user experience across different scenarios. This will soon change as we dissolve the boundaries between products and services, converging user experience across a vast range of scenarios at home, in the office, and on the go. Soon all content and services will travel with users for a completely seamless, holistic experience. Smart collaboration between software and devices gives users an intelligent experience anytime, anywhere.

At the same time, developments in natural interaction and machine learning will take the service quality of smart devices to a whole new level. Smart devices will be able to better identify, understand, and respond to users' needs across different scenarios throughout their day, paving the way for a truly personalized experience.

Huawei will continue working closely with our software, service, and hardware ecosystem partners on systematic integration and innovation to make this consumer-focused vision a reality. We will provide an intelligent experience across all scenarios based on our "1 + 8 + N" strategy, which is centered around our smartphones, and further empower our ecosystem partners with HarmonyOS, Huawei Mobile Services (HMS), the smart assistant Celia, and HiLink.

## Digital Platform

Information technology can help organizations streamline operations and more effectively manage their physical assets like buildings, factories, production lines, and utilities. At the same time, the Internet, AI, and advanced IT technologies like cloud can help organizations redesign the way they work, giving rise to new business models. This is the process of digital transformation.

While digital transformation brings enormous benefits in terms of cutting costs, increasing agility, and driving productivity, going digital isn't easy. There is a whole host of elements that organizations need to be able to manage in a more centralized way, whether it's incorporating all sorts of new technology, integrating mountains of data in all forms, or adapting end-to-end business processes and structures to the changes these bring.

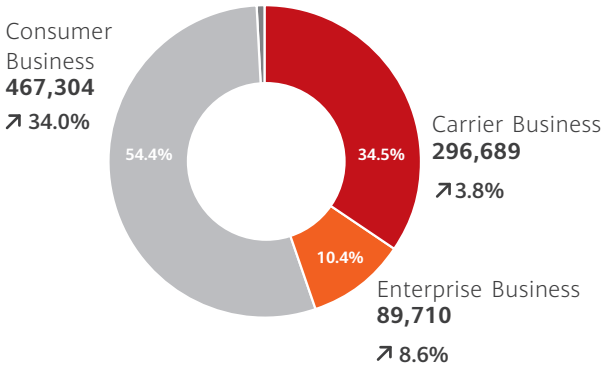
This is where powerful digital platforms come into play, combining IT systems and operational methods that accompany them. These platforms help enterprises to harness new technologies and innovate with greater agility in order to keep on top of change and adapt to new competitive forces.

Together with our ecosystem partners, Huawei provides innovative technologies, products, and solutions that help our customers build open, secure, flexible, and easy-to-use digital platforms. By empowering data integration, business collaboration, and agile innovation, our digital platforms pave the way for successful digital transformation.

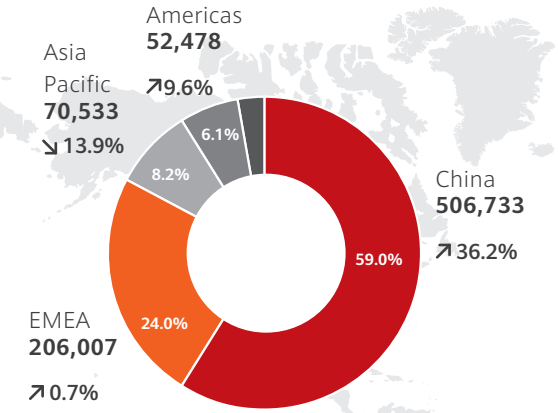
## 2019 Business Review

In 2019, the global economy experienced a slowdown and remained sluggish. Huawei stayed focused on ICT infrastructure and smart devices, and continued investing to create value for our customers, deliver better experiences to consumers, and improve the quality of our operations. Our annual revenue reached CNY858,833 million, up 19.1% year-on-year.

| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| Carrier Business | **296,689** | 285,830 | 3.8% |
| Enterprise Business | **89,710** | 82,592 | 8.6% |
| Consumer Business | **467,304** | 348,852 | 34.0% |
| Other | **5,130** | 3,928 | 30.6% |
| Total | **858,833** | 721,202 | 19.1% |




| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| China | **506,733** | 372,162 | 36.2% |
| EMEA | **206,007** | 204,536 | 0.7% |
| Asia Pacific | **70,533** | 81,918 | (13.9)% |
| Americas | **52,478** | 47,885 | 9.6% |
| Other | **23,082** | 14,701 | 57.0% |
| Total | **858,833** | 721,202 | 19.1% |




- In the Chinese market, 5G networks saw large-scale deployment. Our smartphone business maintained steady growth and we created more local sales channels. Our enterprise business seized the opportunities brought about by digital and intelligent transformation, and our ability to develop industry-based solutions improved. Thanks to these factors, Huawei earned CNY506,733 million in revenue from the Chinese market, up 36.2% year-on-year.
- 5G network rollout and the accelerated pace of enterprises' digital transformation helped Huawei earn CNY206,007 million in revenue from Europe, the Middle East, and Africa (EMEA), up 0.7% from 2018.
- In the Asia-Pacific Region, as we saw fluctuations in carrier investment cycles in some countries and were denied access to the Google Mobile Services (GMS) ecosystem in the consumer business, Huawei's revenue from this region decreased to CNY70,533 million in this region, down 13.9% year-on-year.
- In Latin America, enterprises were building new digital infrastructure and our mid-range consumer products became more competitive. As a result, Huawei's revenue from the Americas grew to CNY52,478 million, up 9.6% from 2018.

## ICT Infrastructure Business

Huawei is a leading global provider of ICT infrastructure and smart devices, with ICT infrastructure serving as one of our core businesses. With a focus on information distribution, interaction, transmission, processing, and storage, we use our innovative and leading products, solutions, and services to help our customers build information technology (IT) and communications technology (CT) infrastructure.

In terms of technology R&D and industry development, our ICT infrastructure business focuses on connectivity and cloud & computing:

- In connectivity, we aspire to build the best connections with the most powerful, simplified, and intelligent networks.
- In cloud & computing, we aim to provide the ultimate computing power with "one cloud" (HUAWEI CLOUD), "two wings" (computing and intelligent data & storage), and "two engines" (Kunpeng and Ascend processors).

Powered by artificial intelligence (AI), connectivity and cloud & computing work together and create synergies.

From the perspective of customer support, we focus our ICT infrastructure business on connectivity, computing, and AI to build an open ecosystem and a digital platform that empowers numerous industries. Our ICT infrastructure business primarily serves two types of customers: carrier customers and government and enterprise customers.

### Carrier Market

5G development is gaining momentum around the world. Industry digitization powered by 5G and AI will be the core driving force behind the development of the global ICT industry over the next decade, providing new impetus for socioeconomic development.

In the carrier market, Huawei is committed to continuously creating value for customers. We strive to become the best partner for carriers worldwide, and help them maximize network value. With a continuous focus on our customers, we will make ongoing R&D investments and innovations in the carrier market in order to help carriers achieve sustainable growth. Our key efforts include the following:

- We build simplified, green, and converged end-to-end commercial 5G networks for carriers worldwide, and provide them with the best paths for evolving their live networks towards 5G.
- We innovatively apply AI to the telecom industry to enable the AI-powered Autonomous Driving Network, which allows for smart operations and faster network rollout and operations & maintenance (O&M).
- As a leader in the ICT industry, we work with industry partners to build a mature 5G ecosystem and develop innovative business models and applications. Our goal is to help carriers unleash the full potential of 5G and achieve greater business success by expanding 5G adoption across vertical industries.

#### Accelerating carriers' 5G rollout with simplified networks

##### 5G Radio Access Network

With its leading hardware capabilities and software, Huawei's 5G RAN portfolio for all scenarios aims to deliver the best network experiences, address the challenges faced by carriers regarding site deployment, spectrum acquisition, and user experience consistency, and help carriers accelerate large-scale 5G network rollout and improve network experience.

- We launched the next-generation active antenna unit (AAU) for 5G with our advanced technologies and algorithms. This new AAU simplifies carriers' deployment of 5G networks in terms of engineering, energy consumption, and performance, and helps Huawei maintain its absolute leadership in the global rollout of commercial 5G networks.
- Carriers face many challenges during 5G site deployment, including limited site space, rising OPEX, and technical difficulties. To address these challenges, Huawei's Ultra-Lean-Site Solution for all scenarios makes 5G deployment more efficient. Our Blade AAU combines full-band, multi-RAN, and active & passive modules into one box, enabling faster 5G site deployment and protecting carriers' investment. Huawei's Ultra-Lean-Site Solution

5G base station installation in Switzerland

has been extensively adopted in many countries, including Switzerland, Italy, Germany, South Korea, China, and Saudi Arabia.

- As the C-Band spectrum for 5G is currently not available for some carriers, Huawei's Sub-3 GHz NR Solution helps them reuse existing Sub-3 GHz spectrum resources on their live networks for quick and extensive 5G coverage.

- Huawei's 4G-5G Coordination Solution helps build converged networks that deliver the best experience for edge and indoor users. Huawei's Digital Indoor System Solution enables 5G networks to deliver large capacity in indoor scenarios and a consistent indoor and outdoor experience, and supports evolution towards future networks. Some of our achievements in 2019 include the following:

  - We teamed up with China Telecom to build the world's first 5G Super Uplink network in Shanghai, which provided strong assurance for the extensive adoption of 5G in vertical industries.

  - Huawei's 5G LampSite for indoor digitization was deployed by nearly 40 carriers from 28 countries and regions.

## 5G Transport Network

Huawei uses industry-leading architecture and innovative products and technologies to build DC-centric 5G transport networks with optimal cost per bit and committed SLAs in order to help carriers succeed in 5G.

- **IP:** Huawei's intelligent 5G transport networks guarantee high bandwidth and low latency while ensuring reliable connectivity. This is achieved through the Network Cloud Engine (NCE) smart brain using FlexE-based slicing, SRv6-based low latency, and real-time packet loss detection by in-situ Flow Information Telemetry (iFIT). Some of our achievements in 2019 include the following:

  - Our intelligent 5G transport networks were commercially deployed on a large scale by China Mobile Zhejiang, China Unicom Beijing, China Telecom Sichuan, MTN, Zain, and other carriers globally.

  - According to market research firm IHS Markit, Huawei routers continued to maintain the largest share in the carrier market in 2019 thanks to our technology and market leadership in 5G transport networks.

- **Optical transport:** Huawei helps carriers build all-optical transport networks with optimal cost per bit by increasing per-fiber capacity and simplifying per-site configurations. Our key efforts and achievements include the following:

  - We launched the industry's first optical cross-connect (OXC) equipment, which reduces the required site space and power consumption by approximately 80% when compared to traditional equipment. The OXC equipment has been deployed by more than 30 carriers (e.g., China Telecom Sichuan).

  - Our 5G-oriented DWDM transport equipment uses Super C band technology to support 120 wavelengths, and boasts capacity 25% higher than the industry average.

- Our 200G optical system supports a transmission distance of over 1,100 km, 70% longer than the industry average. It has been put into commercial use by more than 150 carriers (e.g., Telecom Italia). Statistics from IHS Markit showed that Huawei's 200G ports led the pack in terms of shipments in 2019, leading the large-scale commercial deployment of 200G technology.

By the end of 2019, our 5G transport network solutions had been deployed by more than 90 carriers around the world, spearheading the construction of 5G transport networks.

## 5G Core Network

Huawei has maintained its global leadership by:

- Signing the world's first commercial 5G SA core network contract in the Middle East.
- Providing voice services to 2G, 3G, 4G, 5G, and fixed subscribers with our Single Voice Core solution to help carriers lay the foundation for 5G voice services. We have put more than 100 VoLTE networks into commercial use, which serve over 600 million users.

In May 2019, Huawei proposed 5G Deterministic Networking, aiming to help carriers deliver a deterministic networking experience that can be defined, orchestrated, and managed to their customers from different industries. Our all-in-one Multi-access Edge Computing (MEC) and industry's only multi-dimensional, intelligent dynamic network slicing solutions help carriers facilitate the digital transformation of numerous industries and achieve sustainable development.

Huawei partnered with Haier and China Mobile to launch the world's first AI+5G interconnected factory. Working with partners including Mstar Technologies, we used differentiated and deterministic networking service capabilities to build an intelligent manufacturing system for multiple scenarios, such as 5G+Machine Vision, 5G+AR Man-Machine Collaboration, and 5G+Smart Devices. This factory enables flexible and efficient mass customization production.

## Global Services

Huawei leverages AI-powered digital platforms to help carriers go digital faster, achieve agile network construction, intelligent O&M, and smart operations, and succeed in the 5G era.

- **Network planning and construction:** Huawei works with carriers to implement new digital network construction models using AI and big data technology. By working closely with carriers, we use digital technology to efficiently construct networks throughout the process from gaining insights to planning and construction, and expand the networks during the construction process to maximize carriers' investment efficiency.
- **O&M:** Our intelligent operations services solution, AUTIN™, continues to accumulate O&M knowledge assets and optimize AI training models on the unified open Operation Web Services (OWS) platform in order to evolve towards new O&M models characterized by man-machine collaboration. China Unicom jointly innovates with Huawei in 5G O&M, enabling automated topology generation for fault visualization across domains, intelligent fault detection, and cross-network and cross-domain intelligent fault diagnosis, as well as accelerating staff upskilling.
- **Smart operations:** Huawei worked with the Video Experience Alliance (VEA) – China's industry organization for video experience standards – and industry partners to release the world's first *Technical White Paper on Virtual Reality (VR) Experience Standards.* We have signed commercial contracts to build 5G Service Operations Centers (SOCs) with more than 10 carriers. Our 5G monetization solution helps build a closed-loop business system for 5G and activate new multi-dimensional business models.

In 2019, 35 carriers around the world that had launched commercial 5G services implemented our B.E.S.T. Network solution for 5G.

## Site Energy

To address the increases in energy consumption that will be caused by 5G deployment and increase carriers' investment efficiency, Huawei proposed the simple, intelligent, and green 5G telecom power target network, and launched a new 5G Power solution. We aim to build a unified power supply platform for all scenarios and spearhead the application of the "One Site One Cabinet" and "One Site One Blade" site construction models. This will help carriers construct and run 5G networks in a faster, simpler, and more cost-effective manner.


Customers visiting a site utilizing the 5G Power solution during the 2019 Global ICT Energy Efficiency Summit

Specifically, our solutions have the following unique features:

- "One Site One Cabinet": With innovative high-efficiency and high-density technologies, along with intelligent lithium batteries, and intelligent peak shaving and intelligent voltage boosting, this solution means there will be no need to change mains or power distribution or add cabinets during 5G site evolution.

- "One Site One Blade": With simplified blade power, this solution does not require any extra space. Power installation can be completed by one person within an hour, and site efficiency can increase to nearly 97%. This allows for much faster 5G network deployment and cuts OPEX.

By the end of 2019, the Huawei 5G Power solution had been deployed by 84 carriers worldwide. It also won the 2019 Global Industry Award for Sustainable Impact from ITU thanks to its outstanding contributions to energy conservation and emissions reduction in mobile networks.

## Carrier IT Infrastructure

5G is set to create massive amounts of data, so carriers are ramping up their efforts to upgrade data infrastructure. By the end of 2019, Huawei's storage products had been adopted by all mainstream European carriers, and more than 200 carriers worldwide had chosen Huawei as their partner. Our products include the following:

- OceanStor all-flash storage: This intelligent, high-end all-flash storage system targets core service systems. It delivers industry-leading performance and reliability, ensuring quick service response and no service interruptions.

- A next-generation distributed storage system with high-density nodes: This system supports the coming tidal wave of new data, slashing storage footprints and energy consumption while reducing OPEX.

To support carrier 5G rollout, Huawei has launched a full-stack hybrid cloud solution and developed hybrid cloud services targeting 5G, cloud, AI, and edge. This helps carriers improve IT efficiency and accelerate their innovation in 5G B2B and B2C services. By the end of 2019, Huawei had worked extensively with over 100 carriers on cloud services.

In the 5G era, data centers will be built in multiple scenarios. To address this challenge, we have developed our prefabricated modular data center solution, Huawei FusionDC, which cuts the data center construction period in half. In addition, our AI-powered iCooling technology enables intelligent O&M systems with better energy efficiency, significantly reducing the total cost of ownership (TCO). The prefabricated modular data center has become the mainstream model used by carriers in the Middle East, Latin America, Africa, and Asia Pacific when building hyperscale and medium-sized data centers.

5G rollout also mandates the provisioning of massive edge services. To meet this requirement, Huawei's integrated smart micro-module data center solution and prefabricated modular data center solution will have unified form factors and support one-stop deployment, accelerating service launch.

### Helping carriers succeed in 5G

Global 5G rollout accelerated in 2019. By the end of 2019, more than 60 carriers from over 30 countries and regions had launched 5G services. 5G brings consumers better experiences, and enables more households to access high-speed Internet. More importantly, it will be widely adopted in numerous industries. 5G is creating unprecedented commercial value for carriers.

5G devices are maturing, driving the rapid expansion of the 5G user base. In 2019, the industry saw the launch of more than 30 5G smartphones. Demand for low-end and mid-range 5G smartphones is expected to explode in 2020, further driving 5G user base expansion, and the number of 5G users is expected to exceed 200 million in 2020.

5G brings gigabit-level network speeds to consumers, leading to many innovative applications:

- In South Korea, VR and AR are the most appealing new services in the early stage of 5G's commercial deployment. Average data traffic per user has reached 30 GB each month.
- In China, carriers have established innovation bases for 5G services, and launched 5G applications such as Cloud VR and VR live streaming.
- In Europe, Huawei has established 5G joint innovation centers with carriers to continuously drive the commercial deployment and service innovation of 5G.

5G supports high bandwidth, low latency, and massive numbers of connections, allowing carriers to provide more services and create more value for end users. 5G will increase the average revenue per user (ARPU) for carriers, driving their revenue growth from mobile services. For example:

- In South Korea, 5G services were officially launched in April 2019, and carriers have recorded growth in their mobile service revenue for three consecutive quarters since then.
- In Northern Europe, Finnish carriers designed their service packages for 5G based on factors such as data rate and latency, which provide a better customer experience and enable a sustained increase in mobile service revenues.

Fixed Wireless Access is the fastest growing home broadband technology. Huawei's 5G Wireless Fiber solution for all scenarios takes advantage of high-performance 5G Customer Premise Equipment (CPE), an enhanced MU-MIMO algorithm, and technologies that support device-network synergy. This solution provides home users and small- and medium-sized enterprises (SMEs) with inclusive, efficient, and competitive connections, as well as fiber-like gigabit-level network speeds, while connecting more users. The 5G Wireless Fiber solution supports coordinated deployment of 5G and 4G to provide different access rates for home users and meet different user requirements. By the end of 2019, it had been commercially deployed on more than 30 5G networks worldwide.

In 2019, the 5G B2B device ecosystem developed at an accelerated pace, and exploration into 5G applications was fully underway, greatly promoting the application of 5G technology in various industries.

5G industrial modules and industry devices are also maturing. In October 2019, Huawei launched the world's first commercial 5G industrial module. We have joined hands with more than 50 partners to usher in a new era where 5G can empower numerous industries. By the end of 2019, more than 10 vendors had launched over 30 5G modules. Multiple 5G industrial CPE models have also been launched, and will be used in many scenarios like transportation, energy, mining, and ports.

Carriers and industry integrators worldwide are actively exploring the application of 5G. Huawei has been working with carriers and industry partners worldwide to explore the application of 5G in more than 300 projects that span over 20 industries. 5G private lines and 5G campuses are the first wave of carriers' commercial application of 5G in industries. For example:

- In Kuwait, carriers are using 5G to provide private line services for over 1,000 SMEs, reducing deployment cost by approximately 70% compared with optical fibers.
- In China, 5G has been extensively adopted in a variety of scenarios, including real-time oversight and detection of roads and bridges, remote control of gantry cranes at ports, remote mining, live streaming in the media industry, and power distribution protection. These applications greatly improve personnel safety and productivity.

## Driving carriers' new business growth

### B2C

In the B2C domain, Huawei develops end-to-end digitalized business solutions to help carriers increase revenue, maximize their investment efficiency, and achieve business success.

We have enabled 50 million users in emerging markets to rapidly upgrade their mobile broadband services. This was achieved through big data integration across domains (e.g., business, networks, and operations), scenario-based modeling, and AI-assisted analysis. RingShow (Video Ringback Tone), a 5G-native digital service, has monetized the new business opportunity of call waiting, and helped carriers increase their ringback tone service revenue by more than 20%.

Our CWR@Digital Solution is a digital, automated, and intelligent transformation solution that has helped over 60 mobile carriers worldwide operate efficiently throughout the entire process, from planning and construction to maintenance and optimization. The solution also shortens carriers' time-to-market (TTM) by more than 30%.

Huawei's comprehensive energy saving solutions effectively balance user experience and the energy consumption of networks through collaboration on multiple layers, including equipment, sites, networks, and services. These solutions have reduced the energy consumption of equipment by an average of more than 15% in over 20 projects around the world. This has significantly enhanced network energy efficiency and reduced carriers' OPEX.

### Home Broadband

Huawei's end-to-end solutions including Flex-PON, QuickODN, and PremiumWi-Fi help carriers build 10G PON-ready networks, provide users with ubiquitous gigabit-level service experiences, drive the large-scale deployment of new services such as 4K, 8K, and VR, and succeed in gigaband. Some of our key efforts and success stories include the following:

- Huawei's end-to-end 10G PON solution helped China Mobile Shanghai build a gigaband network in 2019, making Shanghai the first "dual gigabit city" that delivers speeds up to gigabits per second over both 5G and optical fibers.
- A Malaysian carrier chose Huawei's Flex-PON solution to provide premium gigaband access services, reducing the carrier's network swap costs by approximately 30%.
- Huawei's QuickODN is the industry's first solution to support the pre-connection with optical fibers throughout the end-to-end process in all scenarios, including aerial, underground, and high-rise building scenarios. The solution doubles the efficiency of optical fiber network construction and has served more than 80 leading carriers worldwide.
- In the home network domain, we are working with multiple carriers and using embedded AI (eAI) technology to reduce the latency of high-value services like gaming and education. This enables carriers to monetize experience in addition to bandwidth, improving ARPU by more than 25%.

### Private Line Services

Private line services are one of the key services that carriers provide for government and enterprise customers. Huawei's Premium OTN Private Line solution and Agile IP Private Line solution leverage the wide coverage of carrier networks to monetize bandwidth, latency, TTM, and reliability, and fuel carriers' new growth in B2B services.

Huawei's secure and low-latency Premium OTN Private Line solution helps carriers provide high-quality services for numerous customers such as banks, enterprises, and governments. In December 2019, Huawei and a carrier in Thailand announced the launch of the country's first Premium OTN Private Line service, laying a solid network foundation for "Thailand 2020" digital transformation.

Building on SRv6 source path programming, Huawei's Agile IP Private Line solution supports fast provisioning and adjustment of cloud services and provides agile and flexible private line services for enterprise users. In February 2019, Huawei's SRv6 solution was first commercially deployed by China Telecom Sichuan. By deploying SRv6 routers on demand, this solution supports the provisioning of cross-domain private line services within one to two weeks, approximately 70% faster than before.

### Evolving towards ADN to enable intelligent operations

Huawei proposed the AI-powered Autonomous Driving Network (ADN) solution. ADN aims to resolve the structural problems faced by carriers through architectural innovations. These problems include high OPEX, as well as low O&M efficiency and poor service experience caused by the high complexity of networks. This proposal has been widely welcomed by the telecom industry.

In 2019, Huawei continued working with industry organizations such as TMF and GSMA and some leading carriers to explore the use cases and architecture of ADN. Together, we released white papers and use case study reports, which promoted the industry consensus on the goals and architecture of ADN, as well as the standards for intelligently setting ADN levels from L1 to L5.

By the end of 2019, our ADN iMaster intelligent O&M solution had been successfully piloted and commercially deployed by multiple carriers around the world. This solution makes networks more automated by supporting operations such as fast deployment of 5G base stations, energy efficiency improvement, and intelligent troubleshooting.

We will soon enter an intelligent world. However, telecom networks cannot become intelligent overnight. Huawei will work with all industry partners to discuss how future intelligent networks will evolve and continuously innovate to make ADN a reality.

### Connecting the unconnected

Currently, over 700 million people worldwide have no telecom service coverage, and about 3.5 billion have no Internet access. As a leading global ICT infrastructure provider, Huawei is committed to providing the most convenient and cost-effective ICT products and solutions to users across all scenarios through technological innovation. We actively work with industry partners to help bridge the digital divide.

In 2019, we launched RuralStar Lite, building on the success of our existing RuralStar solution. This new solution brought down the CAPEX per base station to less than US$20,000 and made it possible to deploy mobile networks for rural villages with 500 to 1,000

Launch of the first 5G base station for testing in Morocco

residents. Our RuralStar series solutions have provided mobile Internet services for more than 40 million people living in remote areas of over 50 countries and regions.

To provide high-quality broadband services to more people, we deliver high-speed, affordable, and future-oriented broadband solutions for multiple scenarios:

- Our industry-leading WTTx wireless broadband solution doubles broadband coverage, while maintaining consistent speeds, by using the industry's leading multi-band RRU that can work at low, medium, and high frequency bands, along with the world's first 8x8 MIMO high-gain CPE.
- Our AI-based FAN Sharing solution divides one physical optical fiber network into multiple independent logical broadband networks, with each network allowing carriers to provide their own broadband services to users. This solution enables co-construction and sharing of optical fiber networks and greatly reduces deployment costs.

## Enterprise Market

An intelligent world is fast approaching. In the enterprise business, Huawei adheres to a "Platform + AI + Ecosystem" strategy, where we fully leverage the potential of AI technology to build platforms while building a thriving ecosystem.

Together with our partners, we are delivering ubiquitous connectivity and pervasive intelligence to our government and enterprise customers. Building on Huawei's Horizon Digital Platform, we integrate new ICT technologies including cloud computing, the Internet of Things (IoT), big data, AI, and 5G to build a foundation for the digital world. Our goal is to enable customer digitization and bring digital to every organization.

We are actively working with customers, partners, developers, industry alliances, and standards organizations to build an interdependent ecosystem that fosters shared growth. We continuously share value with our partners, and support them in the joint innovation of solutions, marketing, talent cultivation, finance, supply chains, and IT systems. In addition, we have worked to facilitate the development of industry standards and cut the costs of digital transformation. Through these efforts, we aim to jointly create value for customers, grow the industries we support, and achieve sustainable development.

We continue to innovate in products and solutions for domains such as intelligent campuses, data centers, cloud services, and intelligent computing. We have also worked to promote the wide adoption of our innovative products and solutions in sectors such as government, finance, energy, transportation, manufacturing, and education.

We enable greater synergy between cloud, AI, and 5G to provide public cloud services and hybrid cloud solutions that deliver several layers of added value, especially in terms of stability, reliability, security, trustworthiness, and sustainability. HUAWEI CLOUD has launched more than 200 cloud services and 190 solutions, while over 3 million enterprise users and developers currently use HUAWEI CLOUD to develop products and solutions.

By the end of 2019, more than 700 cities and 228 Fortune Global 500 companies – 58 of which are Fortune 100 companies – had chosen Huawei as their partner for digital transformation. In 2019, revenue from our enterprise business was CNY89,710 million, a year-on-year increase of 8.6%.

### A wide array of ICT products and solutions for government and enterprise customers

Huawei is working with its partners to integrate multiple new ICT technologies to build a foundation for the digital world. The goal of this is to create more value for its government and enterprise customers.

#### Building Ubiquitous Connectivity

In the enterprise networking domain, Huawei worked with customers to innovate in applications across multiple scenarios, helping customers build intelligent IP networks.

**Wi-Fi 6:** Huawei is a leader in the Wi-Fi 6 market. Powered by our leading 5G technologies, AirEngine Wi-Fi 6 helps industry customers worldwide build Wi-Fi 6 networks with zero coverage holes, zero wait times, and zero packet loss while roaming. Some of our achievements in Wi-Fi 6 include the following:

- Huawei's AirEngine Wi-Fi 6 has been widely adopted by many customers including Shenzhen Metro, St. Jakob-Park stadium in Basel, Switzerland, and Mondragon University in Spain.
- According to a report on the global Wi-Fi 6 indoor AP market share from 2018 Q3 to 2019 Q3 released by Dell'Oro Group, a leading independent market analysis and research firm, Huawei's AirEngine Wi-Fi 6 ranked No. 1 both in the global market (excluding North America) and in the Chinese market.
- Huawei's campus network offerings were named as a Gartner Peer Insights Customers' Choice for Wired and Wireless LAN Access Infrastructure in January 2020. Huawei was the only non-North American vendor named.

**Data center network switches:** Huawei launched CloudEngine 16800, the industry's first data center switch built for the AI era. Our achievements in data center network switches include the following:

- CloudEngine 16800 has been commercially deployed at more than 150 enterprise data centers around the world, including the New Energy Data Center of Beijing Institute of Technology and the data centers of China CITIC Bank and Germany's Blue Smart Services. The global shipments for this switch have exceeded 1,600 units.

- Our intelligent, simplified, secure, open, and ultra-large capacity CloudEngine series data center switches have won the acclaim of users around the world. These switches were twice named as a Gartner Peer Insights Customers' Choice in 2019.

- Our AI Fabric Intelligent and Lossless Data Center Network solution helped over 30 financial institutions and Internet companies around the world provide future-oriented and innovative services based on AI training, distributed training, and high-performance computing.

**WAN interconnection routers:** Building on innovative technologies like SRv6 and FlexE-based slicing, we launched the NetEngine 8000 series routers, which have seen large-scale commercial deployment in many countries, including Russia, the UAE, Saudi Arabia, and India. In the Chinese market, our SRv6 solution was first put into commercial use by the Bank of China, followed by many other financial institutions.

In the optical communications domain, Huawei launched innovative OptiXtrans, OptiXaccess, and OptiXstar (the "Three OptiXs") products to drive upgrades of traditional network architecture, and enable industrial digital transformation. By the end of 2019, the Three OptiXs had been adopted by over 3,800 companies across 158 countries and regions in the following scenarios:

- **All-optical data center interconnect (DCI):** We launched the industry's first intelligent DCI product, Huawei OptiXtrans DC908, which supports one-click service provisioning without the need for professional support and deployment that can be completed within 8 minutes. The product has a 48 Tbit/s transmission capacity over a single optical fiber, and supports intelligent network O&M, making ultra-broadband, simplified, and intelligent DCI networks a reality. Huawei and CITIC Network put the industry's first single-wavelength 600G DCI network into commercial use. In its 2019 report, *Data Center Interconnect: Competitive Landscape Assessment*, data analytics and consulting company GlobalData ranked the Huawei OptiXtrans DC908 as a leader.

- **All-optical transport:** Huawei launched the industry's first intelligent all-optical transport device for enterprises, Huawei OptiXtrans E9600. It supports ultra-long-haul transmission over a single span of 450 km without electrical regeneration, ensuring industrial-grade security for production communications. Huawei and Energotel, a power communications company in Slovakia, jointly built premium international private line networks to promote interconnection between multinational enterprises in the pan-European region.

- **All-optical campuses:** Huawei worked with industry partners to initiate and establish the Optical Network Alliance (ONA), and was appointed the first director-general of the alliance. We helped drive the publication of the *Passive Optical LAN (POL) Engineering Technical Standard*, the first standard of its type in China, to promote healthy development in the all-optical campus industry. We also deployed our 10G passive optical network (PON) campus solution for Emaar Properties, a leading property developer in the UAE, helping to transform Dubai Creek Harbor into an intelligent community. In addition, we helped build all-optical campus networks for airports, universities, and hotels in countries around the world including China, India, and Malaysia in order to drive industry innovation.

## Delivering Pervasive Intelligence

In the intelligent era, Huawei has deeply integrated AI technology with IT products and solutions to accelerate digital and intelligent transformation.

### HUAWEI CLOUD

HUAWEI CLOUD is developing at an accelerated rate, with revenue, number of paid users, and infrastructure scale rapidly increasing. According to the *China Quarterly Public Cloud Services Tracker: Vertical Markets* for 2019 Q3, released by IDC in February 2020, HUAWEI CLOUD's revenue from the overall IaaS and PaaS market grew by over 300% each quarter between 2019 Q1 and 2019 Q3. In China, HUAWEI CLOUD's market share in both IaaS, and IaaS and PaaS combined exceeded 7%, moving up to fourth place in both categories.

In China, HUAWEI CLOUD has been serving multiple sectors including government, Internet, automotive, finance, and genetics. Our customers include over 30 government ministries and commissions, over 600 government and public institutions, 30 of the top 50 Internet companies, over 20 large automakers, and 14 genetics companies.

HUAWEI CLOUD has launched cloud data centers in Singapore, Chile, Brazil, Mexico, and Peru, and worked with partners to serve customers worldwide with 45 availability zones across 23 regions. HUAWEI CLOUD provides multinational companies with public cloud services that deliver consistent service performance and experience worldwide.

HUAWEI CLOUD's AI solutions help enterprises and other organizations apply AI to support their operations, and have been implemented in over 500 projects across 10 industries worldwide.

In December 2019, HUAWEI CLOUD launched WeLink, an intelligent work platform that provides functions such as videoconferencing, daily health check-ins, online work, and secure access to existing business systems and applications. WeLink provides stable and efficient support for telecommuting in various industries.

### Intelligent computing

Huawei continues to invest and innovate in general-purpose computing and AI computing.

**General-purpose computing:** Huawei works with hardware and software partners to develop a wide range of computing products and solutions, which have been commercially deployed on a large scale in government, finance, Internet, and other sectors. For example:

- SAIC Volkswagen adopted our TaiShan servers to build its R&D High-performance Computing (HPC) platform and optimize the open-source OpenFOAM software, increasing its R&D efficiency by more than 30%.
- Japan's U-NEXT used our TaiShan servers to build a video content storage platform, which improved performance by approximately 20% and is expected to reduce the company's total cost of ownership (TCO) by approximately 20% in three years.

**AI computing:** Since the launch of our Atlas AI computing series products, we have released more than 30 joint solutions with independent software vendors (ISVs), and teamed up with industry customers across Europe and Asia Pacific, including Digi Singapore, Italy's AGS, SARADA in South Korea, the Shanghai Astronomical Observatory, and the Peng Cheng Laboratory. Other examples include the following:

- Shenzhen Power Supply Bureau under China Southern Power Grid adopted an intelligent inspection solution, powered by Atlas 200, which enables unmanned patrols of transmission lines, essentially eliminating the need for linemen to climb up transmission towers or walk along transmission lines.
- The Square Kilometre Array (SKA) Organization used Atlas 900 to sift through mountains of data on 200,000 stars and locate and identify specific types of stars in just 10 seconds, a task which used to take 169 days.
- Russia's ITV adopted Atlas 300 to accelerate its video analysis algorithms, which more than doubled the overall performance of its original solution.
- We released our AI Ecosystem Program in Europe and announced an investment of EUR100 million over the next five years, aiming to jointly shape the European AI industry with our partners.

### Intelligent data and storage

In the data infrastructure domain, we constantly innovate, provide services throughout product lifecycles, and implement a comprehensive ecosystem partnership strategy. This enables us to provide a wide array of scenario-based intelligent data and storage products and solutions and continuously create value for our customers.

For example, Russia's Absolut Bank used Huawei's OceanStor all-flash storage to build an efficient office automation platform. This platform provides 3,000 desktops for 76 office branches, improving end-to-end performance 4-fold. The active-active solution ensures uninterrupted office and banking services 24/7. Online deduplication and compression greatly decreased construction and O&M expenses in terms of overall footprint, power consumption, and cooling, while TCO is expected to drop approximately 50% over the next five years.

According to Gartner's *Magic Quadrant for Primary Storage* report released in September 2019, Huawei's storage products were in the Leaders quadrant.

### Network energy

Huawei is committed to developing green, reliable, and smart network energy solutions and leading energy digitization for a smart and sustainable world.

In the **data center facility** domain, we launched the iCooling solution to drive AI adoption in data centers. Our SmartLi Solution helps customers reduce the footprint of their power supply and distribution systems and improve the reliability of the systems, making lithium battery-powered data centers possible. In October 2019, Huawei won the 2019 Technology Leadership Award in the Global Smart Data Center Industry from Frost & Sullivan.

In the **industry site power** domain, Huawei's iSitePower solution can be flexibly customized to meet the site power supply and backup needs of different industries. The iSitePower-T series integrated cabinets designed for the transportation industry provide integrated power supply and backup as well as equipment housing for electronic toll collection (ETC) gantry systems. This helps eliminate the need for expressway toll gates at provincial borders across China, replacing them with automatic toll collection.


Site installation for an ETC gantry system in Guangxi Province, China

In the **photovoltaic (PV)** domain, Huawei integrates 5G and AI technologies with PV technologies to drive the PV industry to become digital and intelligent and further optimize the Levelized Cost of Energy (LCOE) of PV plants. According to a 2019 report from market research firm IHS Markit, shipments of Huawei smart PV inverters have ranked No. 1 globally for four consecutive years.

### Campus and Data Center Solutions

Relying on our leadership in 5G, optical transmission, IP, and AI, we have conducted joint innovation across different technology domains, and released two solutions – Huawei HiCampus for campuses and Huawei HiDC for data centers – which have the following features:

- Huawei HiCampus provides enterprises with fully wireless access, optical connections, and intelligent services across their campuses. This solution is designed to help enterprises build next-generation campus networks that deliver an improved user experience, lower power consumption, and support faster service innovation.

- Huawei HiDC helps customers build intelligent, high-performance, and green data centers. It includes innovative architecture, technologies, and media, allowing for faster and more effective data convergence and sharing. With a three-in-one architecture that integrates Ethernet, InfinBand, and Fiber Channel networks, Huawei HiDC enables smooth evolution to meet service requirements over the next 10 years, and marks the beginning of a lead-to-lithium battery revolution.

## Open Horizon Digital Platform: Building a Foundation for the Digital World

Industry digitization will create a market worth trillions of US dollars, which will require an open digital platform upon which the foundation of the digital world can be built. We have built the cloud-based Horizon Digital Platform by integrating multiple new ICT technologies including IoT, AI, big data, video, converged communications, and geographic information system (GIS). This platform enables data integration, business collaboration, and agile innovation, and has become an essential tool for helping industries go digital and building a foundation for the future digital world.

The scenario-based solutions we have developed based on the Horizon Digital Platform have seen large-scale commercial use in multiple areas such as cities, campuses, and transportation.

**Horizon for cities:** Horizon integrates the data of government departments to achieve real-time data sharing and build a foundation upon which smart cities can support efficient business decision making and scientific governance. For example, Lanzhou New District in China's Gansu Province worked with Huawei to build a Horizon-based digital twin, which covers ICT infrastructure, city governance, services related to livelihood, industry development, and smart city operations. This project is set to put Lanzhou New District on the fast track to high-quality development.

**Horizon for campuses:** Horizon integrates campus businesses and systems across different domains to share business capabilities and build secure, intelligent, and green digital campuses. For example, Huawei used Horizon to migrate China's Soochow University to the cloud, supporting ubiquitous learning and integrated, innovative scientific research. This also enabled transparent and efficient school administration, created an enriched university culture, and made campus life more convenient.

**Horizon for transportation:**

- With the Horizon Digital Platform, Shenzhen Airport has streamlined its security management, airport operations, and passenger services, hugely boosting efficiency. Flight departure punctuality has increased to 87%, while intelligent stand allocation reduced the number of shuttle bus passengers by 4 million annually.
- Huawei and Shenzhen Metro used the Horizon platform to build an Intelligent Operation Center for urban rail, allowing Shenzhen Metro to stay informed of its overall operations. The center improves IT resource utilization by approximately 50% and platform security by around 80%.


Shenzhen: Huawei has helped more than 1,800 government and enterprise customers go digital, including Shenzhen Airport, Shenzhen Metro, the Shenzhen World Exhibition & Convention Center, and the University Town of Shenzhen.

### A wealth of experience in helping governments and enterprises go digital

Driven by business needs and starting with top-level design, Huawei focuses on creating customer value, and works with governments and leading enterprises worldwide to continuously explore and implement best practices for industry digitization and help customers successfully go digital.

## Smart Cities

Huawei has helped more than 200 cities across over 40 countries and regions implement smart city projects.

Powered by our full-stack, all-scenario AI portfolio, our Horizon platform for cities integrates digital urban resources such as IoT, big data, geographic information, video cloud, and converged communications to enable data sharing, business collaboration, and agile development.

In Malaysia, Huawei helped the state of Sarawak build a government cloud platform and develop a smart city master plan. Sarawak aims to boost economic development, bridge gaps in socioeconomic development, and create more jobs via implementing a digital economy strategy.

In China, Huawei has participated in over 80 smart city projects, including in Beijing, Shanghai, Shenzhen, Suzhou, and Dongguan. We are helping customers achieve smarter city administration and create a more people- and business-friendly environment. For example, we:

- Helped the Shenzhen Municipal Government build an Intelligent Operation Center, which integrates the business systems of 42 government agencies, and combines over 100 types of data and 280,000 video channels in order to build an integrated command system for Shenzhen.
- Built a smart water service system for Shenzhen's Bureau of Water Resources that supports visualized, controllable, and predictable water management.
- Promoted the implementation and verification of China's national standard for smart cities.

Huawei's smart customs solution enables more intelligent customs clearance and inspections. The solution improves customs clearance efficiency, enables more precise supervision, and facilitates more productive trade. The solution is currently used in 17 countries and regions including Saudi Arabia.

We have provided digital services for managing social and public security to government customers in more than 100 countries and regions, and won their trust and support. Huawei's government cloud and network solutions have served the municipal services of Spain, Germany, Kuwait, Russia, Brazil, Peru, India, and many other countries. We have leveraged the power of technology to digitize government services, and offer more convenient and efficient information experiences to urban residents.


At the Smart City Expo World Congress 2019, the digital twin built by Huawei and the government of Yingtan in Jiangxi Province, China, based on the Horizon platform for cities, won the global and China Digital Transformation Award.

## Intelligent Campuses

Building on the experience gained from Huawei's own digital transformation practices, Huawei HiCampus helps customers achieve all-scenario intelligence, enable service innovation, improve operating efficiency, and deliver a superior experience. The solution has been adopted by more than 300 customers in numerous sectors such as government, real estate, education, chemical, and logistics, helping them successfully go digital.

Huawei has established an intelligent campus ecosystem alliance, which has attracted approximately 400 ecosystem partners in 10 categories. We have worked with many partners including ChinaSoft International, ISSTech, Flyrise, BEIMING SOFTWARE, Talkweb, and SF DHL Supply Chain China to develop scenario-specific intelligent campus solutions. We actively promote standardization, as is evident from our work with the China National Standardization Committee for Digital Techniques of Intelligent Buildings and Residence Communities. Together, we released the *White Paper on the Standardization of Intelligent Campuses in China*, and have begun preparations for the establishment of a work group for intelligent campus standards.

Some of our success stories include the following:

- We worked with the Shenzhen World Exhibition & Convention Center to build an intelligent "reception hall", which allows visitors to experience digital interactions, and enables intelligent operations, monitoring, command, and dispatch.
- We built a fully connected digital campus for Guangdong Power Grid, helping them accelerate their transformation into an intelligent power grid operator, energy value chain integrator, and energy ecosystem service provider.

## Finance

Huawei helps financial institutions go digital in the areas of inclusive finance, data-driven business innovation, and open banking, enabling them to provide customers with inclusive, stable, secure, and convenient financial services. By the end of 2019, we had served more than 1,000 financial institutions, including 47 of the world's top 100 banks.

In 2019, Huawei signed strategic partnership agreements with a number of leading financial institutions, including the China National Clearing Center under the People's Bank of China, China Construction Bank, and Postal Savings Bank of China. We have established joint innovation centers with these customers and conducted research in domains such as AI, 5G, big data, cloud computing, and distributed architecture. In addition, we signed a memorandum of understanding with the Digital Currency Research Institute under the People's Bank of China.

Some of our success stories include the following:

- The Industrial and Commercial Bank of China (ICBC) switched from an enterprise-class data warehouse to a big data service cloud powered by Huawei's FusionData solution. With this, ICBC started providing cloud services for 37 of its branches in China and for more than 100 applications and 1,000 scenarios. The big data service cloud supports the integrated management of all structured and unstructured data while providing efficient real-time, quasi-real-time, minute-level, and hour-level computing services.

- Our Converged Financial Data Lake solution helped Malaysia's Hong Leong Bank build a new data platform for unified data management. The platform supports innovative applications such as customer profiles and precision marketing, and provides customers with more personalized products and services.

- Our financial cloud helps Bank of China and Huaxia Bank deploy cloud platforms based on an open and distributed architecture to enable the unified and automated scheduling of IT resources. These cloud platforms reduce service launch times from weeks to minutes, enabling fast innovation and launch times in financial services.

- Our FinCube open banking solution helped a leading bank in Thailand build a new digital core for its services, supporting financial services in five areas: education, government, payment, healthcare, and public transport. This provides inclusive financial services for local citizens.

## Transportation

Huawei strives to facilitate easy transportation for both people and goods. We utilize the Horizon Digital Platform to build the foundation for the digital transformation of the transportation industry.

In **aviation**, we signed a strategic partnership agreement with the Civil Aviation Administration of China, and helped many airports across China go digital, including Shenzhen Bao'an International Airport, Beijing Daxing International Airport, Chengdu Shuangliu International Airport, and Chongqing Jiangbei International Airport. We also released a white paper on Shenzhen Airport's smart and digital transformation. In this white paper, we proposed the construction of new ICT infrastructure to create a smart airport with ubiquitous connectivity, pervasive intelligence, and a digital platform. The aim of this is to lay the digital foundation for a smart airport and help Shenzhen Airport successfully go digital.

In **rail transport**, Huawei serves more than 170 urban rail lines in over 70 cities worldwide. The following examples describe some of our work and achievements in this domain:

- We applied our Urban Rail Cloud Solution at Shenzhen Metro and Hohhot Metro. Following the construction of a central operations platform, the solution integrates siloed business systems and supports network-based operations.

- We actively participated in the formulation of national standards on the digitization of urban rail, and are leading multiple standards groups. We helped make 2019 the first year China applied national standards to urban rail clouds, and drove the expansion of urban rail cloud technology outside China.

- Shenzhen Metro piloted Huawei's AirFlash 5G technology on Line 11, the airport express line. This marked the first application of 5G in the global urban rail transport industry. AirFlash improves passenger travel experiences and lays the foundation for future intelligent O&M.

In **highways**, Huawei has participated in more than 30 vehicle-to-infrastructure projects. Our achievements include the following:

- Our C-V2X-based bus solution was first implemented in Wuxi, Jiangsu Province, China, and we worked with the Shenzhen Bus Group to build China's first smart bus with 5G coverage along the entire bus route, providing passengers with more precise services, high-speed 5G connectivity, and immersive VR travel experiences.

- Huawei's toll solution for expressways has helped more than 20 Chinese provinces successfully deploy an ETC system and build a "one expressway network" across the country.

## Energy

Huawei has worked with its customers and partners in the electricity industry to launch innovative solutions such as AI-powered inspections and power distribution IoT. These solutions have been extensively adopted by notable power companies including Saudi Electricity Company, the Turkish Electricity Transmission Corporation (TEIAS), the Provincial Electricity Authority (PEA) of Thailand, the State Grid Corporation of China, and China Southern Power Grid. The solutions help them build digital power grids, achieve digital operations, and provide digital services. Some of our success stories include the following:

- We built a cloud platform, data platform, and IoT management platform for the State Grid Tianjin Electric Power Company, integrated these three platforms, and launched multiple applications to facilitate an integrated data resource system.

- Our AI-powered inspection solution for power transmission provided Saudi Arabia with real-time security status of power transmission lines and used AI technology to identify intrusion risks, helping to ensure the security of power transmission lines.

We use technologies including 5G, AI, and cloud computing to create new operating and management models for traditional oil, gas, and mining industries, enabling intelligent operations. Specifically:

- We worked with China Mobile to deploy the first 5G network for Shandong Gold Group's underground autonomous driving trolley haulage system. This laid the foundation for a smart mine system for this customer.

- We provided a high-performance cloud computing environment for China National Petroleum Corporation's services, such as earthquake responses and integrated collaborative research in oil exploration. This reduced the company's production costs by approximately 20%.

## Manufacturing

Working with its partners worldwide, Huawei leverages technologies including cloud computing, big data, and 5G to help customers in the manufacturing industry reshape their value chains, develop innovative business models, and create new value. Some of our 2019 success stories include the following:

- We provided a high-performance computing solution for Honda's general-purpose simulation computing system for vehicle design. This solution provides efficient simulation computing capabilities in key domains such as collision, fluids, and manufacturing, helping Honda design high-quality cars.

- Supported by Huawei's hybrid cloud platform, SAIC Volkswagen leveraged HUAWEI CLOUD Stack capabilities and Huawei's full-stack network products to quickly launch development, testing, connected vehicle, and vehicle back-end system services. This effectively reduced the company's TCO and improved both driver and passenger experiences.

- We worked with Jingying Shuzhi Technology to launch the Coal Intelligent Twins solution for mine safety. Through device-edge-cloud integration, the solution builds intelligent twins that enable situational awareness and achieve systematic collaboration for information sharing, improving risk prevention, reducing accidents, and helping the coal industry ensure safer production. By the end of 2019, this solution had been deployed in hundreds of coal mines.

## Education

Huawei is driving the digital transformation of elementary education, higher education, vocational education, and scientific research institutes. In education, we have been transforming from deploying campus networks to digitizing entire campuses and implementing new models for higher education like cloud-based universities. Our goal is to cultivate innovative ICT talent, promote broader and more efficient sharing of education resources, and build safer campuses.


In Europe, Huawei's SmartBus mobile classroom project provides an engaging, interactive, and fun learning environment for children between the ages of 11 and 15, developing their understanding of what constitutes online well-being and the safe use of ICT, through didactic games.

In **elementary education**, we have built wired and wireless networks in multiple countries and regions, such as Spain, the UK, and Ethiopia, in order to promote fair access to education. China is currently striving to build broadband networks in every school, bring quality resources to every class, enable every student to access education online, and build a public service platform for education resources and education management. We have helped expand the adoption of ICT technology in China's education industry to promote the sharing of education resources.

In **higher education**, we use intelligent technologies to build intelligent campuses and cultivate innovative talent. For example, China's Soochow University is now using the university data platform and 5G- and VR-powered 360° immersive smart classrooms after moving to the cloud. This has allowed the university to become a global pioneer implementing new models that combine online and offline study.

In **scientific research**, we have helped countries such as Brazil, Thailand, Pakistan, and Italy build national research and education networks, which make it easier to acquire research resources than ever before.

By the end of 2019, Huawei had served more than 2,500 universities and research institutes in more than 70 countries and regions.

### A thriving enterprise ecosystem and global service capabilities

In the enterprise business, we remain fully committed to our "Being Integrated" strategy, and continue to collaborate and share value with our partners. We consistently implement fair, transparent, and straightforward policies that benefit our partners.

By the end of 2019, over 28,000 partners were working with us worldwide to serve the enterprise market, including over 22,000 sales partners, 1,200 solution partners, 4,200 service partners, 1,000 talent alliance partners, and 80 investment & operation and financing partners. HUAWEI CLOUD works with over 2,000 technology partners, who have launched more than 3,500 applications on the HUAWEI CLOUD Marketplace. Our partners include many industry-leading companies such as SAP, Accenture, Siemens, Alstom, Honeywell, VST ECS, Synnex, ALSO, Redington, Arrow ECS, CNBM Technology, and Digital China. The proportion of our total revenue coming from partner sales has continued to increase, reaching 86% in 2019.

By the end of 2019, Huawei had established 13 OpenLabs worldwide to focus on the enterprise market. At these OpenLabs, we support our partners in the joint innovation of solutions, marketing, talent cultivation, finance, supply chains, and IT systems to continuously improve their capabilities and drive their transformation for shared success.

We are committed to providing consistent, high-quality services to our customers. We have increased our investment into the development of a unified, cloud-based tools platform and other service solutions such as industry cloud enablement and industry O&M services. Our annual investment in this area increased by approximately 30% in 2019. By the end of 2019, we had certified more than 4,200 service partners, working with them to provide services to over 50,000 customers around the world. In 2019, we supported the secure and stable operation of more than 500 key production networks worldwide, and ensured network availability during more than 20 key events. In September 2019, Huawei announced its Enterprise Service Development Strategy 2.0. This strategy reiterates our commitment to providing customers with unified O&M service solutions and building industry O&M systems and standards, based on Huawei's own best practices in digital O&M.

Huawei's enterprise technical support service capabilities continue to expand rapidly outside China. We received the prestigious Rated Outstanding Assisted Support EMEA certification from TSIA – the leading industry association for technology and services organizations. In addition, a recent IDC MarketScape report named Huawei a Leader in the network consulting service market.

Huawei is committed to sharing its technology, experience, and talent cultivation standards gained from years of operations in the ICT industry. We have worked with a huge number of educational authorities, universities, education institutes, partners, and other ecosystem players from around the world to build an open and favorable ICT talent ecosystem that thrives on shared success. Our efforts and achievements in this area include the following:

- We announced the Huawei Developer Program 2.0, which includes an initial investment of US$1.5 billion. With the help of communities and universities around the world, the program is designed to cultivate the skills of 5 million developers over the next five years.
- By March 2020, we had cultivated 1.6 million HUAWEI CLOUD developers together with communities and universities, and more than 260,000 engineers have received Huawei Certifications, with over 11,000 of them receiving the prestigious Huawei Certified ICT Expert (HCIE) certification. Together we have established a large pool of high-quality ICT talent ready to support industry digitization around the world.

The 4th Huawei ICT Competition in 2019 attracted more than 100,000 students from over 1,600 universities across 61 countries and regions.

## Connectivity

Humankind is entering an intelligent world. The volume of data generated worldwide is expected to grow by more than 20% every year. Network services will be provided not just to people, but also to intelligent consumer devices and intelligent industrial systems. Centralized computing architecture will shift to a distributed model. These changes, powered by big data and AI technologies, will take us to a world where everything is intelligent. To support massive data connections, as well as efficient and distributed intelligent computing, networks must be extremely powerful, simplified, and intelligent while also supporting automatic management through intelligent control systems.

### Huawei's connectivity strategy: Promoting unified global standards and investing more heavily in basic technologies to build the best connections

Standardization, openness, and interoperability are the foundation for sustainable development in the connectivity industry. Huawei is committed to working with all industry stakeholders to push for unified global standards based on the work of standards organizations. In order to maintain our innovative capabilities and leadership in connectivity, Huawei will continue to ramp up investment into basic technologies. We will continue working to overcome the slow-down of Moore's law and the Shannon limit, in order to meet the demand for connecting the massive amounts of data in the future intelligent world. One of our focuses will be the Autonomous Driving Network (ADN), which will help provide intelligent, open, and agile connections. We will also lead future-oriented innovations in network technologies such as 5G, all-optical networks, intelligent IP networks, and lossless data center networks. We aspire to build the best connections with the most powerful, simplified, and intelligent networks through open collaboration with industry partners.

**Wireless: In 2019, Huawei led the development of the 5G industry with unparalleled, competitive 5G solutions. We also sought coordinated development of 4G and 5G, which helped promote eco-friendly, sustainable development in the mobile industry.**

- Working with industry partners to drive the evolution of 5G standards:
  - Refined the 3GPP Release 15 standard to pave the way for first-wave commercial rollout of 5G networks worldwide.
  - Designed the major functions of the 3GPP Release 16 standard.
  - Pushed for the initiation of technical work on the 3GPP Release 17 standard to chart specifically how key 5G technologies will continue to evolve.
- Driving the convergence of communications and other industries to enable faster 5G development for the digital world
  - Worked with the world's leading enterprises to promote the development of the 5G industry, and actively contributed to numerous industry alliances such as the 5G Alliance for Connected Industries and Automation (5G-ACIA), Alliance of Industrial Internet (AII), 5G Automotive Association (5GAA), and 5G Applications Industry Alliance (5GAIA).
  - Worked with industry partners, through the Open Site initiative, to define a unified standard for pole sites, making site acquisition easier.
  - Co-drafted the 5G Hospital Network Standard to drive digital transformation within the healthcare industry.

- Maintaining leadership in 5G through breakthroughs in three areas – hardware, algorithms, and AI:
  - Launched the third-generation of 5G Massive-MIMO products based on advanced hardware platforms and new composite materials and processes. These products are leading the industry forward and are generations ahead of the competition.
  - Unveiled the 5G Super BladeSite, "1+1" multi-band antenna, digital indoor systems, and simplified 5G microwave solutions. Huawei is the industry's only vendor that can support simplified all-scenario networking for macro sites, pole sites, and indoor small cells. With these solutions, Huawei helps carriers worldwide speed up 5G rollout.
  - Released the wireless algorithm innovation framework. This framework uses advanced algorithms to maximize network performance and optimize user experience.
  - Launched the first autonomous driving mobile network solution, helping carriers improve O&M efficiency and reduce OPEX.

Huawei's Super BladeSite solution is commercially available. The solution features a component-based design for blade RRUs, BBUs, power systems, batteries, and microwave. It is a full outdoor site solution that does not require an equipment room or even cabinets. One simplified site can accommodate 2G, 3G, 4G, and 5G, allowing for easy, flexible deployment and enabling carriers to scale up 5G rollout faster.

- Building high-quality products with both trustworthy processes and trustworthy results: We have and will continue to ensure supply diversity for our 5G products and solutions, in order to ensure supply security for customers.
- As a technology trend setter, Huawei has released many innovative solutions. One example is the Super Uplink solution, which can provide the large uplink bandwidth and low latency needed for different industry applications, thereby accelerating the integration of 5G and vertical industries.
- Continued to pursue innovation in 4G technology to help carriers build simplified "4G + 5G" networks and accelerate the phase-out of 2G and 3G networks. With our solutions, the economic benefits of site and spectrum resources were greatly enhanced.
- Ensured eco-friendliness and energy saving. With "Bit Drives Watt" as our goal, the PowerStar2.0 solution was designed to save energy and reduce the emissions of wireless networks at the module, site, and network levels, helping to achieve sustainable development.
- Remained committed to bridging the digital divide and promoting digital inclusion. To this end, this year we have:
  - Accelerated progress towards the United Nations Sustainable Development Goals (SDGs) for 2030 by working with global industry partners to develop an affordable LTE mobile phone ecosystem and help the world's unconnected – nearly 3 billion people – access the Internet through mobile broadband.
  - Used our innovative RuralStar solution to slash network access costs, helping promote balanced development in rural areas across more than 50 countries and regions, providing equal access to digital resources for disadvantaged groups, creating new job opportunities, and eliminating economic development gaps.

- Continued to optimize our WTTx broadband access solution, helping solve last-mile broadband access challenges. Currently, there are over 100 million WTTx subscribers worldwide. Huawei has deployed WTTx on over 200 networks in more than 120 countries and regions, giving more than 55 million users access to stable, high-speed broadband services.

- Stepped up efforts to incubate more IoT applications through our commercial NB-IoT solutions, enabling numerous industries with pervasive IoT connections. Huawei's NB-IoT solutions have witnessed commercial success in a wide range of areas such as water management, gas management, and firefighting. Our solutions helped drive the NB-IoT industry towards the milestone of over 100 million connections worldwide.

- Actively fulfilled our corporate social responsibilities to help more people benefit from wireless broadband connections. We partnered with organizations such as UNESCO, GSMA, Safaricom, and Belgian non-profit group Close the Gap to run the DigiTruck program. This program teaches digital skills to teachers, women, and children in rural Kenya through mobile, digital classrooms, ensuring equal access to high-quality education opportunities.

**Transport and access networks: Huawei released its Intelligent OptiX Network strategy in 2019. Guided by this strategy, we worked with upstream and downstream partners to redefine the optical network industry, and build ubiquitous optical connections to deliver a premium experience for customers.**

- To drive a boom in the global optical industry, Huawei followed the lead of the European Telecommunications Standards Institute (ETSI) and pushed for the establishment of the Fifth Generation Fixed Network (F5G) specification group within the ETSI, together with upstream and downstream industries. This group would define unified global standards for F5G. Under the guidance of the Next Generation Optical Transport Network Forum (NGOF), Huawei worked with stakeholders from across the industry to drive innovation and solution incubation for premium private lines, define five-star criteria for premium private lines, and accelerate transformation from optical networks to optical service bearer networks. Together with partners, Huawei also launched the Optical Network Alliance (ONA) to drive the development of industry standards for all-optical campus networks and the industry ecosystem.

- Over the next five years, optical connections will extend from each home to each room, and from each office to each desktop and device. All data centers will be covered by optical networks. This is set to grow the number of fixed connections hundreds of times over and double the size of the global optical market. Focusing on four scenarios – all-optical transport, all-optical access, all-optical data centers, and all-optical campuses – Huawei released a series of innovative products under the OptiXtrans, OptiXaccess, and OptiXstar names (the "Three OptiXs") to lead the development of the global optical industry.

- OptiXtrans: Huawei launched the world's only commercial optical cross-connect (OXC) product series. This product series uses all-optical backplanes which eliminate the need for manual fiber connections, occupies 90% less space, and consumes 60% less power. OXC represents the direction in which Optical Networking 2.0 innovation should be heading. Huawei also launched the industry's first intelligent Data Center Interconnect (DCI) product, which can promote the future development of ultra-broadband, simplified, and intelligent DCI networks.


In an equipment room, one piece of OXC equipment (right) can replace up to 9 traditional ROADM + ODF cabinets (left), greatly saving space and reducing power consumption. The all-optical backplanes eliminate the need for manual fiber connections.

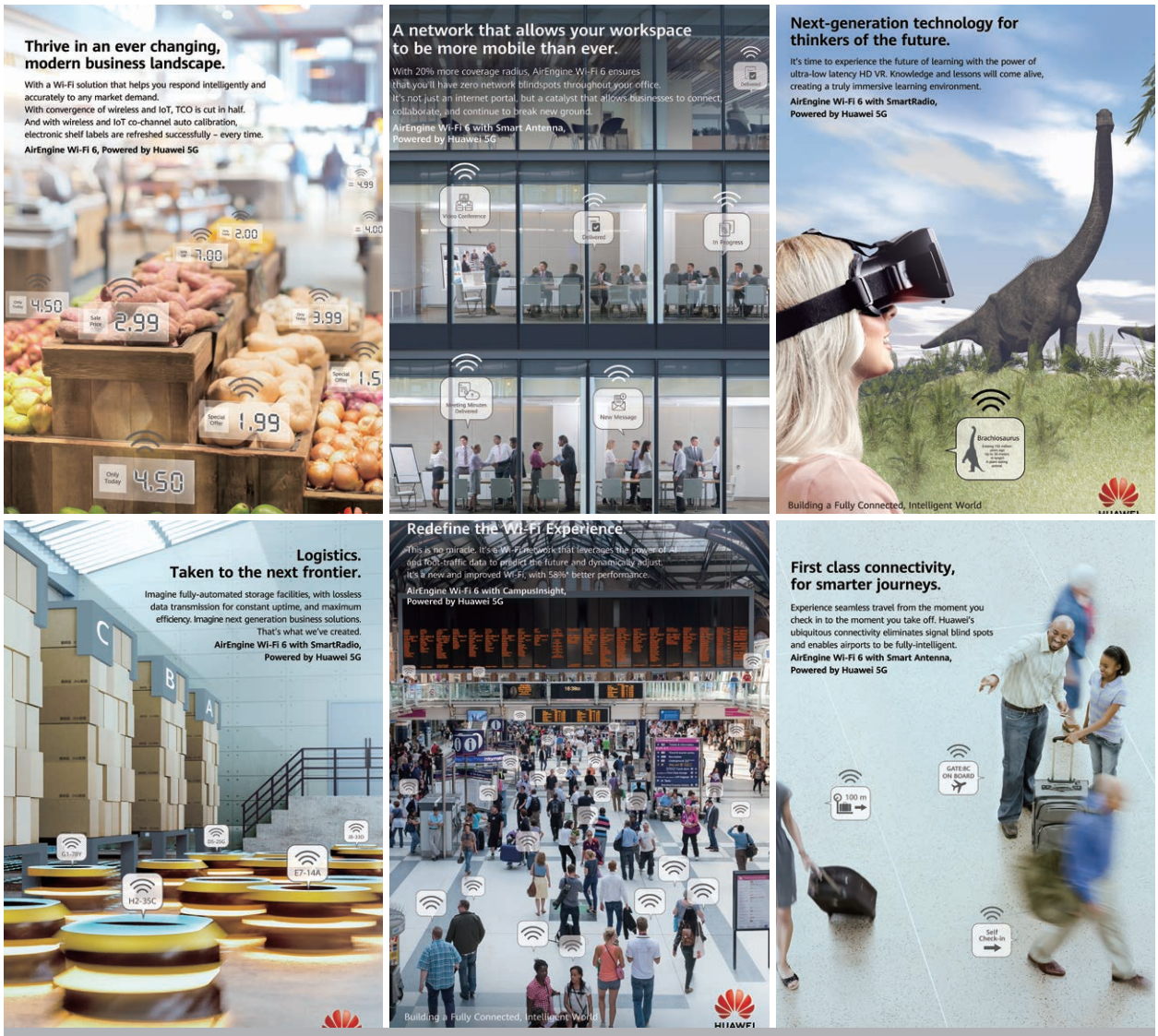
- OptiXaccess: Huawei released intelligent, full-service, distributed Optical Line Terminal (OLT) series. Based on Flex-PON technology, OptiXaccess series triple-mode OLTs support upgrades without changing boards, helping carriers deploy 10G PON-ready networks at the same cost as GPON networks. This will help promote wider adoption of gigabit ultra-broadband networks worldwide.
- OptiXstar: In this series, we unveiled the industry's first optical transport network (OTN) CPE supporting premium private lines, and a gigabit-capable enterprise gateway that supports one-hop access to the cloud. These products could accommodate new service scenarios for optical connections, effectively meeting the private line and cloud private line requirements of all enterprises, large or small. Huawei also released the industry's first gigabit-capable optical network terminal (ONT) powered by AI, which supports VR and gaming applications with zero stalling while simultaneously improving Wi-Fi coverage by 20% and supporting intelligent hibernation features to save energy. This product is leading the way towards a gigabit-capable home ultra-broadband era. In addition, we released industry's first all-optical campus 10GE optical network unit (ONU) and highly integrated video backhaul ONU, accelerating the adoption of optical connections in enterprise campuses.
- Campus OptiX: This solution was designed to reshape enterprise campus networks with fibers. It adopts an all-optical simplified architecture and supports simplified O&M. Once deployed, the network can keep evolving for the next 30 years.

**Data communications: Huawei has announced and forged ahead with a strategy of "leading intelligent IP networks". Upholding this strategy, we have integrated AI across three layers – device, network, and cloud – to accelerate the advent of autonomous driving networks, and drive IP networks towards the 5G and cloud era.**

**We have also taken a great leap forward by unveiling our all-new "four engines" (AirEngine, CloudEngine, NetEngine, and HiSecEngine) products and the iMaster NCE, a one-of-a-kind platform that integrates management and analysis. With these new offerings, we are helping more customers to build leading intelligent IP networks for today and the future.**

- Campus network domain: Huawei has been playing an active role in the development of Wi-Fi 6 standards, acting as a major contributor in international Wi-Fi standards workgroups. To accelerate development within the Wi-Fi 6 industry, Huawei, in collaboration with its partners, released a series of Wi-Fi 6 industry white papers as well as Wi-Fi 6 network construction guidelines for multiple new application scenarios, such as AR/VR, high-density stadiums, and industrial manufacturing. In addition, Huawei has been working with customers to explore innovative commercial use cases in various sectors such as enterprise office, chain retail, education, healthcare, and manufacturing.

Based on continuous technological innovation, Huawei has unveiled a full lineup of 5G-powered AirEngine Wi-Fi 6 products. These all-new products improve air interface performance by almost 100%, reduce network latency by about 50%, and increase coverage distance by approximately 20%, compared with the industry average. Huawei's newly-unveiled CloudEngine S switches can also help cope with surges in data traffic and satisfy the network evolution requirements of large enterprises and campuses over the next decade. Our intelligent and simplified campus network solution is experience-centric and stands out with automatic management, intelligent O&M, and all-layer openness, helping customers build fully-wireless, best-in-class campus networks.




Field-proven AirEngine Wi-Fi 6 across industries

- Data center network (DCN) domain: Data centers are shifting from cloud to AI. The need to process massive amounts of data and the shift to a distributed service architecture are creating new challenges for DCNs. To address these challenges, Huawei has taken the lead in proposing the idea of intelligent and lossless DCNs and worked with partners to develop testing specifications. All of these mark key milestones in Huawei's commitment to contributing to the development of lossless networks.

  Huawei has released the industry's first data center switch with built-in AI chips – the CloudEngine 16800. This innovative switch sets new benchmarks for ultra-high-speed signal transmission, powerful heat dissipation, and power supply efficiency. CloudEngine 16800 comes with the industry's highest density 400GE line card per slot and offers the industry's largest switching capacity (five times the industry average), which can cope with future traffic surges. In addition, power consumption per bit has been reduced by 26%, ensuring greener and more energy-efficient operations.

  Huawei's DCN solution delivers the industry's only intelligent and lossless Ethernet network with zero packet loss, taking AI computing power and the input/output operations per second (IOPS) to new heights. Powered by AI technologies, the DCN solution can automatically identify service intents, and quickly and precisely deliver configurations. It can also detect faults within one minute, locate faults within three minutes, and fix them within five minutes. With these merits, customers can accelerate towards the autonomous driving network and usher in ultra-broadband, lossless, and fully intelligent DCNs.

- 5G converged transport network domain: Huawei has been actively contributing to the SRv6 protocol development to meet diversified service requirements in the 5G and cloud era. Given that services vary with demands for bandwidth and latency, SRv6 protocols allow networks to provide differentiated service assurance and enable fast service provisioning. Huawei has also been actively engaged in the SRv6 standards initiatives led by IETF, independently contributing 25% of current standards drafts, and an additional 34% together with our peers. We have worked with customers worldwide on SRv6 joint innovations and pilots. By the end of 2019, Huawei had deployed over 20 SRv6 commercial networks for customers.

  Our NetEngine 5000E-20, the industry's first cluster router series with Petabit-level capacity, and the NetEngine 8000, the industry's first intelligent metro router series with a capacity of 14.4 Tbit/s per slot, both support SRv6 network protocols. These flagship products are a good choice for customers to build a converged transport network solution with committed SLAs, helping carriers offer premium user experiences in the 5G and cloud era.

- Network security: Huawei has differentiated itself from peers by proposing and defining next-generation AI firewall (AIFW) standards and security defense technology directions. Our industry's first T-level AIFW – the HiSecEngine USG series – designed to provide intelligent border defense for enterprise networks has earned the coveted "Recommended" Rating from the NSS Labs.

**Cloud core networks: Centered on the idea of cloud native, one core, real-time operation, and edge computing, Huawei helped carriers build deterministic networking-oriented 5G core networks to accelerate their 5G rollout. Focusing on 5G development in industries, we established the 5G Deterministic Networking Alliance together with industry stakeholders to drive the commercialization of 5G industrial applications. Specifically, we have:**

- Proposed the concept of 5G Deterministic Networking (5GDN). 5GDN utilizes 5G network resources to build manageable, verifiable, and deterministic virtual private mobile networks, offering customers a predictable and differentiated service experience and enabling the industry digitization. Huawei worked with carriers and industry partners to establish the 5G Deterministic Networking Alliance. By the end of 2019, this alliance had attracted over 80 member organizations, carried out 27 joint research projects, released multiple industry white papers, and promoted the development of 3GPP standards. The deterministic networking solution has been commercially used in multiple industries such as smart grid, smart port, smart manufacturing, and AR/VR, to lead the development of the 5G industry.

- Unveiled the deterministic networking-oriented 5G core network solution, which is the industry's first fully containerized and converged 5G core network solution. The microservice-based 5G core network solution supports fully converged 2G, 3G, 4G, 5G NSA, and 5G SA networks, provides

a seamless service experience, and allows for smooth network evolution to help protect network investment. According to the 5G Mobile Core Competitive Landscape Assessment (CLA) released by GlobalData, Huawei is the leader in all areas of 5G core networks.

- Continued to build industry-leading 5G mobile edge computing (MEC) solutions. Driven by the concept of "connectivity + computing", Huawei's MEC solution features a high-performance hardware platform with a switch-free architecture. It supports heterogeneous computing, one-stop user plane, cloud-edge cooperation, and open integration to ensure premium service experience and enable new business models for edge computing.
- Launched the unique all-cloud, fully-converged Single Voice Core solution based on IMS, allowing 2G, 3G, 4G, 5G, and fixed-line subscribers to enjoy voice services on the same network. The solution helps carriers streamline different voice networks, save network investment, introduce and expand new voice services, and build voice infrastructure networks for the 5G era.
- Released the iMaster MAE-CN, an intelligent O&M solution for autonomous driving 5G core networks. iMaster MAE-CN is the industry's first solution to integrate management and control functions while enabling cloud-edge cooperation and layered autonomy. It helps carriers build intelligent, simplified, and agile 5G core networks.

## Cloud & Computing

As we approach the intelligent era, computing power will be a new driver of production, data itself a core asset, and cloud, AI, and 5G the new tools of productivity. The interplay of these factors is set to enable numerous industries to go digital and become intelligent. At the same time, the demand for computing power is growing fast as new technologies such as 5G, IoT, and edge computing see extensive deployment.

Increasingly diverse applications and data types require diversified computing power. The computing industry must continue to evolve in order to adapt to the intelligent world. The next decade will be a golden age for innovation in computing architecture. Huawei will continue to pursue ongoing innovations in basic research, technological explorations, and engineering realization. Through these efforts, we hope to drive a more diversified ecosystem for computing architecture and to provide the ultimate computing power to deliver ubiquitous cloud and pervasive intelligence.

### Heavy and ongoing investment in the computing industry

In the intelligent era, we'll see three major trends in computing: a demand for the ultimate computing power; ubiquitous computing and intelligence; and cooperation across devices, edge, and cloud. At Huawei, we are determined to invest more in the computing industry. Our strategy focuses on four areas:

- **Architecture innovation:** The Da Vinci architecture was developed by investing in basic research. We believe there needs to be new breakthroughs in processor architectures if we want to meet the surging demand for computing power.
- **All-scenario processors:** Processors are the basic building block of the computing industry. Huawei's years of investment have produced several families of processors for different scenarios: Kunpeng for general-purpose computing, Ascend for AI computing, Kirin for smart devices, and Honghu for smart screens.
- **A business strategy for what Huawei "will and will not do":** We won't sell our processors directly. Instead, we provide cloud services to customers. We also provide components to partners, helping them develop their own products.
- **An open ecosystem:** Computing has always been an open industry. Its growth relies heavily on an open ecosystem and global collaboration. Our goal is to attract and empower software and application partners and to help drive commercial success.

### Full-stack, all-scenario AI portfolio

We have made steady progress since we announced our AI strategy in October 2018, with everything moving forward, from strategy execution and R&D to product launches. In 2019, we delivered on our promise to provide a full-stack, all-scenario AI portfolio through the release of the Ascend series of AI processors, the all-scenario AI computing framework MindSpore, a full Atlas AI portfolio, and our Ascend-based cloud services. Our solutions have already been widely adopted in many industries.

- Ascend 310 AI processor for inference: The Ascend 310-powered Atlas series accelerator module, accelerator card, edge station, and server are now part of dozens of industry solutions (e.g., smart transportation, smart grid, smart finance, smart city, and smart manufacturing) developed by dozens of partners. Our mobile data center (MDC) – a computing platform for intelligent driving based on the Ascend 310 processor – has been used by 18 leading automakers and integrators to provide intelligent driving solutions across a variety of scenarios, including passenger vehicles, commercial vehicles, and remotely controlled vehicles.

- Ascend 910 AI processor for training: For half-precision floating point (FP16) operations, Ascend 910 delivers 256 TFLOPS. For integer precision calculations (INT8), it delivers 512 TOPS. Its maximum power consumption is only 310 W.

- Compute Architecture for Neural Networks (CANN): The efficient programming and execution framework based on the Da Vinci architecture that provides a series of application programming interfaces (APIs) and tools for operator development and network optimization. It helps build open, efficient, and high-performance development environments across layers and domains for different types of developers, which helps make hardware more effective and easier to use.

- MindSpore: The all-scenario AI computing framework that can adapt to all scenarios – across devices, edge, and cloud – and provides a secure and trustworthy inference and training framework for consistent development and on-demand cooperation. The innovative "AI Algorithm as Code" design makes developing AI applications simpler and lowers the threshold for model development. Through technological innovation and a co-optimization of MindSpore and Ascend, our solution ensures runtime efficiency and helps developers address complex AI computing challenges and their need for diversified computing power.

- ModelArts: The one-stop AI development and management platform that provides model development services spanning the full pipeline, from data access and model development to model training and deployment.

- Atlas-powered AI computing products: We have rolled out a full Atlas portfolio including the Atlas 200 AI Accelerator Module, Atlas 300 AI Accelerator Card, Atlas 500 AI Edge Station, Atlas 800 AI Server, and Atlas 900 AI Cluster. Our portfolio provides powerful computing capabilities for AI training and inference across device, edge, and cloud scenarios.

- Ascend-powered AI cloud services: HUAWEI CLOUD has rolled out 43 AI cloud services powered by Ascend in order to unleash computing power. Our AI cloud servers improve performance by more than twofold and are widely used in AI inference, AI training, and autonomous driving training. Additionally, our industry's first enterprise-class Knowledge Graph makes construction of knowledge graphs over 70% more efficient.

### Forging ahead with a computing strategy for a thriving computing industry: "one cloud" + "two wings" + "two engines"

In September 2019, Huawei announced its computing strategy. Driven by this strategy, we aim to provide the ultimate computing power to deliver ubiquitous cloud and pervasive intelligence. If the entire computing ecosystem were a towering tree, then Kunpeng and Ascend would be the roots. It's only after the roots reach deep into the soil that the tree becomes sturdy. To strengthen the computing industry, Huawei harnesses the power of "one cloud" (HUAWEI CLOUD), "two wings" (computing and intelligent data & storage), and "two engines" (Kunpeng and Ascend). Specifically, we continue to pursue innovation in the following areas:

- Cloud: Our solutions enable greater synergy between cloud, AI, and 5G. This synergy, coupled with full-stack technological innovation, translates into several layers of added value in our public cloud services and hybrid cloud solutions, especially in terms of stability, reliability, security, trustworthiness, and sustainability. We are working with our partners to help industries more effectively navigate their digital and intelligent transformations. Our goal is to better support our partners' applications and help customers do more with their data, creating fertile soil for the intelligent world to flourish.

- Computing power: For the past 15 years we have been investing in the development of a chipset family built with Kunpeng and Ascend at the core. We have developed integrated equipment, boards, and cards for general-purpose computing scenarios. For AI computing, we have the full series of Atlas products, supporting devices, edge, and data centers.

- Data infrastructure: Huawei launched an enterprise-class AI-Native distributed database GaussDB and the OceanStor distributed storage solution. These solutions break down silos between storage, databases, and big data systems and enable our customers to integrate and optimize every step of the data lifecycle, from storage and computing to management and data utilization. This helps maximize the value per bit and reduce cost per bit to unlock the full potential of data.

## HUAWEI CLOUD: Creating fertile soil for the intelligent world to flourish

In this Cloud 2.0 era, governments and enterprises are rushing to migrate to the cloud. Huawei is committed to helping enterprises with their digital transformation by sharing its own digital transformation technologies, experience, and capabilities through HUAWEI CLOUD. By doing so, we hope to help governments and enterprises accelerate their digital and intelligent transformations.

- In the AI domain, Huawei provides core AI algorithm capabilities at the perception and cognition layers. HUAWEI CLOUD offers a complete set of development platforms and tools through our ModelArts, HiLens – an AI application development platform, and DAYU – a one-stop data development and operation platform. HUAWEI CLOUD has launched the Industrial Intelligent Twins, Traffic Intelligent Twins, and City Intelligent Twins. Combining AI with industry expertise, these solutions provide affordable, effective, and reliable AI.

- HUAWEI CLOUD also released HUAWEI CLOUD Stack 8.0, a next-generation hybrid cloud solution. One of the challenges facing traditional hybrid cloud solutions is fragmentation. HUAWEI CLOUD Stack 8.0's answer to this is three innovative capabilities: "one cloud" management, "one cloud" service and ecosystem, and "one cloud" resources. This allows our customers to schedule local resources and over 200 services all on one cloud.

- In terms of collaborative office, HUAWEI CLOUD launched WeLink, an intelligent work platform for enterprises. WeLink is a user-centered platform that links up teams, businesses, knowledge, and IoT, helping governments and enterprises accelerate their digital transformation.


- In the basic service domain, HUAWEI CLOUD announced the commercialization of its cloud OS, Alkaid, and launched a range of new products. In the age of cloud, AI, and 5G, cloud infrastructure will be distributed, deterministic, and feature multidimensional intelligence. Huawei's solutions are designed to match this trend, so we can lead the comprehensive transformation of basic services.

- In the application service domain, we continued to develop our HUAWEI CLOUD DevCloud which has been positioned a "leader" in the *IDC MarketScape: China DevOps Cloud Market 2019 Vendor Assessment* report.

- In the enterprise-class cloud database domain, HUAWEI CLOUD launched GeminiDB and TaurusDB distributed databases with more than 40 new functions. We also released the MySQL-based cloud disaster recovery solution and the container-based hybrid storage solution.


In 2019, HUAWEI CLOUD organized 19 developer challenges, attracting over 20,000 contestants with 44,000 submissions.

### Leading diversified computing and developing the industry ecosystem

Huawei hopes to drive the computing industry forward with diversified computing across devices, edge, and cloud with Kunpeng, Ascend, x86, and GPUs. To this end, we have continued investing and innovating in general-purpose computing and AI computing, in order to provide the ultimate computing power.

With an intelligent architecture based on "three flows" and "one cloud", our TaiShan server-based intelligent manufacturing solution helps equip production sites with ICT capabilities, such as Atlas-powered deep learning and intelligent vision. Our solution allows customers to achieve highly automated pull production and one-piece flow, ensuring product delivery quality and meeting requirements for mass customization.

"Three flows": product engineering data flow, business information flow, and production process flow

"One cloud": cloud-based Manufacturing Execution System (MES) + manufacturing IT system

- General-purpose computing: Huawei has worked with a variety of partners to develop the computing industry and build full-stack IT infrastructure and industry applications. The TaiShan series servers are the result of the extensive expertise Huawei has gained in computing technology and integrated equipment engineering over the years. They have already been extensively deployed in many application scenarios such as big data, software-defined storage, databases, web applications, cloud phones, and high-performance computing.

- AI computing: Huawei released its Atlas series products powered by Ascend AI processors. These products include the Atlas accelerator module, accelerator card, edge station, server, and cluster. Coupled with MindSpore and open development tools such as CANN, we provide all-scenario (i.e., devices, edge, and cloud) AI infrastructure that spans the entire deep learning process from AI inference to training.

Among these products is the Atlas 900 – the world's fastest AI training cluster, composed of thousands of Ascend 910 AI processors. Atlas 900 delivers up to 256–1,024 PFLOPS at FP16, equivalent to the computing power of 500,000 PCs. Tests conducted based on the most typical ResNet-50 v1.5 model and ImageNet-1k dataset showed that it takes Atlas 900 just 59.8 seconds to complete the training, making it the fastest training cluster in the world. Researchers can use the leading computing capacity of Atlas 900 to more rapidly train AI models for image and speech recognition. Our AI cluster can also be used to more efficiently forecast weather, search for oil, accelerate the commercialization of autonomous driving, and uncover the mysteries of the universe.


Atlas 900, the world's fastest AI training cluster

Based on these Atlas series products, Huawei is working with over 100 independent software and hardware vendors worldwide to use AI to empower numerous industries and accelerate development towards the intelligent world. In addition, Huawei has worked with over 30 universities around the world to develop educational courses and build research labs, and helped more than 100 universities teach hands-on AI skills. Together, we have achieved many impressive innovation results in areas such as robotics, machine vision, and image processing, promoted the development of academic communities, and cultivated talent for the AI industry.

### Maximizing the value per bit and reducing cost per bit to unlock the full potential of data

To accommodate massive data growth and the rising demand for intelligent services, enterprise IT must shift its current focus on storage towards data infrastructure. Huawei provides converged, intelligent, and open data infrastructure solutions that help customers fully unleash data value and embed AI into all aspects of operations. These solutions were

developed through extensive optimization, innovation, and convergence of big data, storage, and database products.

- All-flash storage: We launched the new-generation OceanStor all-flash storage that sets new benchmarks in storage performance and stability. OceanStor all-flash storage delivers best-in-class 20 million input/output operations per second (IOPS) throughput and 0.1 ms latency. Also, its highly reliable SmartMatrix architecture tolerates the collective failure of 7 out of 8 controllers (known as the "7/8 tolerance" feature) without causing service interruptions. OceanStor all-flash storage also features an intelligent data management system that ensures service automation. Another business model innovation is that this product introduces the idea of "effective capacity", helping customers reduce their total cost of ownership (TCO) of storage systems.

Featuring many advantages in technology and high reliability, Huawei's OceanStor all-flash storage ranked first in a technology test performed by a tier-1 European carrier.

- Distributed storage: To cope with massive data growth, Huawei has developed the next-generation OceanStor Pacific Capacity Node distributed storage. The Pacific node supports up to 2.4 PB of storage capacity within a 5U chassis. Based on an elastic erasure coding algorithm and the separation of storage and computing, the solution reduces TCO for big data storage by over 30%, helping to store massive amounts of data at optimal costs. Huawei's storage solution can support four protocols at once, improving analysis efficiency by over 100% and maximizing the utilization of diversified datasets. With built-in AI technologies, the storage system is fully intelligent, from resource provisioning to fault locating.

- Intelligent edge data: Huawei released the FusionCube hyper-converged infrastructure (HCI) 2.0 solution. The solution realizes rapid deployment with out-of-the-box functionality, unified management of site resources, and online AI model iteration and updates. Compared to traditional solutions, Huawei's offering reduces TCO by about 40%.

- Database: Huawei released GaussDB, the world's first AI-Native, enterprise-class distributed database, which supports numerous scenarios, including local and private or public cloud deployments.

- Big data: Huawei released FusionData intelligent data lake solution. This solution separates storage and computing resources, allowing for flexible resource configuration and improving resource utilization. Also, the converged analysis ability delivered by HetuEngine makes data analysis 100% more efficient.

### Redefining machine vision through innovations in architecture and ecosystem model

Machine vision is key to ensuring worldwide sensory connections, and serves as a powerful catalyst for digital transformation of industries. Huawei has redefined the machine vision industry with its HoloSens solution, featuring multidimensional awareness and data intelligence. This solution is comprised of software-defined cameras (SDCs), all-cloud video platforms, and an intelligent vision algorithm store.

- HoloSens SDC: SDCs have redefined the camera architecture, with advanced AI chips, open operating systems, and a future-proof ecosystem. Huawei launched multiple innovative models of SDCs such as 5G dual-mode cameras and compound-eye cameras. Some models can provide up to 16 TOPS of computing power. These products also have industry-leading features such as intelligent 1+N (1 SDC + N common cameras), SuperColor, and online self-learning. Our SDCs have changed the form factors, networking, and deployment modes of traditional IP cameras, accelerating the evolution of the industry towards multidimensional awareness.

- HoloSens IVS: With an all-cloud architecture, Huawei's IVS platforms – Lite Cloud HoloSens IVS3800 and Micro Cloud HoloSens IVS1800 – help customers build one cloud and enable network-wide collaboration and resource sharing. These platforms have revolutionized the conventional siloed architecture widely adopted across the industry.

- HoloSens Store: Huawei released the industry's first one-stop store for intelligent vision algorithms. This store has changed the industry ecosystem, meeting different industries' demands for intelligent algorithms. The algorithm store will contribute to an open ecosystem, making algorithms easier to launch and use, and allowing users to pick, customize, and trust the algorithms they need.

### Working with partners to build an open, collaborative, and win-win computing ecosystem

Compared to its predecessor, the Huawei Developer Program 2.0 will be upgraded across five dimensions: products, enablement, alliances, communities, and incentives. Specifically, we will:

- Build open hardware and software ecosystems.
- Build an inclusive training system.
- Promote the development of industry standards, specifications, showcases, and technical certification systems through alliances for joint market expansion effort.
- Build application ecosystems by industry and industry ecosystems by region.
- Enhance collaboration with educational and scientific research institutes to ensure that computing technologies and the computing power of Kunpeng and Ascend are accessible.

There are three pillars to Huawei's computing ecosystem strategy: open hardware, open-source software, and partner enablement. We are working closely with our partners to build an open, collaborative, and win-win computing ecosystem so that everyone can enjoy the benefits of an intelligent world.

- Open hardware: Based on our expertise in hardware, we provide boards, SSDs, NICs, RAID controllers, and Atlas accelerator modules and cards to external customers.

- Open-source software: We make our operating systems, databases, and AI computing framework open source so that our partners can develop their own products. We also provide developers with an all-scenario development framework that works across devices, edge, and cloud. We announced that we would make our openEuler OS, openGauss database, AI computing framework MindSpore, and data virtualization engine openHetu, among others, all open source.

  Of these, the open-source editions of openEuler and MindSpore have already been made available. Many operating system vendors and research institutes have already joined us to build the openEuler community and unveiled Long-Term Support (LTS) commercial editions. In addition, the open-source editions of openGauss and openHetu will be released in the second quarter of 2020.

- Partner enablement: Huawei has launched its Kunpeng Partner Program. This program aims to provide a platform and ecosystem from which Huawei can lead the development of industry standards, solve technical challenges facing the industry, and provide training and technologies to partners.


Huawei released the *White Paper on Kunpeng Computing Industry Development* with industry partners

## Device Business

In 2019, our Consumer BG continued to focus everything we do on consumers. With a fully connected, intelligent world fast approaching, we are committed to delivering an inspired, intelligent experience to consumers across all devices and scenarios.

We have further optimized our Seamless AI Life strategy and made explosive innovations in core technologies. As a result, our reputation is growing among global consumers, and we have reinforced our position as a premium brand.

In 2019, revenue from our consumer business was CNY467,304 million, representing a year-on-year increase of 34.0%. In addition, our monthly active users exceeded 600 million worldwide.

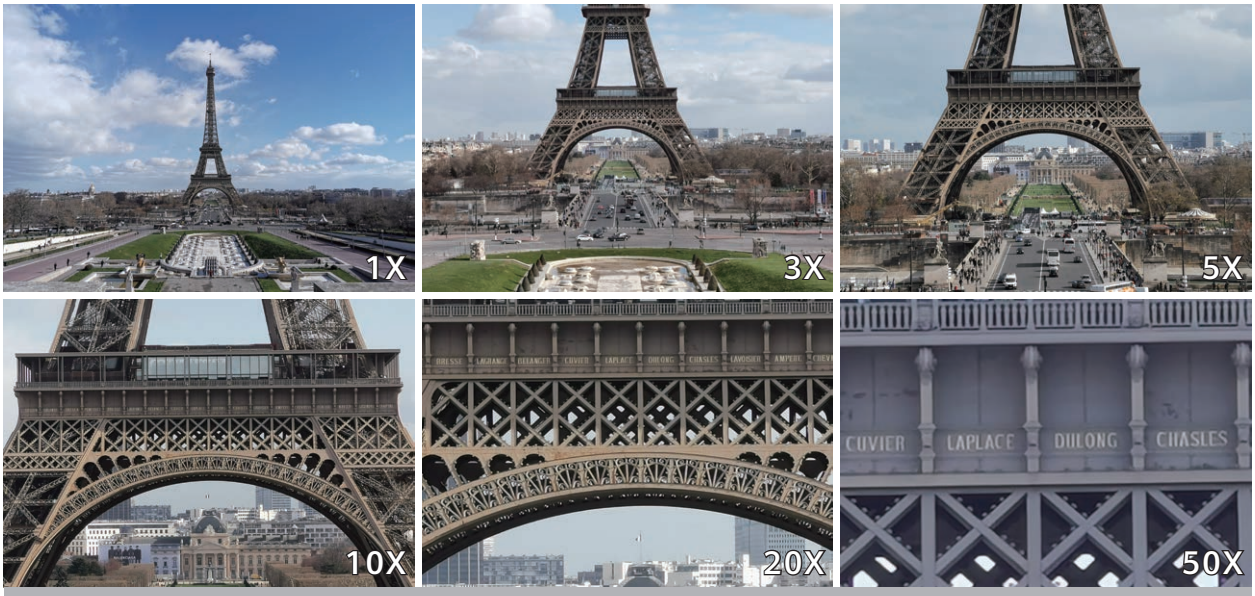
### The Seamless AI Life Strategy and Related Substantial Progress

In 2019, the Consumer BG continued adhering to the "1 + 8 + N" Seamless AI Life strategy, where: "1" represents mobile phones; "8" represents tablets, PCs, VR devices, wearables, smart screens, smart audio, smart speakers, and head units; and "N" represents ubiquitous Internet of Things (IoT) devices.

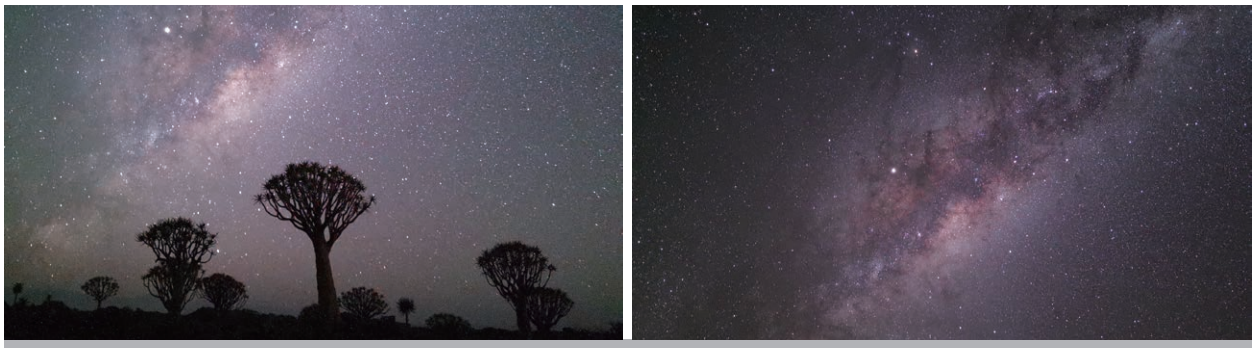
This strategy is driven by HarmonyOS and HiAI, with which we are able to support collaborative innovation within our HiLink smart home ecosystem and Huawei Mobile Services (HMS) ecosystem and deliver better hardware and software experiences to users. This enables interconnection and capability sharing among all devices in all scenarios, including smartphones. The strategy allows our consumers to enjoy an intelligent experience that seamlessly shares data and shifts between different scenarios and different types of devices.

Based on the Seamless AI Life strategy, we are continuing to innovate in our core capabilities to improve our smartphone experiences while actively exploring the expansion of our non-smartphone products including PCs, wearables, and smart screens. Thanks to our unique innovations, we have won high acclaim across the market.

**Smartphones:** In 2019, we shipped more than 240 million Huawei and Honor smartphones, up more than 16% year-on-year, and shipments of our 5G smartphones exceeded 6.9 million units. According to reports from market research firms IDC and Strategy Analytics, Huawei and Honor smartphones together occupied 17.6% of the global market share in 2019, meaning we have maintained our position as the world's second-biggest smartphone brand. In addition, we hold the largest market share in 5G smartphones.




The HUAWEI P30 Pro features a SuperZoom Lens fitted into the ultra slim chassis, which supports 5x optical zoom, 10x hybrid zoom, and 50x digital zoom. The lens uses a prism to bend light at a 90-degree angle, enabling users to see farther.



The HUAWEI P30 Pro comes with a large 1/1.7-inch RYYB sensor. When combined with the HUAWEI optical image stabilization (OIS) and a f/1.6 wide aperture, the phone can attain a maximum ISO rating of 409,600 and achieve superior light sensitivity, reduced image noise, and improved color reproduction as seen in these photos of the Milky Way, taken with the HUAWEI P30 Pro in Namibia.

The market influence of Huawei's flagship smartphones has also further increased. In 2019, shipments of our Mate and P series flagship smartphones exceeded 44 million units, up 53% year-on-year. Consumers have even compared the revolutionary RYYB HUAWEI SuperSpectrum Sensor and periscope-style SuperZoom Lens, featured by our HUAWEI P30 Series smartphones, to night vision goggles and telescopes. Shipments of this series exceeded 20 million units within eight months of launch.

Huawei is a pioneer and leader in foldable 5G phones. The HUAWEI Mate X was our first foray into this realm. With powerful connectivity and intelligent interactive user experiences, the HUAWEI Mate X offers a glimpse into the future of smartphones. The HUAWEI Mate Xs, officially launched in February 2020, further raises the bar and consolidates Huawei's leadership in foldable 5G phones.

The HUAWEI Mate Xs uses a unique Falcon Wing design. Featuring over 100 interlocking parts, the hinge system effectively shifts the flexible display between smartphone and tablet modes, enabling the phone to deliver excellent performance and a truly seamless user experience that shows no sign of creases or crevices when the phone is folded or unfolded.

**PCs:** Huawei's PC products (e.g., HUAWEI MateBook X Pro) boast unique innovations like OneHop File Sharing and Multi-screen Collaboration, and deliver interactive experiences to consumers across multiple devices. In 2019, Huawei's PC shipments grew by more than 200% year-on-year.

**Tablets:** Our tablet revenue maintained its growth despite a continued overall decline of the global tablet market. Specifically:

- The HUAWEI MatePad Pro, launched in November 2019, has an all-screen front with a 90% screen-to-body ratio. This makes it a convenient office assistant, receiving very positive market feedback.
- According to a report from market research firm IDC, Huawei's share in the Chinese tablet market surpassed Apple in 2019 Q3 and Q4 to rank No. 1.

**Wearables and smart audio:** Our wearables and smart audio products have maintained rapid growth, boosted by the strong sales of the HUAWEI WATCH GT 2 and FreeBuds 3 – the world's first True Wireless Stereo (TWS) earbuds with open-fit active noise cancellation. For example:

- Shipments of our wearables and smart audio products increased by 170% and more than 200% year-on-year, respectively in 2019.
- The smart glasses we launched with Gentle Monster perfectly combine technology with fashion, becoming an instant hit after launch.

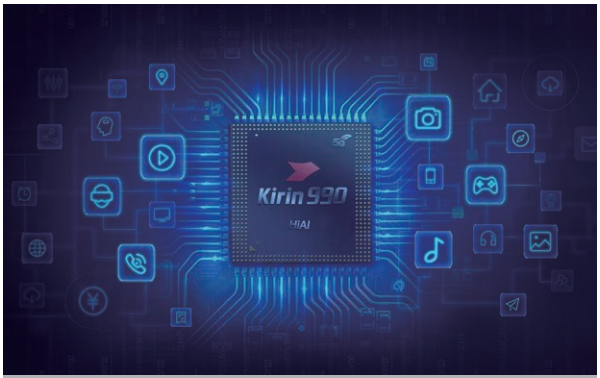
**Smart screens:** In 2019, we launched our Huawei Vision and Honor Vision smart screen products, upgrading large-screen devices into intelligent hubs for interactions and cross-screen experiences, as well as IoT control centers and media and entertainment centers. Large-screen devices have been transformed into household smart assistants, smartphones with super-large screens, "housekeepers" for the HiLink ecosystem, and super home theaters. Our smart screen products have set a new trend for the television industry.

**VR devices:** The weight and volume of the HUAWEI VR Glass are only one third of an average VR headset, completely reshaping the form factor of this product category. As a perfect accessory for 5G smartphones, the HUAWEI VR Glass brings an immersive VR experience in 5G-supported scenarios and tears down the barriers of computing through VR Screen Mirroring. This allows consumers to take full advantage of the huge amounts of media and entertainment resources available on their smartphones.

## Enhancing All-Scenario Device Chipsets, OSs, and the Global Cloud Service Presence

To guarantee a Seamless AI Life for consumers, we are actively building the basic capabilities we will need to deliver all-scenario device chipsets, operating systems, and cloud services. With significantly improved competitiveness and user experience, our products across all scenarios have been well received by consumers the world over.

**Chipsets:** We have expanded from mobile device chipsets to all-scenario device chipsets. In 2019, we launched multiple processors for different devices, including the Kirin 990 5G for our flagship smartphones and the Kirin A1 for TWS earbuds and other wearables.




The Kirin 990 5G is manufactured using the cutting-edge 7nm + EUV process, which provides the industry's most competitive performance, energy efficiency, and transistor density. 10.3 billion transistors are packed into an area the size of a fingernail, making the Kirin 990 5G 2019's most complex commercial 5G SoC, with the most transistors and the most complete functions.

As the world's first 5G System-on-Chip (SoC), and the first SoC to integrate a 5G modem, the Kirin 990 5G uses the industry's most cutting-edge 7nm + EUV manufacturing process. This gives it unrivaled levels of performance and energy efficiency. Based on the outstanding 5G connectivity delivered by Balong 5000, the Kirin 990 5G is the first full-frequency 5G SoC to support both non-standalone (NSA) and standalone (SA) architectures and TDD/FDD full frequency bands. The Kirin 990 5G achieves a peak downlink rate of 2.3 Gbit/s and a peak uplink rate of 1.25 Gbit/s at sub-6 GHz. This enables the HUAWEI Mate 30 Series to deliver an unmatched 5G experience to consumers.

The Kirin A1 is the industry's first BT 5.1 & BLE 5.1 SoC. It boasts efficient and stable connectivity, robust audio processing, and superior anti-interference capabilities. The Kirin A1 also supports intelligent and natural human-device interactions, and enables premium audio quality and immersive gaming experiences thanks to instant acoustic feedback, giving consumers a seamless, high-quality audio experience in all scenarios.

**Operating systems:** We have leveraged breakthroughs in underlying software technologies, such as compilers, to shift from upper-layer user interface (UI) optimization to all-scenario device operating system development. This provides strong operating system capabilities that can achieve multi-screen collaboration and deliver an inspired, intelligent experience to consumers across all devices and scenarios.

As an underlying software technology that was developed in-house, the HUAWEI ARK Compiler provides brand-new mechanisms for compiling and running systems and applications. It is also the first static compiler capable of performing on par with Android's virtual machine. The HUAWEI ARK Compiler addresses Android operating efficiency problems in the underlying layer, while the Deterministic Latency Engine ensures system tasks are executed orderly and efficiently, bringing users consistently smooth experiences.

EMUI 10.0, for the first time, applies the concept of a distributed system to all-scenario device systems. The software system can abstract the hardware capabilities of devices and provide them to upper-layer applications through the virtual resource pool. This allows applications to intelligently invoke multiple devices on demand. When using EMUI 10.0, consumers will benefit from the intelligent collaboration of multiple devices, and enjoy a high-quality experience equal to using one incredibly powerful virtual device.

Microkernel-based HarmonyOS is an intelligent, distributed, next-generation operating system that can be deployed on multiple devices. It decouples hardware capabilities from devices and connects different devices through distributed virtual buses, allowing applications to easily invoke the peripheral hardware capabilities of other devices. HarmonyOS delivers a seamless experience to consumers across devices, and meets the new requirements for operating systems in the all-scenario, intelligent era.

**HMS:** We have built basic capabilities in cloud services worldwide. HMS is now available in more than 170 countries and regions, and we have established six regional operations centers and 15 data centers around the world to support these services.

At the same time, we leverage our unique capabilities in chip-device-cloud synergy to continuously improve the HMS app experience surrounding our Seamless AI Life strategy. Many of our apps, such as AppGallery, HUAWEI Browser, HUAWEI Assistant, HUAWEI Video, HUAWEI Music, HUAWEI Reader, HUAWEI Themes, HUAWEI Mobile Cloud, and HUAWEI Wallet have been launched around the world. By the end of 2019, HMS had over 400 million monthly active users, and was winning over an increasing number of consumers.

## Building Open HMS and HiLink Ecosystems for Developers to Deliver Inspired Customer Experiences

**App ecosystem:** The Consumer BG continuously builds competitiveness targeting the ecosystem and experiences. We fully opened up our HMS to developers around the world, allowing them to quickly and conveniently access the HMS ecosystem for app innovation and ecosystem resource sharing.

HMS Core provides the key capabilities that can help developers focus on innovation. This allows them to readily access the HMS ecosystem, and intelligently distribute apps to all devices across all scenarios worldwide. In 2019, Huawei opened up its chip-device-cloud capabilities to developers, including HMS Core like Maps, Machine Learning, Scan, Account, Push, In-App Purchases, and Ads. We also launched Quick App and HUAWEI Ability worldwide, helping app developers deliver innovative app experiences to 600 million Huawei device users around the world.

HUAWEI HiAI, an open AI capability platform for smart devices, has entered phase 3.0. With its chip-device-cloud architecture, HUAWEI HiAI opens up chipset, app, and service capabilities, enabling developers to leverage Huawei's powerful AI processing capabilities to substantially reduce costs and drive innovation for optimal and intelligent app experiences. In its infancy, HUAWEI HiAI 1.0 supported only single type devices. 2.0 expanded to support devices such as smartphones, tablets, and smart screens. Now, HUAWEI HiAI 3.0 goes even further, pooling hardware resources to form super devices. Powered by distributed AI, devices reinforce each other, providing users with the best possible experience.

Thanks to the aforementioned open capabilities, global and regional mainstream apps have been quickly launched on the AppGallery, and over 55,000 apps have been integrated with HMS Core worldwide. The AppGallery is available in more than 170 countries and regions, providing a huge array of high-quality global and local apps for users. The platform also provides unique, innovative, and intelligent experiences while strictly protecting user privacy. In 2019, there were 210 billion app downloads from the AppGallery, while its monthly active users exceeded 400 million. The Quick App available on the AppGallery brings revolutionary mobile app experiences to Huawei's device users, who can run apps without installing them. The Quick App will build a new app ecosystem in the 5G era.

Huawei actively engages with developers worldwide to help them create apps that deliver inspired experiences. In addition to our annual Huawei Developer Conference, we also held 45 HUAWEI Developer Day events in 32 countries and regions over the course of 2019, allowing us to talk with tens of thousands of developers face-to-face. By the end of 2019, the number of developers registered with HMS exceeded 1.3 million.

We also provide the AppGallery Connect service for developers worldwide, helping them operate efficiently throughout the entire app creation process from initial ideation and app development to distribution, operations, and analysis. We have revamped the Shining-Star Program by increasing the program's incentives from CNY1 billion to US$1 billion in order to motivate developers to innovate. We have also expanded the program outside of China to also cover global developers, and worked with industry-leading ecosystem partners to build incentive alliances. Our DigiX Lab aims to drive and support the innovation of developers around the world.

**HiLink ecosystem:** We have opened up our operating system and IoT chip capabilities to IoT developers, and provided them with services such as development, certification, and testing to efficiently support their product launch.

By the end of 2019, the HiLink smart home platform had accumulated over 50 million users, and covered over 1,000 product models in more than 100 product categories. The total shipments of IoT devices that support the HiLink protocol had exceeded 150 million units. We have also established strong partnerships with more than 600 home appliance brands, including BSH, Philips, Panasonic, Toshiba, Allegion, Canon, Kärcher, Blueair, Legrand, Sonos, Bose, Haier, Gree, and Midea, providing our consumers with a greater variety of quality options for smart living.


About 200 developers and partners attending the 2019 Asia-Pacific HUAWEI Developer Day (HDD) held in Singapore

HDD CodeLabs held by the Consumer BG during Web Summit 2019 in Europe

The Huawei Developer Conference held on August 9, 2019, attended by over 600 of Huawei's technical experts and nearly 6,000 developers and partners from around the world, who discussed how to build a new, future-oriented ecosystem for the all-scenario, intelligent era under the theme "Rethink Possibilities"

## Protecting Consumer Privacy with Cutting-edge Technology and Building a Privacy Protection Brand Trusted by Consumers

The Consumer BG is committed to building a brand that is trusted by global consumers in terms of privacy protection. We believe that privacy is a basic right of our consumers, and that they should have complete control over their privacy. We regard privacy protection as a cornerstone of our product design, and believe that it is equally as important as the experience the products provide.

We always adhere to the following four basic principles when protecting user privacy:

- **Transparency:** The way we process personal data is transparent to our consumers, who can make decisions according to their wishes and fully control their privacy.
- **User benefits:** We believe that any collection of personal data should always benefit consumers, for example, by providing a better user experience.
- **Security:** Effectively protecting user privacy requires advanced technologies. We leverage industry-leading security technology to protect personal data, safeguarding privacy while improving user experiences.
- **Legal compliance:** We strictly comply with the *Generally Accepted Privacy Principles* (GAPP), the EU's *General Data Protection Regulations* (GDPR), and all other applicable laws and regulations in the countries where we operate.

We integrate the above privacy protection principles into our products right from the beginning in product design. These principles are then followed throughout product development in order to fully protect user privacy. Our leading technologies have enabled us to produce many outstanding results in privacy protection, gaining us the recognition of leading global organizations.

For example, the HUAWEI Mate 30 Series comes with Huawei's in-house formal microkernel Trusted Execution Environment (TEE). Sensitive data, such as consumer biometric data and passwords, is stored only in the TEE, while operations like fingerprint verification, facial recognition, and password confirmation are all performed in the TEE. This move effectively prevents leaks of user privacy. Huawei's TEE obtained the following certifications:

- Common Criteria (CC) EAL5+ certification, the highest level that a commercial OS kernel can obtain during security certifications
- Numerous international authoritative security and privacy certifications, including the EMVCo certification in the finance industry and the ePrivacyseal EU certification

In the HMS domain, we have established a complete system for managing personal data protection, and we are the global leader in terms of personal data security management, transparency, and privacy compliance. For example:

- The AppGallery manages the security of apps with a unique four-layer system: malicious behavior detection, security vulnerability scanning, privacy leak checks, and manual real-name reviews. This system ensures that only secure apps are available for download from the AppGallery.
- In November 2019, HMS became one of the first recipients of the ISO/IEC 27701 privacy protection system certification issued by the British Standards Institute (BSI), an authoritative international standards organization. This shows that our ability to protect user privacy and manage information security is recognized by world-leading organizations.

## Building Global Flagship Stores into Showcases of Premium Retail Services and Optimizing the "Last-Mile" Sales and Service System

In 2019, the Consumer BG actively explored and built brand-new premium retail and service models to improve Huawei's brand image and optimize our "last-mile" sales and service system. By the end of 2019, Huawei had over 65,000 retail stores, display zones, and display counters around the world, including more than 6,000 experience stores.

On September 28, 2019, as the start of Huawei's efforts to build a global retail system for direct sales, we opened a Global Flagship Store at the heart of Shenzhen's vibrant MixC World. This store has reinvented the traditional image of Huawei retail stores, and become the city's "living room", a new cultural landmark. Featuring a sophisticated design and cutting-edge technology, the store provides an offline, tech-savvy space that allows consumers to study, share, connect with their loved ones, and enjoy inspired experiences.

In customer service, we are committed to building and improving our basic service capabilities, and focusing on three service platforms: offline services, online services, and self-service. Throughout 2019, we provided services to over 50 million consumers. At the same time, we used AI technologies to pursue a transformation towards intelligent customer services, and accepted over 25 million consumer inquiries through robots.

By the end of 2019, the Consumer BG had over 2,600 offline service centers in 105 countries and regions, providing convenient and fast repair services to consumers. In 2019, global customer satisfaction with Huawei's services increased by 8 percentage points compared with 2018. We also accepted more than 1,000 consumer suggestions and requests related to the optimization of products and services, aiming to constantly improve consumer experiences.

Thanks to the continuous improvements made by the Consumer BG in product innovation, ecosystem building, retail, services, and other domains, our brand recognition and reputation among global consumers continue to grow. We have taken another solid step forward on our journey toward becoming an iconic global tech brand.

A report from brand research firm Ipsos showed that Huawei's global brand awareness increased to 93% in 2019, a 4-percentage-point increase from 2018. Meanwhile, brand consideration among global consumers had increased to 58% in 2019, up from 49% in 2018. Global consumers are becoming increasingly aware of Huawei as a stylish, vibrant, innovative, and high-end brand.

We have always stressed that everything we do in the Consumer BG begins and ends with consumers. With this in mind, we will continue adopting our Seamless AI Life strategy in 2020. We will continuously innovate in core technologies, including 5G, AI, AR, and VR, while actively improving consumer experience by focusing on consumer touch points such as retail, service, and marketing. Our ultimate goal is clear: Deliver an inspired and intelligent experience to consumers across all devices and scenarios.


Huawei's Global Flagship Store in MixC World, Shenzhen

Customers trying Huawei's smart devices at the Huawei Global Flagship Store


Photographer Alexan Deng sharing his experience taking pictures with Huawei smartphones in the Huawei Community

The Huawei Global Flagship Store in Shenzhen is a three-story building that adopts the design concept of "City Square", combining traditional Chinese and Western architectural philosophies. The facade features a large area of high transmission glass with rounded corners. The unique semi-open staircase connects the square with the surrounding environment, giving the feeling of a borderless community. Customers can not only relax and meet up with friends, but also participate in the free courses held by the Huawei Community every day, which cover areas like photography, videography, health, and fitness. Customers can also hear from professionals in various sectors, including art and tourism.

## Intelligent Automotive Solution Business

The ongoing integration of ICT into the automotive industry is making vehicles more connected than ever before, while AI is infusing them with greater intelligence. Intelligent and connected electric vehicles will become supercomputers on wheels as well as platforms for continual value creation. These vehicles will emerge as a new engine of development for society, with their impact going far beyond the two industries themselves. Intelligent and connected electric vehicles will significantly change the way we travel, the automotive industry, and even future society. Specifically, these vehicles will bring:

- A new way of travel: Social costs (e.g., carbon emissions, traffic collisions, and time taken to park) will be greatly reduced. Vehicles will become more efficient and boast more features, making travel more comfortable and entertaining. In addition, intelligent electric vehicles that support higher security, longer ranges, and fast charging will become intelligent mobile spaces, rather than just a means of transportation. Autonomous driving will free up drivers' hands, legs, and senses, making travel safer and more convenient. In-vehicle infotainment (IVI) systems will be integrated into the smart device ecosystem, while smart cockpits will connect with the hardware and application ecosystems of users' mobile phones. Software and hardware will also be upgradeable to ensure user experiences remain fresh.

- New vehicle architecture: Traditional vehicles use a distributed electrical/electronic (E/E) architecture, where hardware is stacked to add new functions. However, as the number of intelligent functions continues to increase, vehicles will have more than 100 electronic control units (ECUs) from hundreds of suppliers, making the existing architecture difficult to sustain. In the future, a "computing + communications" (C/C) architecture powered by regional networking and central computing will be adopted to build intelligent connected vehicles. This architecture will be able to support fast iteration and deliver better user experiences if we enable sensors and actuators to access nearby networks and facilitate high-speed communication inside vehicles, software-hardware decoupling, simplified vehicle designs, and software-defined functions. Looking at a vehicle as a whole, digital security solutions that ensure in-depth defense must be developed to support the transition from safety to trustworthiness.

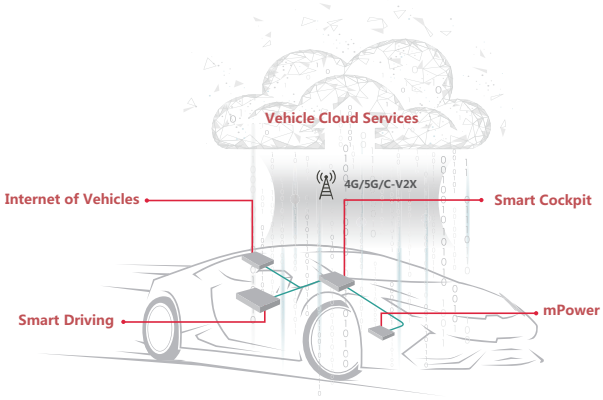
- A platform for continual value creation in future society: Since the shift from feature phones to smartphones, mobile phones have become platforms for continual value creation. Like mobile phones, intelligent connected vehicles will also continuously create value for the whole industry and improve user experiences throughout their lifecycles.

### Huawei's Strategic Position on Intelligence in the Automotive Industry

Over the past few years, Huawei has been exploring how to leverage its leading expertise in ICT to help make traditional vehicles intelligent and connected. Our strategy for the automotive industry is clear: **Huawei does not make cars. By focusing on ICT, Huawei is committed to serving as a new added-component provider for intelligent connected vehicles and helping car OEMs build better vehicles.** To implement this strategy and flesh out our solutions for intelligent connected vehicles, we officially established the Intelligent Automotive Solution BU in May 2019.

### Huawei's Intelligent Automotive Solutions

Building on our solid presence in ICT and relevant businesses, we align what Huawei can offer (e.g., ICT design, technologies, and experiences) with what the automotive industry expects, and have developed five intelligent automotive solutions.




### Vision for the Future

Vehicles are becoming increasingly electric, and more connected and intelligent, creating opportunities worth trillions of dollars. With our proven engineering experience and technical expertise in ICT, Huawei hopes to serve as a new added-component provider for intelligent connected vehicles, and **help car OEMs build better vehicles**. To realize this goal, we will focus on smart cockpits, smart driving, Internet of Vehicles (IoV), mPower, and vehicle cloud services.

We will soon see a new sort of Moore's law emerge for the automotive industry, where advancements in technology will emerge ever more rapidly. We will **work with car OEMs to simplify vehicle designs and make software-defined vehicles a reality**. Through this, vehicles will continuously provide fresh user experiences and create value through software and hardware upgrades across their entire lifecycles.

## Research and Innovation

Looking to the future, Huawei's innovation will transition as we move from an Innovation 1.0 era to an Innovation 2.0 era. In Innovation 1.0, we have focused on innovations in technology, engineering, products, and solutions to address customer needs. In Innovation 2.0, driven by our vision, we will expand our efforts to seek breakthroughs in basic theories and develop new basic technologies.

### Open Innovation: Aggregating Wisdom and Innovation of Humanity to Light the Way Forward for the World and Huawei

In Innovation 1.0, we have focused on innovations in technology, engineering, products, and solutions to address customer needs and challenges. This is about going from 1 to N. The primary goal is to help our customers and partners become more competitive, increase their revenue or reduce their costs, and enable them to achieve greater business success. In the past, Huawei made many engineering and technological innovations in wireless, optical networks, and smart devices. These innovations generated a large amount of commercial value for our customers and tremendous social value.

In Innovation 2.0, based on our vision for the intelligent world we are entering, we will aim to break the bottlenecks in theories and basic technologies that have hindered the development of ICT. In this stage, we will focus on theoretical breakthroughs and inventions, which means going from 0 to 1.

- **Philosophy: Open innovation and inclusive development**

  Theoretical breakthroughs and inventions involve many uncertainties, meaning innovation should not be a closed-door activity. The philosophy of Huawei's Innovation 2.0 will bring together universities and research institutes and connect the academia with businesses, to allow all types of global scientific research resources and talent to come together in the pursuit of innovation.

- **Methodology: Vision coupled with technological breakthroughs**

  Driven by our shared vision for the future, we will delve deep into the challenges the future intelligent world may bring regarding the way we live, work, play, and stay healthy. With these challenges in mind, we will try to determine the business opportunities and technological development directions which we should pursue, and endeavor to incubate new industries. On this basis, we will make bold assumptions and plan our future technological elements.

- **Focus: Exploring disruptive technologies throughout the information lifecycle**

  We have been exploring future-oriented technologies that can be applied to the entire process of information generation, storage, computing, transmission, presentation, and consumption. In addition, we have ramped up efforts on research into disruptive technologies.

- **Strategic initiative: Collaboration with universities and technology investment**

  Collaboration between businesses and universities can accelerate the commercial use of research results. And with insights into the challenges, real-world scenarios, and needs shared by businesses, scientists can also better decide what directions their future research should go in. To better implement Innovation 2.0, Huawei will adopt a number of approaches, including supporting the research programs of universities and research institutes, building its own labs, and investing along multiple technological paths.

Innovation has been the very foundation for Huawei's survival and growth over the past 30 years. We will continue redoubling our efforts in exploring future-oriented cutting-edge technologies and basic research, with an annual investment of US$3 billion to US$5 billion. Today, Huawei has approximately 15,000 employees engaged in basic research, including over 700 PhDs specializing in mathematics, over 200 PhDs specializing in physics and chemistry, and over 5,000 PhDs specializing in engineering.

Meanwhile, we have established research and innovation partnerships with over 300 universities and more than 900 research institutes and firms. Following the principle of open innovation, we will leverage global innovation resources and attract professionals from around the world to collaborate on research. We will consider the challenges facing businesses and academic insights, as well as the confidence of venture capitalists to jointly innovate. The concerted push for innovation will allow our innovation accomplishments to be shared across both our industry and society as a whole, lighting the way forward for the world and Huawei.

Huawei invests significantly in research and innovation, pursues open innovation, and actively brings professionals from around the world to the company for joint innovation. More than a decade ago, Huawei established a microwave innovation center in Milan, Italy to support the work of microwave expert Renato Lombardi. This center has gradually helped Huawei build its global competitiveness in microwave products from scratch. "To this day, I still see myself as a lucky guy to have joined Huawei. I'm very lucky to work with an excellent team, conduct industry-leading research, and contribute new thoughts and ideas. The microwave innovation center in Milan was built from scratch and has been growing ever since. It is like my baby and has become a part of me." –Huawei Fellow Renato Lombardi.

Renato showcasing the Milan microwave innovation center's accomplishments and discussing how to demonstrate functions of a sample device


Renato's collection of badges from technical meetings he attended as a Huawei representative

## Key Innovations Enable a Fully Connected, Intelligent World

Huawei is continuing to focus on research and innovation to seize the opportunities and address the challenges of the future intelligent world. This will widen the "de Laval nozzle", the rocket engine that will drive us forward. We are also bringing top minds from around the world to join us, while openly innovating and incubating new theories and key ICT technologies to share with the industry. Together we can jointly serve the information society.

### Redoubling efforts in basic research to make theoretical breakthroughs, fueling the development of the intelligent world

- The rapid development of communications technology over the years continues to drive communications channel capacities closer to the Shannon limit. The whole industry is continuing to search for breakthroughs in underlying technologies, so that communications technologies can keep pace with the development of the intelligent world. In 2019, we continued our deep exploration of communications theories, aspiring to redefine a wireless network architecture for the time when the Shannon limit is broken. Specifically, we:

  - Were the first in the industry to define the 10 grand challenges facing basic research and the challenges we foresee as we stand at the threshold of the intelligent world. These challenges include problems related to privacy, information models, channel capacity, and approximate computing and optimization. We have also been working with top scientists from around the world to tackle these challenges.

  - Pioneered a theoretical model for trustworthy networks in the age of AI, a dynamic network data traffic forecast model, and a theoretical model for distributed dynamic sliced networks. These models have significantly improved network robustness, forecastability, and utilization, and driven active control efficiency up by 56%.

- Achieved new breakthroughs in key theories and scheduling algorithms for next-generation massive Multiple Input Multiple Output (MIMO) that are applicable to future wireless networks, increasing edge user experienced data rates by at least 30%.

- AI has become a major driver of revolutionary changes to computer architecture. In this area, we:

  - Attached importance to basic research, including both theoretical breakthroughs and technological innovation.

  - Published more than 80 papers on AI, one of which was the only paper to win the ACL 2019 Best Long Paper award.

  - Were the first to propose AdderNets in the deep learning field, which only contains additions and breaks the traditional framework of massive multiplications. This new method features software-hardware co-design and thus can achieve high performance on computer vision tasks and potentially save over 10 times the current requirements in terms of energy consumption and chip area. We have also made the testing code of AdderNets public to the community, aiming to explore the next generation of AI accelerators together with academia.

  - Created the industry's first framework of causal structure learning in replacement of the conventional local search method. This novel framework is based on reinforcement learning and can achieve state-of-the-art accuracy on academia benchmarks. Our paper on this framework was accepted to ICLR 2020 and ranked first (parallel with other submissions).

  - Pioneered the proposal of comprehensive explainable AI measures based on computational metrics, and designed novel explainable methods from data-driven and knowledge-driven aspects, in order to construct complete and explainable AI benchmarks in the industry.

  - Supported the implementation of hardware design space exploration technology with Pareto optimizations, the first of its kind to employ the Design Space Explorer (DSE) which boosts chip design efficiency and performance.

**Innovating and inventing to drive the industry forward**

- Advanced Wireless Networks

  Today, we have entered the 5G era and embarked on 6G research. Huawei is exploring new directions for 6G. To this end, we:

  - Began research into the basic theories of 6G, including research into new air interface technologies, new network architectures, and key enabling technologies.

  - Initiated extensive open collaboration projects with other industry players and pushed the industry to build a consensus on 6G.

- Optical Networks

  To maintain our leadership in this area, we:

  - Continued efforts to push the limits of fiber capacity and created industry-leading super-core transmission sites, which will ensure that fiber capacity can double every 36 months, even in the ultra-broadband age.

  - Addressed the difficulties surrounding key technologies like high-performance optical algorithms for long-haul transmission at data rates of 400 Gbit/s per wavelength, high-speed optoelectronic components, and L-band wide-spectrum optical amplifiers, extending the transmission distance to more than 1,600 km and increasing the capacity of a single fiber to 48 Tbit/s.

  - Proposed an optical cross-connect (OXC) architecture that supports wavelength-based flexible scalability to a super large capacity of 10 Pbit/s.

- Intelligent O&M

  In this area, we:

  - Reduced repeated work order assignment by using intelligent identification and more accurate fault location to ensure only a single work order is placed for each fault.

- Performed forecasts using spatial-temporal algorithms and dynamic equipment adjustments on wireless networks, resulting in a 15% improvement in energy conservation during pilot programs and reducing the cooling power consumption for data centers with a higher power usage effectiveness (PUE) by between 9% and 17%.

- Worked with other industry players to release a white paper entitled *Autonomous Networks: Empowering Digital Transformation For The Telecoms Industry* on the five levels of Autonomous Driving Network (ADN), as previously defined from L0 to L5, and their technical implementation paths.

- Continued research into ADN technology, to make intelligent, automated, self-optimizing, self-healing, and autonomous network operations and maintenance (O&M) a reality.

- AI Computing

  In this area, we continued to build on our full-stack capabilities ranging from computing power, operators, and the framework to application enablement, lowering AI application threshold and providing affordable AI capabilities for industries. Specifically, we launched:

  - The Ascend 910, a proprietary AI training processor packed with a Da Vinci 3D cube architecture; and

  - MindSpore, an all-scenario AI computing framework across devices, edge, and cloud.

- Smartphone Camera

  In this area, we:

  - Used AI to redefine the smartphone photography experience by being the first in the industry to deliver a staggering ISO 409,600, which enables crystal-clear night-time images, as well as 10x hybrid zoom and 50x digital zoom.

  - Unveiled the industry's first-ever high-precision segmentation algorithm, enabling high-precision foreground extraction (even for fine details like hair) and achieving the best bokeh and video effect in the industry.

  - Introduced AI to sharpen our edge in device video, by improving scene identification and video enhancement, and delivering brand new experiences such as shooting ultra-slow motion, as well as ultra-wide-angle, ultra-low-light, and time-lapse videos.

- Media CODEC Standards

  To promote technological advancement within the ultra-high-definition video industry, we actively participated in setting standards in standards organizations such as the Moving Picture Experts Group (MPEG) with the ISO/IEC, ITU-T SG16, and China's AVS by:

  - Submitting more than 500 technical contributions to different standards organizations; and

  - Acting as a major contributor to standards in fields such as Versatile Video Coding (VVC, or referred to as ITU-T H.266), MPEG-5 EVC, and AVS3.

- Software

  In this area, we have always continued our efforts to pursue innovation and breakthroughs, so as to build our leadership in underlying software. In 2019, we:

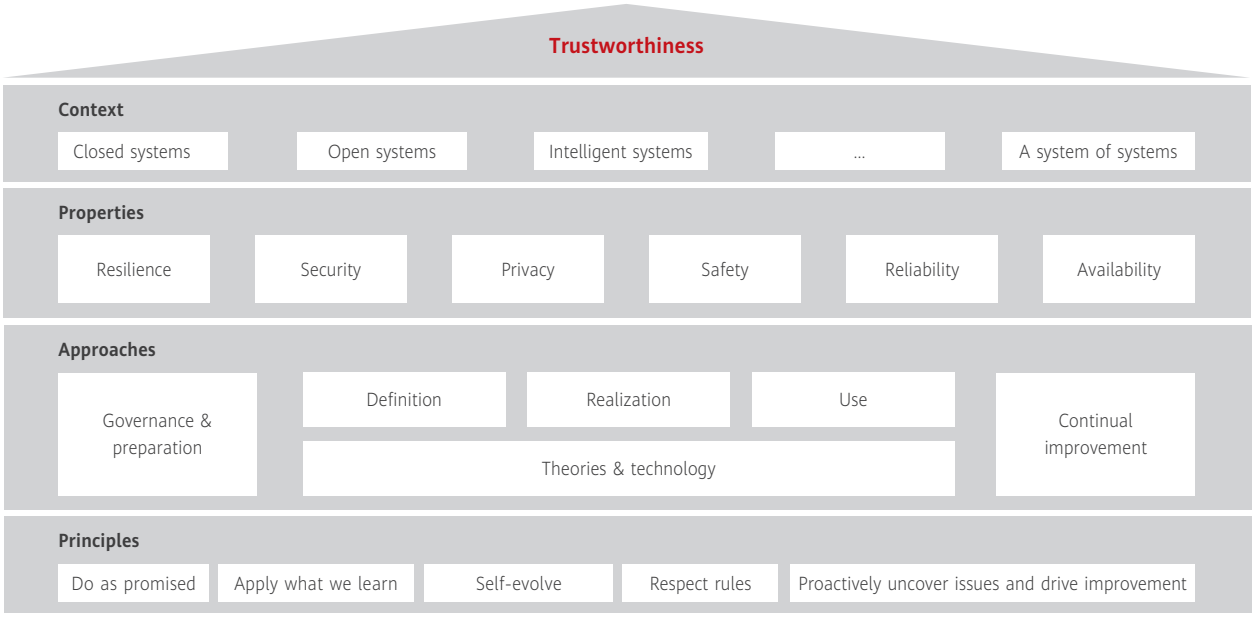
  - Unveiled the world's first-ever AI-native and enterprise-class database with an AI kernel.

  - Launched OpenEuler, an open source server operating system, based on a RISC and multi-core architecture. OpenEuler features three-level intelligent scheduling, which can reduce the multi-process concurrency latency by 60% and improve the performance of web servers by 137% through intelligent and automated planning, giving full play to the strengths of our Kunpeng and Ascend processors in computing power.

- Trustworthiness

  To increase the trustworthiness of our products and services, we have:

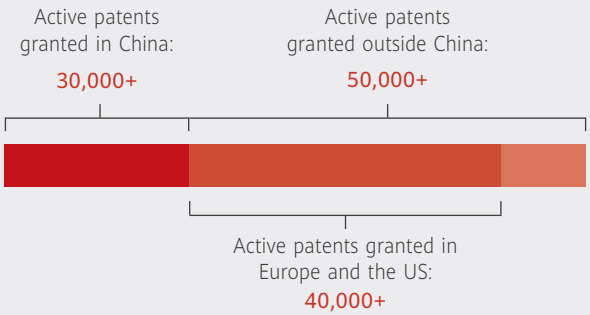
  - Ramped up efforts to protect the digital sovereignty and privacy of customers, and lay a solid foundation for building trust in the digital society.
  - Joined hands with industry players and academics from around the world to actively drive the development of trustworthiness theories, standards, and specifications.
  - Become a major player and contributor of trustworthiness-related work groups in the ISO, Internet Engineering Task Force (IETF), 3rd Generation Partnership Project (3GPP), and European Telecommunications Standards Institute (ETSI).
  - Actively sought certification for our trustworthiness from industry organizations, like gaining the CC EAL5+ certification for the HongMeng Kernel, making it the first commercial microkernel in the industry to receive this certification, and the CC EAL4+ certification for EulerOS.
  - Released the Huawei Trustworthiness Framework.
  - Continued our research and exploration into cutting-edge technologies, including AI trustworthiness, post-quantum security, differential privacy, and the digital trust mechanism.



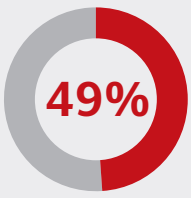

The Huawei Trustworthiness Framework incorporates the industry's best system engineering practices into Huawei's end-to-end process and helps improve Huawei's overall capabilities in delivering trustworthy, quality products to customers.

Huawei is one of the largest patent holders in the world. As of December 31, 2019, the number of active patents held by Huawei exceeded:

**85,000**



Huawei has consistently invested over 10% of its annual sales revenue into R&D.




In 2019, we had approximately 96,000 R&D employees, accounting for 49% of our total workforce.


Huawei's R&D expenditure totaled CNY131,659 million in 2019, accounting for 15.3% of the company's total revenue.

Huawei's total R&D investment over the past decade has exceeded:

**CNY600,000 million**

## Improving the Management System

Our global management system enables the company-wide promotion of our corporate culture and the effective management of our business. Ultimately, we aim to:

- Stay customer-centric, continue basing innovation on customer needs and technological leadership, and build an ecosystem for shared success;
- Ensure operational compliance and business continuity, and control risks;
- Guarantee the trustworthiness of both processes and results, and provide trustworthy, quality products; and
- Pursue corporate social responsibility (CSR) initiatives and promote social sustainability.

### Quality and Customer Satisfaction

Huawei aims to make its name synonymous with high quality in the ICT industry. To achieve this, we define our standard for "broad quality" as ISO 9000-based total quality management. We have implemented a strategy-driven, **all-hands, full-process, and full value chain** quality management system in alignment with our customers' needs.

- With a focus on value and experience, we drive efforts to extend quality management to every link along our value chain:
  - Previously, our "broad quality" concept was only applied to product lines and engineering. Today, it has been adopted by multiple business domains within the company and has become an integral part of every link along our industry chain.
  - With quality as our foundation, we continue to stress operational compliance and place cyber security and privacy protection at the top of the company's agenda.
  - To deliver Real-time, On-demand, All-online, DIY, and Social (ROADS) user experiences, we are striving to build the best digital operation platform. This platform will make operations more simple, prompt, and accurate, and raise the overall quality of our routine work and results.
  - Huawei actively works to capture the Voice of the Customer (VOC) through a wide array of channels to identify and consolidate key improvement points and continuously improve customer satisfaction.

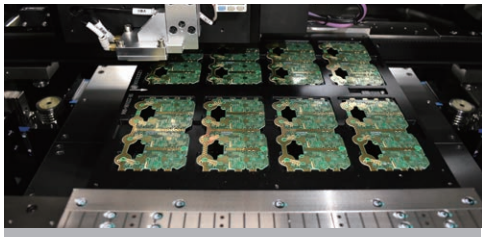
- We constantly push customer requirements and expectations up the industry chain to align quality strategies and encourage further collaboration for mutual development. We also call on suppliers to build their own business continuity management (BCM) systems and lead our value chain in the pursuit of high quality.

- We are working to increase quality awareness in all employees so the company can win with quality: We have continued to develop leadership in quality management, pursue a quality-first culture, and inspire a sense of responsibility and honor towards quality among all employees. This is achieved through the Huawei Quality Awards, internal and external audits and assessments, Top N Initiatives, Six Sigma and lean management initiatives, Quality Control Circle (QCC) projects, broad acceptance of improvement suggestions, and research into new approaches to improvement.

- We work to manage quality and embed quality requirements into all of our processes. Through our complete process system, including operational, enablement, and supporting processes, we have embedded requirements for compliance; trustworthiness; quality; internal controls; cyber security and privacy protection; information security; business continuity; Environment, Health, and Safety (EHS); CSR; and sustainability into multiple business domains. These domains include sales, marketing, R&D, delivery and services, supply chain, procurement, and manufacturing. We have also streamlined these processes from end to end, and worked to constantly sharpen our quality edge and mitigate major quality risks.

All aspects of Huawei's broad quality and relevant management systems have been certified by leading industry organizations, winning extensive recognition from customers.

- The company has been certified by multiple independent third parties, receiving certifications in ISO 9001 (quality management), TL 9000 (quality management for the ICT industry), IATF 16949 (quality management for the automotive industry), ISO 14001 (environmental management), OHSAS 18001/ISO 45001 (occupational health and safety management), IECQ QC 080000 (hazardous substance process management), ISO 50001 (energy management), ISO 22301 (BCM), ISO/IEC 20000-1 (IT service management), ISO/IEC 27001 (information security management), ISO 28000 (security management for the supply chain), ISO/IEC 27017 (cloud security management), ISO/IEC 27018 (protection of personal data in public clouds), ISO/IEC 27701 (privacy information management), ISO/IEC 29151 (protection of personally identifiable information), CSA STAR (cloud security management), PCI DSS (payment card industry data security), and SOC 1/2/3 (system and organization controls).



Self-calibrating, multi-plate printing.

5G-powered burn-in test

Power-on flow test

Over the air (OTA) test

Huawei uses 5G, IoT, and other digital technologies in its 5G equipment manufacturing processes, enabling real-time collection of key parameters, early warnings, automated calibration, and closed-loop equipment management. 5G technology improves the overall quality of our intelligent 5G equipment manufacturing.

- Huawei has passed comprehensive audits, and regular reviews and assessments, all conducted by many of the world's top carriers, as well as by major enterprise and industry customers. Audited domains include financial robustness, quality management, risk management, delivery and services, supply chain management, knowledge management, project management, trustworthiness and software engineering, cyber security and privacy protection, information security, EHS, CSR, sustainability, and BCM. We aspire to become a strategic partner that can assist our customers in their future-oriented transformations.

## Improving the BCM System

With today's highly globalized division of labor, Huawei must rely on a wide variety of third parties for procurement, manufacturing, logistics, and global technical services. This makes BCM critical for Huawei.

Through years of ongoing investment, Huawei has established a BCM system for domains such as procurement, manufacturing, logistics, and global technical services. This system covers end-to-end processes, from suppliers to Huawei, and on to our customers. As part of this system, we have developed and established effective measures to manage risks that arise during our daily work. Specifically, we have built up management organizations, processes, and IT platforms, prepared business continuity plans and incident management plans, and organized BCM training and drills for employees.

### Key Initiatives for BCM in R&D and Procurement

- Multi-sourcing solution: When designing a product, we strive to source raw materials, boards, and products from more than one supplier, prioritizing the supply diversity in raw materials. We prefer suppliers that have multiple manufacturing sites in order to safeguard sustained product availability.
- Scenario-specific stock-up: During mass production, we prepare safety stock of raw materials, semi-finished products, and finished products. This allows us to better respond to fluctuations in demand and supply.
- Supply and demand visibility: Huawei works closely with suppliers to ensure that demand forecasts, purchase orders, and supplier inventory are all visible through IT systems. This ensures that we get timely demand information and have adequate supply capacity to meet the demand.
- Strategic partnerships: Huawei establishes strategic partnerships with core suppliers to ensure stable supply. We also sign long-term supply assurance agreements with key suppliers to guarantee supply capacity and availability, and avoid material bottlenecks. Additionally, we encourage suppliers to establish their own BCM systems, arrange for special audits on suppliers, and follow up on their corrective action plans.

### Key Initiatives for BCM in Manufacturing, Supply, and Spare Parts

- Manufacturing and supply resource backups: Huawei has established strategic partnerships with multiple electronics manufacturing service (EMS) suppliers. Board manufacturing and supply capabilities are shared between Huawei and EMS suppliers, and between multiple EMS suppliers, to ensure there is always a backup. We have also established supply centers in Shenzhen, Europe, Latin America, and Dubai to also serve as integrated equipment backups for each other.
- Spare part reserves to support full-lifecycle operations: Huawei reserves spare parts according to market demand and historical usage before product end-of-life (EOL) is determined. After EOL is determined, we reserve enough spare parts for the full-lifecycle of the product in one go. This prevents any impact on the operational continuity of live customer networks.

Over the past decade, we have faced many major disasters, be they natural, political, economic, trade-related, or simply open conflict. However, Huawei has managed to mitigate these risks, ensure supply continuity, and achieve timely delivery of products and services. This shows that Huawei's BCM system – as part of our overall management system – is functioning properly. Huawei is a global company that works in the network infrastructure, IT infrastructure, cloud services, and smart device domains. We have worked with over 10,000 of suppliers and established sound, long-term partnerships with them.

The Bureau of Industry and Security of the US Department of Commerce successively added Huawei Technologies Co., Ltd., and some of its non-US affiliates, to the Entity List on May 16 and August 19, 2019, pursuant to §744.11 of the Export Administration

Regulations (EAR). This means the export, re-export, or in-country transfer of any item subject to the EAR (including hardware, software, and technologies) to Huawei or its listed affiliates requires a license from the Department of Commerce.

This has interrupted our business development, but that impact has been limited. As a staunch advocate of globalization, we source products from the global supply chain without depending on any one country or region, and then build our competitiveness upon this. Being added to the Entity List does not restrict or prohibit Huawei from providing products and services to our customers in accordance with compliance requirements. Looking to the future, we have confidence that with assistance from our partners, we can build an ecosystem for shared success and development as well as a secure, reliable, competitive, and healthy industry chain. This will ensure that we have the capabilities to meet customer requirements on our sustained supply and delivery, and will continuously provide premium products, solutions, and services to customers worldwide.

## Regulatory Compliance

Huawei conducts business with integrity and conforms to business ethics standards and all applicable laws and regulations. This is a key operational principle held by our highest levels of management. For years, we have worked hard to build a compliance management system that aligns with industry best practices and embeds compliance management into every link of our business activities and processes. These efforts continue to this day. Huawei places an emphasis on and invests heavily into building a culture of integrity. As such, every employee at Huawei is required to adhere to our *Business Conduct Guidelines (BCGs)*.

- We have a Chief Compliance Officer (CCO) to centrally manage the company's operational compliance. The CCO reports to the Board of Directors. Every business department and subsidiary of our company has also appointed a compliance officer and set up their own compliance teams, taking responsibility for the management of their own operational compliance work.
- We identify and assess risk with reference to applicable laws and regulations and business scenarios. On top of this, we have set compliance objectives, developed control measures, and incorporated them into all of our business activities and processes. This ensures effective compliance management and oversight in each business link. Huawei also conducts checks and audits to verify the effectiveness of our compliance management system and continuously optimize the system through root cause analysis and targeted corrective action.
- We attach great importance to and continuously raise the compliance awareness and capabilities of our employees. Through training, publicity, assessments, disciplinary action, and more we push employees to fully understand both the company's and their own responsibilities and obligations to ensure compliance and incorporate that understanding into their behavior.
- With an open mind, we proactively work with customers, partners, regulators, and other stakeholders on compliance, and communicate our compliance principles and practices to them to constantly enhance mutual understanding and trust.

### Compliance Management in Each Domain

Huawei has long been dedicated to ensuring better compliance across multiple domains, including but not limited to trade compliance, financial compliance, anti-bribery, intellectual property and trade secret protection, and cyber security and privacy protection. Compliance requirements have been embedded into our policies, systems, and business processes.

#### Trade Compliance

Huawei has long been dedicated to complying with all applicable laws and regulations of the countries and regions in which it operates. These include all applicable export control and sanction laws and regulations of the UN, China, US, and EU. We have worked hard for more than 10 years to establish a mature and sustainable internal system for trade compliance in line with industry best practices.

We have also brought in industry best practices and established an integrated trade compliance management organization within the company. This organization manages trade compliance across both group functions and field offices. We have also established specialist teams in our global offices that track changes to local laws, integrate trade compliance into the company's rules and processes, and manage

and oversee trade compliance in each link of our business operations, ranging from procurement, R&D, and sales, to supply and services.

Huawei continuously works to increase employee awareness of trade compliance, and requires them to sign the *BCGs* each year, which includes commitments to observing applicable export control laws and regulations. Huawei provides a wide variety of training on trade compliance to managers and employees across the company. These efforts, combined with targeted training for specific business scenarios, allow employees to fully understand the company's and their own responsibilities and obligations regarding export control.

Ever since Huawei Technologies Co., Ltd. and some of its affiliates were added to the Entity List by the US Department of Commerce, the company has reiterated the importance of compliance with export control and work to ensure control measures are in place. We have also promptly communicated with our customers, suppliers, and other partners, enhancing mutual understanding and trust.

## Financial Compliance

Huawei earnestly fulfills legal obligations and social responsibilities, and attaches great importance to the management of financial compliance risks, including but not limited to the risks of financial sanctions, money laundering, and terrorist financing. We invest ongoing efforts into building a culture that is conducive to financial compliance and raising employee awareness in this regard. We manage key elements for financial compliance according to factors such as country, customer, and transaction type, incorporate key control points into our procurement, sales, and treasury processes, and constantly improve our IT systems, ensuring the financial compliance risks of different business domains are effectively managed before, during, and after the process.

## Anti-Bribery Compliance

Huawei has a zero tolerance policy towards corruption and bribery. We will continue to strengthen our anti-bribery compliance system at the group and subsidiary levels in four ways: a culture of compliance, governance and oversight, compliance risk assessment and prevention-discovery-response techniques, and continuous operations. In addition, we have assigned key roles for the group and business departments, who are responsible for controlling anti-bribery risks and providing support for operations of the anti-bribery compliance system.

## IPR and Trade Secret Protection

**Respecting and protecting IPR:** Huawei invests long-term in R&D and continuously enriches its IPR portfolio. Huawei is one of the world's largest patent holders, and the company believes that respecting and protecting IPR is the foundation of innovation. As a follower, practitioner, and contributor of IPR rules, as well as an innovator, Huawei protects its own IPR and respects the IPR of others. Huawei has reached cross-licensing agreements with major ICT companies around the world, and works tirelessly to improve the environment for protecting innovation and IPR in the industry and across countries and regions.

**Respecting and protecting the trade secrets of others:** Huawei respects and protects trade secrets of third parties, and complies with all applicable laws and regulations relating to trade secret protection. In addition, we have embedded requirements for protecting trade secrets into our policies, systems, and processes. We deliver training on trade secret compliance to all employees, track relevant legislation around the world, and proactively communicate with judicial bodies and law firms. This has allowed us to build a mature management system for ensuring compliance with trade secret rules.

## Regional Compliance Management

Huawei has appointed a compliance officer for each of our subsidiaries worldwide and established oversight-oriented subsidiary boards, which manage and oversee the operational compliance of these subsidiaries.

- The company has incorporated compliance into key performance indicators (KPIs) of its subsidiaries, and established an award and disciplinary mechanism to steer compliance management among subsidiaries.
- Under the guidance of the group's unified compliance requirements, all subsidiaries set their own compliance management policies and systems with reference to local laws and regulations, and ensure appropriate compliance management in the countries and regions where we operate.

- Following thorough risk identification and assessment, subsidiaries set annual compliance objectives, develop and implement control measures, and regularly review progress, thereby ensuring compliance objectives are achieved.
- The subsidiaries also perform self-checks, inspections on certain aspects of their compliance management, and independent internal audits, and invite third parties to audit key compliance areas, to ensure that compliance management is effective.

## Management Transformation

The overall goal of Huawei's transformation is to "grow the harvest and build a more fertile environment". To build a fully connected, intelligent Huawei, we have dedicated ourselves to becoming an industry benchmark for ROADS experiences in all business areas, including marketing, sales, supply, services, R&D, human resources, and finance. We will continue to work hard at our own digital transformation, driving internal efficiency and effectiveness as well as customer and user satisfaction. To transform our management system, the company flexibly leverages HQ's open platform capabilities and consistent and foundational data platform. This allows us to address the unique needs of each customer type or business model.

- **IPD 2.0 Transformation**

  **The company's transformation of its Integrated Product Development (IPD) process focuses on improving business continuity and software engineering capabilities, and supporting the growth of our new businesses. Over the past years, we have endeavored to move *from coincidence to certainty*. Today, we are determined to *make the impossible possible*.**

  Through this program, we aspire to continuously improve our software engineering capabilities and build trustworthy and quality products, so that trustworthiness and high quality become an inherent attribute of and a synonym for Huawei products. By referring to trustworthiness theories and modern software engineering methodologies, we have been implementing this program across many domains and all of our business segments. These cover the management system, culture and awareness, employee upskilling, and many others, making the impossible possible.

  - **To build trustworthiness into the management system, we:**
    - Consolidated several departments into the Trustworthiness Theory, Technology & Engineering Lab and the Trustworthiness Enabling Department in each product line. These teams are tasked with enabling product trustworthiness.
    - Consolidated several departments into the Digital IPD Department to build a trustworthy software and tool chain.
    - Built trustworthiness into the IPD process.
    - Built trustworthiness into IT systems and the tool chain by developing trustworthy coding and trustworthiness build tools, and providing an efficient, responsive environment for product development, as well as a trustworthy process.
    - Constantly improved the performance and experience of our desktop cloud, computing cloud, and network infrastructure, and addressed their business continuity problems.
  - **Culture and awareness**

    In this area, we:
    - Worked to create a trustworthy software culture, in which every engineer pursues and writes clean code.
    - Refined the structures and operating models of lower-level organizations and made code quality through white box testing a KPI of all software professionals.
  - **Employee upskilling**

    The company now requests that all software engineers become specialists of trustworthiness and that they pass required certification within two years. Specifically, we:
    - Established a Trustworthy Software Engineering Academy and built a training and certification system and platform.

- Used this platform to provide holistic training and certification for key software roles such as software development managers, software engineers, system engineers, and product management engineers.

- Had more than 9,000 employees pass the required certification in 2019.

- **Trustworthy processes**

  - The key to a trustworthy process lies in preventing implantation, tampering, and backdoors throughout a repeatable and traceable process.

  - In 2019, we preliminarily built trustworthiness into the whole process from requirement definition, coding, and build, to testing, release, and deployment.

  - A total of 62 business domains and product lines have participated in this transformation.

- **Code refactoring**

  - We created a team culture that is conducive to clean code and continuous refactoring, optimized the product architecture based on trustworthy results, and refactored legacy code under this architecture, thereby cleaning the code.

- **Trustworthy results**

  The key to achieving trustworthy results is ensuring both security and resilience, systematically resolving issues on the architecture side, and making steady and gradual progress.

  - In 2019, we completed threat analysis, defined what a trustworthy product is, and set external certification goals for all our products. All of this informed our software architecture improvement.

  - Our MA5800 has passed the tier 4 certification of the National Institute of Standards and Technology (NIST)'s Cybersecurity Framework (CSF), Euler OS of CC EAL4+ certification, and HongMeng Kernel of CC EAL5+ certification.

- **Transformation in the Carrier Business**

  In this area, we implemented user-oriented and experience-driven digital transformation, and achieved quick product iteration.

  - Internally, we:

    - Transitioned the role of pre-sales tools from imposing control to supporting operations, and enabled them to support all major operating scenarios;

    - Extended the coverage of sales project tools to all scenarios, supporting online project operations throughout the entire process;

    - Gradually refined the online bidding and contracting workspace and supported standardized and coordinated reviews for typical scenarios;

    - Made the Three Cloud the company's major digital marketing and sales platform for customer engagement;

    - Fostered a habit of acquiring data and managing everyday work using smartphones among managers, taking us close to hitting our target of no offline reports.

  - Externally, we:

    - Embedded the Integrated Service Delivery Platform (ISDP) into customers' production processes, allowing for multiple parties to manage delivery projects in a well-coordinated manner;

    - Kept transaction information structured, improved the transaction efficiency of both the buyer and seller, and continuously improved customer loyalty.

- **Transformation in the Enterprise Business**

  In this area, we:

  - Built a secure, compliant, and efficient digital operation platform, along with identity, policy, business performance, and incentivization centers that target partners such as governments and enterprises, with a focus on supporting operations and business continuity.

- Improved our mid-end capabilities for sales, marketing, and services.

These efforts have not just provided a series of digital tools for partners and employees, but also improved partners' capabilities to independently make transactions. With these tools, it is simpler and more efficient for partners to do business with Huawei, driving the growth of our global enterprise business.

- **Transformation in the Consumer Business**

In this area, we stay consumer-centric and experience-driven, and are committed to building a secure, compliant, and efficient digital operation command system. Centering on four major business streams and the architecture of our core business capabilities, we established product teams comprising both business and IT professionals and implemented a strategy for cloud-based and service-oriented mid-end service management, as well as investing ongoing efforts into delivering better value streams and IT products. Specifically, we:

- Concentrated efforts to optimize and digitize business processes of the planning system from end to end, and constructed the delivery fulfillment center and supply center, guaranteeing the balance of global supply and demand, and supply continuity.
- Launched an integrated, official website to support the company in winning over markets outside of China, leveraged e-transactions on Pmall to help the China Region engage directly with lower level distributors, and rolled out a one-stop work station that integrated a service hotline and store repair center, as well as a retail store transaction platform.
- Continued promoting the digitization of product development and transformation driven by user experience, and built an ecosystem management system to support the full-scenario business strategy.
- Built the business architecture and process system, and launched the product finance management system, enabling estimation across all domains as well as rolling forecasts on a monthly basis.

- **Transformation of the Integrated Supply Chain**

In this area, we:

- Continued efforts to build a digital and proactive supply chain. The ISC+ transformation program we implemented over the past years has honed our service-oriented and digitization skills. On this basis, we have sharpened our expertise in adaptive planning, differentiated and simplified order fulfillment, and automated logistics, while guaranteeing supply and business continuity.
- Achieved initial success with our construction of the Agile Bee automated logistics center and Lingkun intelligent operation center, which supported the digital transformation of business operations for our supply chain.
- Ensured that our digitization of the supply chain, transaction flows, and products could help deliver a B2C-like experience to our B2B customers.

- **HIS Digital Platform**

As a unified digital platform that supports the company's digital transformation, Huawei IT Services (HIS) provides a wide array of platform and infrastructure services for internal applications. HIS also serves as tenant of HUAWEI CLOUD, delivering equidistant experiences for all global services.

Specifically, we:

- Built a data lake, which preliminarily addressed the problem of data silos.
- Helped field offices independently analyze data through data services in forms such as flat-wide tables, models, and cards, which was a huge step forward compared with the offline data analytics approach we previously adopted.
- Continuously enriched the service portfolio and released the HIS service framework. This framework provides tailored services for R&D, Business Enablement Team (BET), and employees from different business departments.

- **Transformation in Field Offices**

  Over the past year, field offices have actively explored and practiced new approaches to the digitization of transactions, production, and operations. The ultimate goal is to make transactions with customers simpler and more efficient, and improve customer satisfaction. In these areas, we performed:

  - Transaction digitization: Eliminated barriers to accessing Huawei systems and provided online channels, making it easier for customers to do business with Huawei. This created synergy between Huawei and our ecosystem partners.
  - Production digitization: Automated production allowed instructions to be sent directly to the site, enabled the efficient transfer of physical goods and intelligent logistics, and ensured visibility throughout the entire process.
  - Operation digitization: Shifted from post-event reporting to real-time operations by launching an Intelligent Operation Center (IOC). As an operation command platform, when coupled with ground support, this IOC can quickly locate and analyze issues, provide early warnings about business risks, and facilitate the closed-loop management of these issues and risks, thereby ensuring real-time operations.

## Organizational Vitality

Huawei has invested much effort into interpreting and communicating the company's new vision to its employees. Through this vision, we work to ignite a stronger sense of mission amongst our employees. By instilling a greater sense of honor among our employees, we aim to inspire a stronger sense of responsibility and drive for continuous dedication. In addition, we have simplified management based on trust in people and continued to implement differentiated management mechanisms for different employee groups and businesses. These efforts combined have helped us create an organizational climate that values trust, collaboration, and dedication, and boosted the vitality of the organization as a whole.

Our initiatives to boost organizational vitality focus on five areas:

- Refining organizational management by:
  - Redoubling efforts to consolidate a business and platform management mechanism primarily through the Consumer Business Managing Board, ICT Infrastructure Managing Board, and Platform Coordination Committee.
  - Rolling out the Representative Office Contract Review and Conclusion Transformation Program, which explored novel organizational and operating models for complicated business scenarios in large representative offices and encouraged all representative offices to increase per-capita contributions by "growing the harvest and building a more fertile environment", while ensuring operational compliance.
  - Further streamlining and optimizing field and functional organizations, and encouraging further delegation of authority to lower levels and field offices, which has helped increase the vitality of all business units.
- Implementing better leadership management by:
  - Continuing to stress responsibility fulfillment results, and investing sustained effort in selecting and developing managers with successful track records.
  - Actively searching for outstanding high-potential talent from key projects, giving them more opportunities, and boldly deploying them to key positions to encourage more outstanding talent to emerge.
  - Extending our pilot of a dedicated talent development plan (i.e., fast-track promotions), applying the Manager Capability Assessment mechanism to more senior managers, ramping up efforts to reposition unqualified managers, and ensuring that managers willingly accept promotions or demotions.
  - Improving operations of management teams at different levels to boost operating quality and push these teams to step up to the plate.

- Building stronger talent pipelines for the company by:
  - Bringing a sustained flow of top minds into the company with our global vision and world-class research topics, so that they can help us better implement our business strategy.
  - Establishing a mechanism for internal mobility and rotation via training and practice sessions, helping employees update their skillsets.
  - Strengthening competency and qualification management, consolidating rule-based operations within profession committees, pushing them to fulfill all of their responsibilities, and encouraging employees to hone their expertise.
  - Optimizing individual performance management by encouraging teamwork, rewarding those who take on challenging assignments, and shifting our focus from pure individual output to the combination of individual output, value created for customers, contributions to the output of others, and building on the output of others.
  - Continuously promoting the Talent Reservoir Transformation Project and customized management solutions for specialists, as these solutions help develop employees, who act as the foundation of the company's operations.
  - Attaching greater importance to the development of local talent teams.
- Creating a better environment for employees by:
  - Continuing to refine and customize our incentive policies for different business segments and employee types.
  - Putting our core values into practice by staying customer-centric, persevering, and growing by self-reflection, while also pushing employees to stay dedicated and improve their operating capabilities.
  - Continuing to create an open and inclusive work climate that encourages trial and error and respects expertise, so that we can inspire creativity among junior employees.


Huawei was one of the recipients for the Top Employer Europe award. Huawei's West European Region does training in different formats.

# Cyber Security and Privacy Protection

## The Rapid Development of Digital Technologies Brings Both Opportunities and Challenges in Cyber Security

All industries are undergoing digital transformation, and technologies such as cloud computing, big data, 5G, IoT, and AI are being applied extensively. In addition, business ecosystems are becoming more open, service rollout is becoming faster, and solutions are becoming more diversified and made available globally. These innovations bring convenience, opportunities and benefits. However, they also create new challenges to cyber security and privacy protection. In 2019, 5G became a reality. It offers significant opportunities but also faces security challenges brought by new services, architectures, and technologies, as well as higher requirements in terms of user privacy protection. AI is a new general-purpose technology that will profoundly enhance every industry and every organization, creating new incentives to address existing and emerging cyber security threats.

As a leading global provider of ICT infrastructure and smart devices, Huawei is proud to have helped industries go digital, thereby bringing digital to every person, home and organization. As digital transformation initiatives accelerate across the world, we have a clear responsibility to ensure cyber security and privacy protection are a top priority. We have implemented and maintained a comprehensive end-to-end cyber security assurance system. Over the past three decades, we have built more than 1,500 networks together with our carrier customers, serving over three billion people in more than 170 countries and regions around the world, and we have maintained a solid track record in security throughout. Huawei is the leading provider and designer of enhancing 5G security. We have provided more manpower and resources to the international bodies than anyone else, and we are the No. 1 contributor of proposals to the 5G security standardization initiatives which have been accepted and adopted by the industry. For example, 385 proposals submitted by Huawei were accepted by 3GPP SA3, which accounts for 24.6% of all proposals accepted in 2019, making Huawei the top contributor of security proposals.

## Helping Our Customers Secure Their Networks and Devices with Secure, Trustworthy, and High-Quality Products

Over the past two years, we have reviewed our approach to security and privacy, analyzed the directions in which new technologies are heading and the current and future challenges facing our customers. As a consequence, we have enhanced our cyber security and privacy protection frameworks operating on the assumption that in this globally intertwined world, the ICT environment is insecure and will face constant attacks.

Throughout 2019, the frameworks guided the way in which we continued to drive process transformation, solutions, security engineering capabilities, security technologies and standards, independent verification, supply chain, and personnel management. This has enabled us to proactively enhance our end-to-end cyber security assurance capabilities. Some of the key activities undertaken in 2019 are highlighted here:

- **Heavily invested in software engineering capability transformation** to ensure secure, trustworthy, and high-quality products: We simplified our products and solutions as much as possible, implemented the latest thinking about security architecture and development, and progressively we are upgrading all appropriate products and solutions to the latest thinking, technology components and partners. We have systematically built and deployed resilient architecture design methods, and have launched the distributed automatic binary vulnerability mining platform. Moreover, we have improved our security design tools, the code security scanning cloud, security test cloud, and fuzz test cloud. These initiatives greatly enhanced our security engineering capabilities enabling us to help our customers safely digitize their businesses and create value for their customers.

- **Maximizing technological innovation to reduce risks to customers:** We have introduced full-stack security technologies into ICT products to enhance product security and resilience. These technologies include host intrusion detection, sandboxing functionality, container security, CPU side-channel attack detection, web application security, and intelligent risk control. We have also deployed memory code integrity measurement on 5G gNodeBs ensuring runtime code security. Furthermore, we have enhanced kernel integrity protection on mobile phones, and applied key security technologies such as real-time detection of kernel attacks and AI-based detection of unknown threats to improve mobile phone security. Another area in which we executed innovation was in mobile apps. Dynamic and static privacy data access compliance detection technologies will detect exceptions in mobile applications, such as permission abuse, malicious behavior, and pirated applications. This not only ensures that the AppGallery complies with Android Green Alliance 2.0, but also provides for a clean and sustainable application software ecosystem.

- **Maximizing the use of AI in developing security products and solutions:** We have launched a series of security products and components centering on AI-powered security risk identification, security situational awareness, security risk prevention and response, and security ecosystem. These tools are integrated with our 5G, IoT, and cloud solutions to provide intelligent network boundary protection and defense, real-time situational awareness, and efficient closed-loop handling of security risks, helping customers build network resilience and protect themselves and their customers.

- **Strengthened the independent verification mechanism:** We have fully supported the independent verification of Huawei cyber security by stakeholders. In addition, we have assured and verified our cyber security management systems, products, services, and personnel through quality monitoring, internal and external auditing, and standards certification, meeting stakeholders' cyber security requirements across all of our business processes (e.g., R&D, sales, service, and supply) helping us to enhance external confidence in Huawei's overall approach to cyber security. Take product security standards certification as an example. We continue to work with authoritative certification organizations and third-party labs in the UK, Germany, France, the Netherlands, Spain, and Sweden to obtain high-level certification. In 2019, our major products obtained more than 20 cyber security and privacy certifications inside and outside China. These include:

  - HongMeng Kernel: CC EAL5+ certification
  - HUAWEI CLOUD: World's first batch of ISO/IEC 27701:2019 certification
  - EulerOS: CC EAL4+ certification
  - EMUI 10.0: ePrivacyseal
  - Kirin 990 5G chip: Financial security certification from the People's Bank of China

  Our bug bounty program in HUAWEI CLOUD, Huawei Mobile Services, mobile phones, and other domains is a continued success. We have also collaborated with multiple White Hat security experts to build a responsible, transparent, collaborative, and secure vulnerability ecosystem, all contributing to ever safer and more resilient technology.

- **Supply chain cyber security risk management and capability building:** Huawei's comprehensive supply chain security management system is certified to ISO 28000, enabling us to identify and control security risks throughout the supply chain lifecycle. We produced 28 types of industry-leading material security specifications and security sourcing test standards, along with 11 sets of industry-leading standards for the certifications of our supplier cyber security systems. Our suppliers must pass a rigorous security sourcing test and obtain system certification before they are accepted. In 2019, we assessed, tracked, and managed the risks of more than 3,800 suppliers worldwide. We signed data processing agreements (DPAs) with more than 3,000 suppliers and continued to run due diligence to ensure compliance with privacy obligations.

  We released the supply availability security baseline and implemented it in all of our 145 newly-developed products. Furthermore, we developed an in-transit exception dashboard to provide real-time warnings about exceptions such as abnormal stay and route deviation. We restructured the product delivery tracing system, allowing us to trace software information within one hour and trace hardware information (from incoming materials to delivery to customers) within one day to facilitate the speedy and transparent resolution of issues and to further mitigate against risks.

- **Employee skills enhancement:** We conducted training across a range of cyber security and privacy protection topics and held exams for all Huawei employees, with a 99% success rate. Employees continue to be encouraged to improve their cyber security and privacy expertise through external training and professional certification. To date, more than 500 employees have obtained external professional certifications such as IAPP (privacy) and CISSP (cyber security). Our Cyber Security & Privacy Protection Knowledge Center, a one-stop learning and training platform, was launched and is already helping employees improve their skills and enhance their knowledge. Over 620,000 hours of coursework has been completed by our employees, with a total of more than 290,000 individual enrollments in our 111 courses. This means the average Huawei employee spent two hours taking cyber security and privacy training.

- **User privacy protection obligations:** Huawei remains committed to complying with privacy protection laws and regulations around the world. We have adopted industry-recognized best practices, and have embedded Privacy by Design into product and service development processes. These initiatives contribute to a holistic framework for personal privacy protection policy. We have increased our investment in the management of data subject rights assurance, developed explicit management requirements and processes, and deployed them in a unified IT system ensuring that we can promptly and effectively process data subjects' requests. To date, we have handled more than 10,000 data subjects' requests. In addition, we completed 26 internal audits to ensure that our personal privacy protection policy has been implemented in a consistent and effective manner, and we underwent and successfully passed five external audits as well as one professional inspection by a regulator.

- **AI governance:** In 2019, Huawei released the *Thinking Ahead About AI Security and Privacy Protection* white paper, setting out Huawei's viewpoint on the current security and privacy challenges surrounding AI. The paper explores key topics such as technical reliability, societal applications, and legal requirements and responsibilities. In addition, the paper proposes a number of feasible governance models, including planning trustworthy technical solutions, and adopting a shared responsibility model for AI security and privacy. The paper calls on all stakeholders to work together towards shared goals and for the healthy development of AI into the future.

Our experience tells us that no one has a monopoly on all of the good ideas and the more we share, the more we discuss the challenges we all face, the better solutions, standards and approaches we can develop to raise the benchmark for all. Huawei remains determined to communicate and cooperate with stakeholders in a manner characterized by openness & transparency, integrity & trustworthiness, and accountability. We strive to address cyber security and privacy protection challenges through technological innovation, standards development, and management improvement. We are relentless in our mission to help customers establish their own cyber resilience and risk mitigation strategies.

On March 5, 2019, Huawei unveiled a Cyber Security Transparency Centre in Brussels. This center serves as a platform where government agencies, technical experts, industry associations, and standards organizations can communicate and collaborate to address the issue of cyber security. The center has three major functions:

- The center showcases Huawei's end-to-end cyber security practices, from strategies and supply chain to R&D and products and solutions.

- The center facilitates communication and cooperation between Huawei and key stakeholders to explore and promote the development of security standards and verification mechanisms, facilitating technological innovation in cyber security across the industry.

- The center provides a product security testing and verification platform and related services to Huawei customers.

Since it opened, the center has received more than 1,500 visitors from governments, customers, the media, industry organizations, and standards organizations. Several verification and testing projects have been completed successfully. Moving forward, we welcome all stakeholders to use the platform to collaborate more closely on security standards, verification, and secure innovation. Together, we can improve security across the entire value chain and build mutual, verifiable trust.


On January 30, 2020, Huawei held a debate on 5G cyber security in the transparency center, following the issuance of the EU 5G "toolbox".

## Openness. Collaboration. Shared Success

Digital transformation and intelligent transformation are inevitable trends that are profoundly changing each and every industry. Our entire industry agrees that globalization is the way forward, and that building and sharing global ecosystems is key to success. Huawei is committed to dissolving boundaries and working with partners around the world to build an industry that works for every player because we work with, share with, and create new opportunities for our ecosystem partners. That is how we create value both for ourselves and for the wider community.

In addition, we continue to work with industry partners to build a more inclusive and sustainable industry ecosystem, with a focus on driving progress towards the UN's Sustainable Development Goals (SDGs). As we create a digital and intelligent world together, we are bringing its benefits to more individuals, homes, and organizations.

### Ecosystem and Industry Development: Our Principles

Huawei's goal is to foster a fertile business environment that spans the entire globe, while remaining close to our ecosystem partners. Huawei itself focuses on ICT infrastructure and smart devices, and through open innovation, we will help build a welcoming and robust industry for all. Our ecosystem will be digital, intelligent, and localized, and it will provide a healthy space for our partners' content and applications to develop. Together, we provide customers with a broad range of specialized solutions and services. When it comes to ecosystem and industry development, we have three guiding principles:

- Growing the industry and enlarging the market. This is more important than increasing our own market share.
- Cooperation is more important than competition. We enable others; we till the soil. We will not compete for profit with our partners, and will stay committed to openness, collaboration, and shared success.
- Sharing value with others. As we move towards a fully connected, intelligent world, Huawei will be the glue that holds ecosystems together and the catalyst for ecosystem success. Sharing value means that we can unite as many people and companies as possible, to speed up the process of industry digitization.

## Key Progress and Industry Contributions

In 2019, we continued to work hard to earn the trust and support of many industry organizations and partners, with whom we joined forces to maintain a fair, just, and open industry environment. International organizations including 3GPP, GSMA, ETSI, IEEE, IETF, the Linux Foundation, Apache, and TMF, have issued public statements in support of inclusivity for all members in public industry activities, including Huawei, insofar as the law permits. Together, we can do more for the industry.

As of the end of 2019, Huawei is an active member of more than 400 standards organizations, industry alliances, and open source communities, where we hold more than 400 key positions. We serve as a member of the board or executive committee in 3GPP, IETF, IIC, IEEE-SA, the Linux Foundation, BBF, ETSI, TMF, WFA, WWRF, CNCF, OpenStack, LFN, LFDL, IFAA, GP, CCSA, AII, CUVA, and VRIF.

In the industry space, Huawei actively contributes to industry organizations in an effort to better support the industry and expand the market for everyone. In the customer space, Huawei creates platforms and forms business alliances to address our customers' specific business needs. We work with ecosystem partners in a process of open innovation to create customized solutions that give our customers the digital edge for success in their own business. In the government space, we work with our industry partners worldwide to offer national governments recommendations on policies for ICT adoption and industry digitization. We help governments improve their industry policy so that new technologies like 5G, AI, IoT, and cloud can deliver inclusive economic growth for their country.

### Standards organizations

**We work closely with international standards organizations and proactively contribute. We help grow the industry by driving the upgrade of ICT technology and promoting broader collaboration. We help vertical industries go digital, and work with ecosystem partners to create an ecosystem where everything is connected.**

We are active in the development of standards to support the growth of the ICT infrastructure and smart device industries. We contribute to more than 200 standards organizations on an ongoing basis. To date, we have submitted over 60,000 standards contributions. By working closely with key international standards bodies and industry organizations, we are helping to drive the global industry forward.

- We support 3GPP, working with industry partners to develop a consistent set of global 5G standards so as to accelerate the practical application of 5G in a highly connected world.
- We are working actively with the ITU to produce comprehensive standards for 5G transport networks and optical transport networks (OTNs). This work helps support advances in IP network technologies that will enable sustained growth for the industry. We also support the efficient allocation of spectrum resources for mobile communications on an international level.
- We are active members of the IEEE. Under its umbrella, we work with many industry partners on the next-generation Wi-Fi and Ethernet technologies. These technologies will support industrial automation and connected vehicles. We are also developing standards for smart cities and IoT for the power industry; these are key to drive the digital transformation of vertical industries.
- Through the ETSI, we are working with telecom carriers to explore the cloud computing architectures of the future and develop standards for the automation of telecom networks. We are also part of industry-wide efforts to build up a multi-access edge computing (MEC) ecosystem, so that innovative new applications can reach the market more quickly.
- Alongside China's big three carriers, we are building China's system of 5G standards and helping industries incorporate this new technology to ensure a smooth evolution to 5G.
- We engage with emerging industries: We are contributing to standards in domains such as AI, consumer-facing businesses, and intelligent vehicles. We support the establishment of standards organizations and industry ecosystems in emerging domains.

## Industry alliances

**Huawei actively supports emerging industries. Alongside industry partners, we establish and promote industry alliances to help build alignment across the industry so that new applications can be quickly commercialized and the industry can develop more sustainably.**

- We join and support emerging ecosystems: We have joined forces with industry partners to establish industry alliances such as the 5G Applications Industry Alliance (5GAIA), 5G Deterministic Network Industry Alliance, 5G Cloud VR Industry Alliance, AIoT Industry Alliance, and the Intelligent Big Video Data Industry Alliance. These alliances promote the development of key technologies, formulate and promote industry standards, and encourage training and skill transfer. This helps accelerate innovation and elevate each industry to the next level.

- We have expanded our partnership with ITU-D to deliver digital skills: In September 2019, Huawei and ITU-D signed a memorandum of understanding for a high-level partnership. We will expand our work with the ITU across its global network for delivering digital skills to different communities. At centers of excellence run by ITU partners around the world, we will provide training courses, access to expert resources, and other support for new technologies like AI and 5G.

- We are active members and supporters of major international industry alliances, including GSMA, the Alliance of Industrial Internet (AII), the 5G Automotive Association (5GAA), and the Edge Computing Consortium (ECC). Through these groups, we are driving the digital transformation of the telecom industry, and speeding the adoption of digital technology in other industries, which will help provide a path to sustainable growth for the ICT sector.

  - We launched the 5GAA with our partners in Europe, and continue to carry out joint innovation in autonomous driving, smart manufacturing, and other related domains.

  - We started a task group for smart IoT models within the AII, which will address challenges in IoT application development and better enable the industry as a whole.

  - We helped create the 5G Alliance for Connected Industries and Automation (5G-ACIA) to integrate 5G into smart manufacturing, advance the Industry 4.0 model, and create new applications and scenarios for 5G in smart manufacturing.

## Open source communities

**We embrace open source and continue to contribute more resources to open source projects. We are a major contributor to leading open source foundations and communities, and we are bringing more open innovations and open ecosystems to the ICT industry.**

- We continued to increase our contributions to major global open source communities like CNCF, OpenStack, OCI, ONAP, OPNFV, Akraino, Acumos, Hadoop, and Linaro.

  - We sit on more than 10 different boards of major international open source communities. Huawei serves in more than 200 Technical Steering Committee, Project Team Lead, and Core Committer roles. We are among the leading code contributors in these communities.

  - We are an active supporter of open source in the telecom sector as a route to industry innovation and industry digitization. We contribute NSMF and CCVPN use cases to ONAP, which has helped to enable interoperability between different vendors and carriers, and bring innovative technologies into commercial use more quickly.

  - Within Acumos, we championed and delivered integration with ONAP, so that machine learning can power intelligent O&M that is accessible to the entire industry.

  - We contributed interfaces and blueprints to ONAP and Akraino projects so that they could harmonize with standards organizations like 3GPP, ETSI, and IETF.

- We add value to open source software and make it easier to use for developers.

- In partnership with open source communities, we launched the OpenLab program that supports better integration across communities, and released integration and verification baselines.

- We support open certification to enable more effective open source commercialization. Under the Linux Foundation Networking (LFN) umbrella, we led the OPNFV Verification Program (OVP) to ease interoperability issues between vendors.

- In the ONAP community, we teamed up with China Mobile and Tencent to develop a showcase application that supports automatic deployment and intelligent control of 5G private lines for third-party applications. This application won the 2019 Innovation Award at the Global Network Technology Conference.

- We work with leading open source communities to build out the Arm ecosystem. We continue to provide the infrastructure needed for Arm development, compilation, and verification, and share best practices in optimization for Arm. With our support, more open source communities can support development, optimization, and release on Arm.

- More open source releases of Huawei software: We announced plans to release the code for our ARK Compiler, OpenEuler, and GaussDB OLTP standalone version. We also released a number of complete projects, including basic software, cloud native services, big data, microservices, and storage. Examples include the release of Cyborg for OpenStack; CarbonData for big data; SODA for intelligent data and storage; KubeEdge and Volcano for cloud native communities; and ServiceComb for microservices. These open source projects have been widely used by developers and user groups.

## Technological innovation

**Huawei is committed to open innovation and close collaboration between industry and scientific researchers. By bridging the gap between innovation and standardization, we have become a meaningful contributor to global standards and industry ecosystems.**

Only innovation can drive progress and steer our path to the future. Huawei itself is shifting from an Innovation 1.0 model to Innovation 2.0. In Innovation 1.0, we focused on innovation in technology and engineering to meet our customers' needs. Innovation 2.0 means breakthroughs in basic theory and developing new basic technologies, driven by our shared vision for the future. We continue to push to the very edges of the Shannon Limit and break through the confines of Moore's law, so that our technologies can continue to support the exponential growth of information in the intelligent world.

- Huawei has helped bring together industry demand with the academic researcher community. We have engaged in a number of research partnerships, and continue to provide increased support for research into basic technologies and basic theories.

  - We enable two-way communication and partnerships between universities and businesses. Our academic salons have helped academic researchers better understand real-world needs and challenges that the industry faces. On this basis, we and our research partners have been able to jointly develop research proposals that directly address the constraints of existing technology.

  - The Huawei Innovation Research Program (HIRP) has provided funding for innovation projects at more than 400 universities and research institutes, and more than 900 businesses across over 30 countries and regions. In Europe, this program has disbursed a total of US$100 million in research funding. We work with 140 European universities, research institutes, and consulting agencies, and have supported the work of more than 230 researchers and over 150 academic institutions in Europe.

- We established the Huawei Institute of Strategic Research, which will boost our ability to research the cutting-edge technologies that are still five to ten years into the future. It will propose questions and potential solutions based on our vision and our insight into the latest technology trends; identify future technology pathways and their commercial potential; and incubate new technologies, new product types, new business models, and new opportunities for the industry. This institute will ensure that Huawei does not lose its way and miss out on future opportunities.

- We have boosted investment in trustworthy technology to strengthen our position as a trusted supplier and partner in the industry. In 2019, we established a lab that will focus on innovations in trustworthiness theories and breakthroughs in key technologies. With this lab, we aim to improve our software engineering and develop new ways to enhance the trustworthiness

of our products and services, ensuring both processes and results are trustworthy.

## Business alliances

**We work with global partners to provide digital transformation services for end customers.**

- We work on an ongoing basis to expand and prime the ICT market for new growth, deepening and expanding relationships with solution partners worldwide. In 2019, we added more than 6,600 registered partners.
- We have expanded our program of joint innovation with global partners in AI, cloud, computing, 5G, and other domains. We have launched joint solutions with more than 1,200 partners in 10 major technological domains (e.g., Kunpeng and Ascend) across 16 key industries, including public utilities, electricity, and manufacturing.
- We work with our innovation partners on joint marketing and sales for new solutions, and jointly deliver digital services to end customers. We also provide more incentives for our partners to develop replicable solutions.
- We work closely with over 1,000 partners in Europe to develop innovative solutions. We have built OpenLabs in Munich and Paris. These OpenLabs give our partners access to Huawei's ICT capabilities, so they can leverage professional functionality in areas like 5G factories, industrial Internet, edge computing, and big data analytics to meet the needs of customers in manufacturing, transportation, smart city, and smart campus domains. We have helped a wide range of industries to digitize and pursue diversified growth.

## Ecosystems

**Huawei provides full-stack, open ICT capabilities and intelligence, enabling digital services across all scenarios.**

We use HUAWEI CLOUD to help developers improve their skills and offer new capabilities. Over 570,000 developers in the ICT sector are now registered with Huawei.

- We launched the Huawei Developer Program 2.0 to build a full-stack software ecosystem based on our Kunpeng and Ascend processors. We aim to deliver upgrades in our developer services in five key areas: products, enablement, alliances, communities, and incentives. Over the next five years, we will invest US$1.5 billion in this program.
- We have issued more than 260,000 Huawei certifications, and there are now more than 10,000 Huawei Certified ICT Experts (HCIEs) around the world. In addition, we have begun offering developer training courses and certification systems for Kunpeng and Ascend.

In the consumer sector, we are committed to working with global developers to build up the Huawei Mobile Services (HMS) ecosystem. We support innovation by application developers and partners, so that they can deliver better experiences for consumers.

- We have launched and will continue to enable the HMS ecosystem, which gives developers access to our HMS Core and HMS Capability, including 24 HMS Core kits.
- We offer multiple initiatives, such as the Shining-Star Program, to encourage global developers to join the HMS ecosystem and innovate. The initial investment in this program is US$1 billion.


APAC HUAWEI Developer Day
Huawei Consumer Business holds developer conferences worldwide to build the HMS ecosystem

## Industrial policy recommendations

**Huawei researches and consults on industrial policy, and offers recommendations to world governments on developing their local ICT sector. As an active participant in the digital economy, we also engage with international research into digital rules and digital governance to help spur ongoing growth.**

We regularly engage with governments and industry regulators around the world so that we can bolster growth in the ICT industry by jointly addressing key policy issues.

- We are active participants in national discussions on strategies for the digital economy. Examples include our involvement in supporting strategy development for the rollout of all-optical networks in China and Europe; and helping countries such as Myanmar, Bangladesh, and Tanzania make plans for efficiently allocating their Universal Service Funds (USFs).

- We work with telecom carriers in the UK to maintain dialogue with the Department for Digital, Culture, Media & Sport (DCMS) and Ofcom, the UK's communications regulator. These discussions focus on industry policies (e.g., spectrum allocation and future networks), new Telecoms Security Requirements (TSR), and the Statement of Strategic Priorities (SSP) for the telecom sector.

- We participate in public consultations in Germany with various digital policy committees, conferences, institutions, and ministries, and have engaged in discussions on digital policies through various channels, including:

    - The Federal Association for Information Technology, Telecommunications and New Media (Bitkom), the Association of Telecommunications and Value-Added Service Providers (VATM), the German Broadband Association (BREKO), the Federal Fiber Optic Connection Association (BUGLAS), and the Association of the Internet Industry (eco).

    - We have also regularly participated in public consultations and technical discussions with the Federal Network Agency (BNetzA), Federal Ministry of the Interior (BMI), and Federal Office for Information Security (BSI).

- We set up the Huawei Cyber Security Transparency Centre in Brussels, Belgium, with the mission of building a trustworthy digital environment for all. Through this facility, we have worked more closely with regulators, standards organizations, and customers on security standards, verification, and security innovation. We are building security along the entire value chain, with verification to enable mutual trust.

We actively participate in setting digital rules and shaping digital governance, to help build an open, fair, and inclusive business environment that drives the digital economy forward.

- We conducted forward-looking research on AI ethics and governance with research teams from the TUM Institute for Ethics in Artificial Intelligence (IEAI), the Alan Turing Institute, University College London, and the EU's High-Level Expert Group on Artificial Intelligence (AI HLEG).

- We published a series of recommendations for AI governance in a report entitled *Responsible AI: Building a Trustworthy Intelligent World*. In this report, we share Huawei's principles and best practices for AI governance:

    - We aim to build inclusive and responsible AI for the social good.

    - We adhere to the principles of transparency and fairness to ensure the security and reliability of our AI products, services, and processes.

    - We ensure the controllability and legitimacy of AI, and promote the healthy development of AI through multilateral and open collaboration while balancing innovation and regulation. This will ensure the shared success of all parties.

- We worked with leading global industry organizations to develop a white paper on industry digital transformation through the Global Industry Organizations (GIO). In this paper, we shared industry insights and the best practices of each organization, and developed a consensus on the need for alignment between organizations. This project has helped to develop an open forum for debate in the industry.

# Results of Operations

## Financial Performance

| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| Revenue | **858,833** | 721,202 | 19.1% |
| Gross profit | **322,689** | 278,171 | 16.0% |
| – Gross profit margin | **37.6%** | 38.6% | (1.0)% |
| Total operating expenses | **(244,854)** | (204,884) | 19.5% |
| – as % of revenue | **28.5%** | 28.4% | 0.1% |
| Operating profit | **77,835** | 73,287 | 6.2% |
| – as % of revenue | **9.1%** | 10.2% | (1.1)% |
| Net finance income | **178** | 253 | (29.6)% |
| Income tax | **(15,367)** | (14,301) | 7.5% |
| Net profit | **62,656** | 59,345 | 5.6% |

Revenue in 2019 totaled CNY858,833 million, representing a 19.1% year-on-year increase. Net profit grew by 5.6% year-on-year to CNY62,656 million. This is attributable to the following factors:

- As the consumer business grew rapidly and contributed a larger share to total revenue in 2019, the company's gross profit margin dropped by 1 percentage point from 2018.
- While we increased our investment in future-oriented research and innovation, branding, and sales channel development, we continued with our management transformation to increase efficiency. As a result, there was a slight increase in our total operating expenses as a percentage of revenue, up 0.1 percentage points compared with 2018.
- As interest expenses related to financing activities increased and net finance income decreased sharply, net finance income contributed less to our net profit.

### Total operating expenses

| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| Research and development expenses | **131,659** | 101,509 | 29.7% |
| – as % of revenue | **15.3%** | 14.1% | 1.2% |
| Selling and administrative expenses | **114,165** | 105,199 | 8.5% |
| – as % of revenue | **13.3%** | 14.6% | (1.3)% |
| Other (income)/expenses, net | **(970)** | (1,824) | (46.8)% |
| – as % of revenue | **(0.1)%** | (0.3)% | 0.2% |
| Total operating expenses | **244,854** | 204,884 | 19.5% |
| – as % of revenue | **28.5%** | 28.4% | 0.1% |

In 2019, Huawei continued to increase its investment in research and development for the future, such as in 5G, cloud, artificial intelligence, and smart devices, as well as in its business continuity plan. As a result, the company's R&D expenses as a percentage of revenue increased by 1.2 percentage points year-on-year.

In addition, the company increased investment in building its brand and sales channels for the consumer and enterprise businesses; however, the higher operating efficiency made possible by ongoing management transformation resulted in a decline of 1.3 percentage points in selling and administrative expenses as a percentage of revenue. Total operating expenses as a percentage of revenue increased slightly by 0.1 percentage points.

### Net finance income

| (CNY Million) | **2019** | 2018 | YoY |
|---|---|---|---|
| Net foreign exchange loss | **(1,340)** | (2,031) | (34.0)% |
| Other net finance gains | **1,518** | 2,284 | (33.5)% |
| Total net finance income | **178** | 253 | (29.6)% |

Net finance income in 2019 amounted to CNY178 million, a decrease of CNY75 million compared with 2018. Due to enhanced controls over illiquid currencies and decreased currency fluctuations in emerging markets, net foreign exchange losses decreased by CNY691 million in 2019. However, increased financing caused an increase in interest expenses. As a result, other net finance gains declined by CNY766 million, offsetting the gains from decreased net foreign exchange losses.

## Financial Position

| (CNY Million) | **December 31, 2019** | December 31, 2018 | YoY |
|---|---|---|---|
| Non-current assets | **154,768** | 135,678 | 14.1% |
| Current assets | **703,893** | 530,114 | 32.8% |
| Total assets | **858,661** | 665,792 | 29.0% |
| Among which: Cash and short-term investments | **371,040** | 265,857 | 39.6% |
| Trade receivables | **85,294** | 91,052 | (6.3)% |
| Contract assets | **53,012** | 48,276 | 9.8% |
| Inventories and other contract costs | **167,390** | 96,545 | 73.4% |
| Non-current liabilities | **116,869** | 73,477 | 59.1% |
| Among which: Long-term borrowings | **104,531** | 66,170 | 58.0% |
| Current liabilities | **446,255** | 359,250 | 24.2% |
| Among which: Short-term borrowings | **7,631** | 3,771 | 102.4% |
| Trade payables | **135,654** | 94,320 | 43.8% |
| Contract liabilities | **69,327** | 58,278 | 19.0% |
| Equity | **295,537** | 233,065 | 26.8% |
| Total liabilities and equity | **858,661** | 665,792 | 29.0% |

As of December 31, 2019, the balance of cash and short-term investments reached CNY371,040 million, up 39.6% year-on-year.

In 2019, Huawei's DSO was 58 days, 12 days shorter than that in 2018; ITO increased by 34 days to 111 days; and DPO reached 91 days, 14 days longer than that in 2018.

As of December 31, 2019, total short-term and long-term borrowings amounted to CNY112,162 million, an increase of 60.4% year-on-year. The primary purpose of these borrowings was to continue with our already heavy investment in key business and research and innovation for the future, and to invest in other key areas such as branding, sales channel development, and business continuity.

### Cash Flow from Operating Activities

| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| Net profit | **62,656** | 59,345 | 5.6% |
| Adjustment for depreciation, amortization, net foreign exchange losses and non-operating expenses, net | **25,814** | 14,090 | 83.2% |
| Cash flow before change in operating assets and liabilities | **88,470** | 73,435 | 20.5% |
| Change in operating assets and liabilities | **2,914** | 1,224 | 138.1% |
| Cash flow from operating activities | **91,384** | 74,659 | 22.4% |

In 2019, Huawei's cash flow from operating activities increased by 22.4% year-on-year to CNY91,384 million. This is attributable to the following factors:

- Net profit grew by 5.6% year-on-year.
- Depreciation, amortization, net foreign exchange losses, and non-operating expenses increased due to increased investment in areas like cloud and R&D. This in turn increased Huawei's total long-term assets and drove up depreciation and amortization.
- In 2019, changes in operating assets and liabilities contributed CNY2,914 million to the cash flow from operating activities, up 138.1% year-on-year. This is mainly due to the rapid growth of our consumer business and our increased operating efficiency facilitated by ongoing management improvement.

## Financial Risk Management

In 2019, we closely monitored the changes in our external environment and proactively assessed their impact on Huawei using the financial risk management system we have built over the past years. In addition, we continued to amend and improve our financial risk management policies and processes to further enhance our ability to withstand financial risks and better support our business development.

### Liquidity Risk

We have continuously worked to improve our capital structure and short-term liquidity planning, budgeting, and forecasting systems to better assess mid- to long-term liquidity needs and short-term funding shortfalls. We have implemented prudent financial measures to meet our liquidity needs and guarantee our company's business development, including maintaining a robust capital structure and financial flexibility, keeping a proper level of funds, gaining access to adequate and committed credit facilities, creating effective cash plans, and centralizing cash management. As of December 31, 2019, the balance of our cash and short-term investments had increased by 39.6% year-on-year to CNY371,040 million, further reducing our liquidity risks.

| (CNY Million) | 2019 | 2018 | YoY |
|---|---|---|---|
| Cash flow from operating activities | **91,384** | 74,659 | 22.4% |
| Cash and short-term investments | **371,040** | 265,857 | 39.6% |
| Short-term and long-term borrowings | **112,162** | 69,941 | 60.4% |

## Foreign Exchange Risk

Our presentation currency is CNY, but we have foreign currency exposure related to buying, selling, and financing in currencies other than CNY. According to our established foreign exchange risk management policy, material foreign exchange exposures are hedged based on a comprehensive analysis of market liquidity and hedging costs. We have developed a complete set of foreign exchange management policies, processes, and instructions. These include:

- Natural hedging: We structure our operations to match currencies between procurement and sales transactions, to the greatest extent possible.
- Financial hedging: For certain currencies where natural hedging does not fully offset the foreign currency position, we hedge through forward foreign exchange transactions.

In countries where local currencies depreciate sharply or that have strict foreign exchange controls, we manage foreign exchange exposure using different measures, including exchange rate protection and financial hedging. We have also adopted solutions like accelerating customer payment and promptly transferring cash out of these countries to minimize risks.

With other conditions remaining unchanged, exchange rate fluctuations will impact our net profit as follows:

| (CNY Million) | **2019** | 2018 |
|---|---|---|
| USD depreciates by 5% | **2,427** | (1,776) |
| EUR depreciates by 5% | **117** | 177 |

## Interest Rate Risk

Interest rate risks mainly arise from Huawei's long-term borrowings and long-term receivables. By analyzing interest rate exposure, the company uses a combination of fixed-rate and floating-rate financing tools to mitigate these interest rate risks.

1. Major interest-bearing long-term financial instruments held by the company as at December 31, 2019

| | **2019** | | 2018 | |
|---|---|---|---|---|
| | **Effective Interest Rate (%)** | **(CNY million)** | Effective Interest Rate (%) | (CNY million) |
| Fixed-rate long-term financial instruments: | | | | |
| Long-term borrowings | **3.99** | **37,338** | 4.07 | 30,762 |
| Trade and other receivables | **5.32** | **(1,692)** | 5.87 | (2,316) |
| Floating-rate long-term financial instruments: | | | | |
| Long-term borrowings | **3.82** | **67,193** | 3.82 | 35,408 |
| Trade and other receivables | **0.67** | **(1,259)** | 0.83 | (1,737) |
| Total | | **101,580** | | 62,117 |

2. Sensitivity analysis

Assuming that the interest rate increased by 50 basis points on December 31, 2019 and other variables remained unchanged, the company's net profit and equity would decrease by CNY264 million (in 2018, the amount decreased by CNY132 million).

## Credit Risk

The company has established and implemented globally consistent credit management policies, processes, IT systems, and quantitative credit risk assessment tools. It has established dedicated credit management teams across all regions and business units, and set up centers of expertise specializing in credit management in Europe and Asia Pacific. The company uses quantitative risk assessment models to determine customer credit ratings and credit limits and quantify transaction risks. It has also set risk control points for key activities across the end-to-end sales process to manage credit risks in a closed loop. Huawei's Credit Management Department regularly assesses global credit risk exposures and develops IT tools to help field offices monitor risk status, estimate potential losses, and determine bad debt provisions as appropriate. To minimize risk, a special process is followed if a customer defaults on a payment or poses an unacceptably high credit risk.

## Sales Financing

With its global coverage, Huawei's sales financing team maintains close contact with customers to understand their financing needs and taps into a wide range of financing resources around the world. As a bridge for communication and cooperation between financial institutions and customers, the sales financing team provides customers with specialized financing solutions that contribute to ongoing customer success. To transfer risks, Huawei arranges for third-party financial institutions to provide sales financing, such as export credit facilities, leasing, and factoring. These institutions bear the associated risks and profit from these operations. Huawei has established systematic financing policies and project approval processes to strictly control financing risk exposures. Huawei only shares risks with financial institutions on certain projects, and measures and recognizes the risk exposures to ensure that business risks are under control.

# Independent Auditors' Report

## Independent auditors' report on the consolidated financial statements summary to the Board of Directors of Huawei Investment & Holding Co., Ltd.

### Opinion

The consolidated financial statements summary of Huawei Investment & Holding Co., Ltd. and its subsidiaries (the Group) set out on pages 90 to 141, which comprises the summary consolidated statement of financial position as at December 31, 2019, the summary consolidated statements of profit or loss and other comprehensive income and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information, is derived from the audited consolidated financial statements of the Group for the year ended December 31, 2019.

In our opinion, the accompanying consolidated financial statements summary is consistent, in all material respects, with the audited consolidated financial statements, in accordance with the basis described in note 2 to the consolidated financial statements summary.

### Consolidated financial statements summary

The consolidated financial statements summary does not contain all the disclosures required by International Financial Reporting Standards applied in the preparation of the audited consolidated financial statements of the Group. Reading the consolidated financial statements summary and the auditors' report thereon, therefore, is not a substitute for reading the audited consolidated financial statements of the Group and the auditors' report thereon.

### The audited consolidated financial statements and our report thereon

We expressed an unmodified audit opinion on the audited consolidated financial statements for the year ended December 31, 2019 in our report dated March 26, 2020.

### Management's responsibilities for the consolidated financial statements summary

Management is responsible for the preparation of the consolidated financial statements summary in accordance with the basis described in note 2 to the consolidated financial statements summary.

### Auditors' responsibilities

Our responsibility is to express an opinion on whether the consolidated financial statements summary is consistent, in all material respects, with the audited consolidated financial statements based on our procedures, which were conducted in accordance with International Standard on Auditing 810 (Revised), *Engagements to Report on Summary Financial Statements*.

KPMG Huazhen LLP
Certified Public Accountants
15th Floor, China Resources Tower
2666 Keyuan South Road
Shenzhen 518052, China

March 26, 2020

# Consolidated Financial Statements Summary

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Pages



## Notes

## Summary Consolidated Statement of Profit or Loss and Other Comprehensive Income

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Revenue | 8 | **858,833** | 721,202 |
| Cost of sales | | **(536,144)** | (443,031) |
| **Gross Profit** | | **322,689** | 278,171 |
| Research and development expenses | | **(131,659)** | (101,509) |
| Selling and administrative expenses | | **(114,165)** | (105,199) |
| Other income, net | 9 | **970** | 1,824 |
| **Operating profit** | | **77,835** | 73,287 |
| Finance income and expenses | 11 | **178** | 253 |
| Share of associates' and joint ventures' results (post tax) | | **10** | 106 |
| **Profit before taxation** | | **78,023** | 73,646 |
| Income tax | 12 | **(15,367)** | (14,301) |
| **Profit after tax** | | **62,656** | 59,345 |
| **Other comprehensive income (after tax and reclassification adjustments)** | 13 | | |
| **Items that will not be reclassified to profit or loss:** | | | |
| Re-measurement of defined benefit obligations | | **186** | (766) |
| Equity investments at fair value through other comprehensive income (FVOCI) – net change in fair value | | **148** | (66) |
| | | **334** | (832) |
| **Items that are or may be reclassified subsequently to profit or loss:** | | | |
| Non-equity financial assets at FVOCI – net change in fair value and impairment loss | | **(14)** | 36 |
| Translation differences on foreign operations | | **1,881** | 1,247 |
| Equity-accounted investees – share of OCI | | **–** | (21) |
| | | **1,867** | 1,262 |
| **Total other comprehensive income** | | **2,201** | 430 |
| **Total comprehensive income** | | **64,857** | 59,775 |
| **Profit for the year attributable to:** | | | |
| Equity holders of the Company | | **62,605** | 59,227 |
| Non-controlling interests | | **51** | 118 |
| **Total comprehensive income attributable to:** | | | |
| Equity holders of the Company | | **64,806** | 59,656 |
| Non-controlling interests | | **51** | 119 |

Note: The Group has initially applied International Financial Reporting Standard 16 *Leases* (IFRS 16) at January 1, 2019, using the modified retrospective approach under which comparative information is not restated. See note 4.

The notes on pages 95 to 141 form part of this consolidated financial statements summary.

## Summary Consolidated Statement of Financial Position

| (CNY million) | Note | December 31, 2019 | December 31, 2018 |
|---|---|---|---|
| **Assets** | | | |
| Goodwill and intangible assets | 14 | **8,822** | 7,964 |
| Property, plant and equipment | 15 | **97,719** | 74,662 |
| Right-of-use assets | 30 | **17,417** | – |
| Long-term leasehold prepayments | 16 | **–** | 6,896 |
| Interests in associates and joint ventures | 17 | **731** | 562 |
| Other investments, including derivatives | 18 | **7,266** | 18,725 |
| Deferred tax assets | 19 | **10,877** | 17,257 |
| Contract assets | 21 | **2,200** | 601 |
| Trade and bills receivable | 22 | **4,540** | 3,588 |
| Other assets | 23 | **5,196** | 5,423 |
| **Non-current assets** | | **154,768** | 135,678 |
| Inventories and other contract costs | 20 | **167,390** | 96,545 |
| Contract assets | 21 | **50,812** | 47,675 |
| Trade and bills receivable | 22 | **85,525** | 91,995 |
| Other assets | 23 | **29,126** | 28,042 |
| Other investments, including derivatives | 18 | **200,356** | 81,751 |
| Cash and cash equivalents | 24 | **170,684** | 184,106 |
| **Current assets** | | **703,893** | 530,114 |
| **Total assets** | | **858,661** | 665,792 |
| **Equity** | | | |
| Equity attributable to equity holders of the Company | | **295,106** | 232,658 |
| Non-controlling interests | | **431** | 407 |
| **Total equity** | | **295,537** | 233,065 |

| (CNY million) | Note | December 31, 2019 | December 31, 2018 |
|---|---|---|---|
| **Liabilities** | | | |
| Loans and borrowings | 25 | **104,531** | 66,170 |
| Deferred government grants | | **1,013** | 1,209 |
| Deferred tax liabilities | 19 | **1,755** | 1,937 |
| Lease liabilities | | **6,413** | – |
| Other liabilities | 28 | **3,157** | 4,161 |
| **Non-current liabilities** | | **116,869** | 73,477 |
| Loans and borrowings | 25 | **7,631** | 3,771 |
| Employee benefits | | **98,375** | 98,164 |
| Income tax payable | | **3,909** | 4,191 |
| Trade and bills payable | 26 | **142,185** | 96,919 |
| Contract liabilities | 27 | **69,327** | 58,278 |
| Lease liabilities | | **3,274** | – |
| Other liabilities | 28 | **106,005** | 87,683 |
| Provisions | 29 | **15,549** | 10,244 |
| **Current liabilities** | | **446,255** | 359,250 |
| **Total liabilities** | | **563,124** | 432,727 |
| **Total equity and liabilities** | | **858,661** | 665,792 |

Note: The Group has initially applied IFRS 16 at January 1, 2019, using the modified retrospective approach under which comparative information is not restated. See note 4.

The notes on pages 95 to 141 form part of this consolidated financial statements summary.

## Summary Consolidated Statement of Cash Flows

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| **Cash flows from operating activities** | | | |
| Cash receipts from goods and services | | **959,785** | 795,520 |
| Cash paid to suppliers and employees | | **(929,482)** | (768,796) |
| Other operating cash flows | | **61,081** | 47,935 |
| **Net cash generated from operating activities** | | **91,384** | 74,659 |
| **Net cash used in investing activities** | | **(145,001)** | (93,880) |
| **Net cash generated from financing activities** | | **37,744** | 26,926 |
| **Cash and cash equivalents** | | | |
| Net (decrease)/increase | | **(15,873)** | 7,705 |
| At January 1 | 24 | **184,106** | 175,347 |
| Effect of foreign exchange rate changes | | **2,837** | 1,054 |
| **At December 31** | 24 | **171,070** | 184,106 |

Note: The Group has initially applied IFRS 16 at January 1, 2019, using the modified retrospective approach under which comparative information is not restated. See note 4.

The notes on pages 95 to 141 form part of this consolidated financial statements summary.

# Notes

## 1 Reporting entity

Huawei Investment & Holding Co., Ltd. (the Company) is a limited liability company established in Shenzhen in the People's Republic of China (the PRC). The Company's registered office is at Building 1, Zone B, Huawei Base, Bantian Longgang District, Shenzhen City, PRC.

The Company and its subsidiaries (the Group) principally provide end to end Information and Communication Technology solutions. This includes the research, design, manufacture and marketing of telecom network equipment, IT products and solutions, cloud technology and services and smart devices for telecom carriers, enterprises and consumers. The principal activities and other particulars of the Company's major subsidiaries are set out in note 33(b) to the consolidated financial statements summary.

## 2 Preparation basis of the consolidated financial statements summary

The Group has prepared a full set of consolidated financial statements (consolidated financial statements) for the year ended December 31, 2019 in accordance with International Financial Reporting Standards (IFRSs).

This is the first set of the Group's annual financial statements in which IFRS 16 *Leases* has been applied. The related changes to significant accounting policies are described in note 4.

The consolidated financial statements summary has been prepared and presented based on the audited consolidated financial statements for the year ended December 31, 2019 in order to disclose material financial and operational information.

## 3 Significant accounting policies

### (a) Basis of preparation of the consolidated financial statements

The consolidated financial statements have been prepared under the historical cost basis modified for the fair valuation of certain financial instrument classifications (see note 3(e)).

The preparation of consolidated financial statements in accordance with IFRSs requires management to make judgements, estimates and assumptions that affect the application of policies and reported amounts of assets, liabilities, income and expenses. Estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed regularly and revised when required. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

Judgements made by management in the application of IFRSs that have significant effect on the consolidated financial statements and major sources of estimation uncertainty are discussed in note 5.

### (b) Functional and presentation currency

All financial information in the consolidated financial statements summary is presented in millions of Chinese Yuan (CNY), which is the Company's functional currency.

### (c) Consolidation

The consolidated financial statements consolidate the results, assets, liabilities and cash flows of all subsidiaries which the Group controls.

Subsidiaries are consolidated from the date that control commences until the date that control passes. Intra-group balances, transactions and cash flows and any unrealised profits arising from intra-group transactions are eliminated in full in preparing the consolidated financial statements. Unrealised losses resulting from intra-group transactions are eliminated in the same way as unrealised gains but only to the extent that there is no evidence of impairment.

The Group controls an entity when it is exposed, or has rights, to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. When assessing whether the Group has power, only substantive rights are considered.

The Group uses the acquisition method to account for business acquisitions. The difference between the fair value of the consideration paid and the fair value of assets, liabilities and contingent liabilities acquired is recorded as goodwill. Transaction costs incurred in an acquisition are included in operating costs.

Non-controlling interests represent the carrying value of the net assets of subsidiaries attributable to non-controlling shareholders. The Group measures non-controlling interests at the non-controlling interests' proportionate share of the subsidiary's net identifiable assets. Changes in the Group's interests in a subsidiary that do not result in a loss of control are accounted for as equity transactions, whereby adjustments are made to the amounts of controlling and non-controlling interests within consolidated equity to reflect the change in relative interests, but no adjustments are made to goodwill and no gain or loss is recognised.

When the Group loses control of a subsidiary, it is accounted for as a disposal of the entire interest in that subsidiary, with a resulting gain or loss being recognised in profit or loss. Any interest retained in that former subsidiary at the date when control is lost is recognised at fair value or, when appropriate, the cost on initial recognition of an investment in an associate or a joint venture (see note 3(d)).

## (d) Associates and joint ventures

An associate is an entity in which the Group has significant influence, but not control or joint control, over its management, including participation in the financial and operating policy decisions.

A joint venture is an arrangement whereby the Group and other parties contractually agree to share control of the arrangement, and have rights to the net assets of the arrangement.

An investment in an associate or a joint venture is accounted for in the consolidated financial statements using the equity method until the date on which significant influence or joint control ceases. They are initially recognised at cost and subsequently adjusted to include the Group's share of the profit or loss and other comprehensive income (OCI).

Unrealised profits and losses resulting from transactions between the Group and its associates and joint ventures are eliminated to the extent of the Group's interest in the investee, except where unrealised losses provide evidence of an impairment of the asset transferred, in which case they are recognised immediately in profit or loss.

## (e) Financial instruments

### (i) Recognition and derecognition

Financial instruments, comprising financial assets and financial liabilities, are recognised in the consolidated statement of financial position when the Group becomes a party to the contractual provisions of the instrument.

The Group derecognises a financial asset when the contractual rights to the cash flows from the asset expire, or it transfers the rights to receive the contractual cash flows in a transaction in which substantially all of the risks and rewards of ownership of the financial asset are transferred or where it neither transfers nor retains substantially all of the risks and rewards of ownership and loses control. When control is retained, the Group continues to recognise the financial asset to the extent of its continuing involvement. Financial assets are also de-recognised when they are written off. Financial assets are written off when there is no reasonable expectation of further recoveries even though there may be enforcement actions ongoing.

The Group derecognises a financial liability when its contractual obligations are discharged, cancelled, or expire.

Financial assets and financial liabilities are offset and the net amount presented in the consolidated statement of financial position when, and only when, the Group currently has a legally enforceable right to set off the

recognised amounts and intends either to settle them on a net basis or to realise the asset and settle the liability simultaneously.

### (ii) Classification and measurement

All financial assets and liabilities are initially recognised at fair value, which is usually the transaction price including, where appropriate, transaction costs, with the exception of trade receivables without a significant financing component, which are measured at their transaction price, determined in accordance with the Group's accounting policies for revenue. Subsequently, measurement depends on the financial assets/liabilities classification as follows:

- Financial assets measured at fair value through profit or loss (FVPL)

  Non-equity financial assets are classified as FVPL if they arise from contracts which do not give rise to cash flows which are solely principal and interest, or otherwise where they are held in a business model which mainly realises them through sale. Such assets are re-measured to fair value at the end of each reporting period. Gains and losses arising from re-measurement are taken to profit or loss, as are transaction costs.

  Equity investments are classified as FVPL unless they are designated as at FVOCI on initial recognition (see below). Dividends from equity investments, irrespective of whether classified as FVPL or FVOCI, are recognised in profit or loss as finance income.

- Financial assets measured at FVOCI

  Non-equity financial assets are classified as FVOCI where they arise from contracts which give rise to contractual cash flows which are solely principal and interest and which are held in a business model which realises some through sale and some by holding them to maturity. They are recognised initially at fair value plus any directly attributable transaction costs, or in the case of trade receivables, at the transaction price.

  At the end of each reporting period they are re-measured to fair value, with the cumulative gain or loss compared to their amortised cost (AC) being recognised in other comprehensive income and in the fair value reserve, except for the recognition in profit or loss of expected credit losses, interest income (calculated using the effective interest method) and foreign exchange gains and losses.

  When these assets are derecognised, the cumulative gain or loss is reclassified from equity to profit or loss.

  Equity investments not held for trading purposes are designated as at FVOCI where they are considered strategic to the Group. Such designation is made on an instrument-by-instrument basis, but may only be made if the investment meets the definition of equity from the issuer's perspective. Amounts accumulated in the fair value reserve in respect of these investments are transferred directly to retained earnings on the disposal of the investment. These investments are not subject to impairment.

- Financial assets measured at amortised cost

  Financial assets are held at amortised cost when they arise from contracts which give rise to contractual cash flows which are solely principal and interest and are held in a business model which mainly holds the assets to collect contractual cash flows.

  Financial assets measured at amortised cost when they are not purchased or originated credit-impaired are measured at amortised cost using the effective interest method. For those purchased or originated credit-impaired, the Group applies the credit-adjusted effective interest rate since initial recognition. These assets are also subject to impairment losses (see note 3(k)). Interest income is calculated based on the gross carrying amount of the financial asset unless the financial asset is credit impaired, in which case interest income is calculated on the amortised cost (i.e. gross carrying amount less loss allowance). Interest income is included in finance income.

- Financial liabilities at amortised cost

  Financial liabilities, except those designated as at FVPL, are stated at amortised cost using the effective interest method. Interest is included in finance expenses unless capitalised into property, plant and equipment (see note 3(t)).

- Financial liabilities designated as at FVPL

  The Group has irrevocably designated certain financial liabilities as at FVPL on initial recognition because they are managed and their performance is evaluated on a fair value basis and information is provided internally on that basis to the Group's key management personnel.

## (f) Investment property

Investment properties are land and buildings which are owned or held under a leasehold interest (see note 3(j)) to earn rental income and/or for capital appreciation.

Investment properties are stated at cost less accumulated depreciation (see note 3(g)(ii)) and impairment losses (see note 3(k)). Rental income from investment properties is accounted for as described in note 3(q)(ii).

## (g) Other property, plant and equipment

### (i) Cost

Items of property, plant and equipment are stated at cost less accumulated depreciation and impairment losses (see note 3(k)). Cost includes expenditure that is directly attributable to the acquisition of the assets including for self-constructed assets, the cost of materials, direct labour, the initial estimate, where appropriate, of the costs of dismantling and removing the items and restoring the site on which they are located, and an appropriate proportion of production overheads and borrowing costs.

Construction in progress is transferred to other property, plant and equipment when it is ready for its intended use.

Gains or losses arising from the retirement or disposal of an item of property, plant and equipment are determined as the difference between the net disposal proceeds and the carrying amount of the item and are recognised in profit or loss on the date of retirement or disposal.

### (ii) Depreciation

Depreciation is calculated to write off the cost of items of property, plant and equipment and investment property, less their estimated residual value, if any, using the straight line method over their estimated useful lives as follows:

| | |
|---|---|
| ■ Buildings | 30 years |
| ■ Machinery | 2 to 10 years |
| ■ Motor vehicles | 5 years |
| ■ Electronic and other equipment | 2 to 5 years |
| ■ Decoration and leasehold improvements | 2 to 5 years |

Where components of an item of property, plant and equipment and investment property have different useful lives, the cost or valuation of the item is allocated on a reasonable basis between the parts and each part is depreciated separately. Both the useful life of an item of property, plant and equipment and investment property and its residual value, if any, are reviewed annually.

Freehold land and construction in progress are not depreciated.

## (h) Long-term leasehold prepayments

Long-term leasehold prepayments represent land premium paid, resettlement fees and related expenses incurred in obtaining the relevant land use rights.

*Policy applied from January 1, 2019*

The Group's leasehold prepayments meet the definition of a lease and they are accounted for in accordance with the accounting policies set out in note 3(j).

*Policy applied before January 1, 2019*

Long-term leasehold prepayments are carried at cost, less accumulated amortisation and impairment losses (see note 3(k)).

Amortisation is charged to profit or loss on a straight-line basis over the period of the rights which is generally no more than 50 years.

## (i) Goodwill and intangible assets

### (i) Goodwill

Goodwill represents the excess of the fair value of consideration paid to acquire a subsidiary over the acquisition date fair value of the acquiree's identifiable assets acquired less liabilities, including contingent liabilities, assumed as at the acquisition date, less impairment losses (see note 3(k)).

Where the fair value of the assets acquired less liabilities assumed exceeds the consideration paid, the excess is recognised immediately in profit or loss as a gain.

### (ii) Other intangible assets

Other intangible assets are stated at cost less accumulated amortisation and impairment losses (see note 3(k)).

### (iii) Amortisation

Goodwill is not amortised but subject to impairment testing (see note 3(k)) annually.

The cost of other intangible assets with finite useful lives is amortised to profit or loss on a straight-line basis over the assets' estimated useful lives from the date they are available for use. Their estimated useful lives are as follows:

- Software 2 to 10 years
- Royalties 2 to 10 years
- Patents 2 to 10 years
- Trademark and others 2 to 20 years

Both the period and method of amortisation are reviewed annually and revised when necessary.

### (iv) Research and development

Research and development costs are all costs directly attributable to research and development activities together with cost which can be allocated on a reasonable basis to such activities. The nature of the Group's research and development activities is such that the criteria for the recognition of such costs as assets are generally not met until late in the development stage of the project when the remaining development costs are immaterial. Therefore, expenditure on research and development activities is generally recognised as an expense in the period in which it is incurred.

## (j) Leases

The Group has adopted IFRS 16 from January 1, 2019. As permitted by the standard, comparative figures have not been restated and these are presented in accordance with the Group's previous policies. Both the new and the previous accounting policies are described below.

*Policy applied from January 1, 2019*

A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time, the lease term, in exchange for consideration. The Group assesses whether a contract is, or contains, a lease on inception.

The lease term is either the non-cancellable period of the lease and any additional periods when there is an enforceable option to extend the lease and it is reasonably certain that the Group will extend the term, or a lease period in which it is reasonably certain that the Group will not exercise a right to terminate. The lease term is reassessed if there is a significant change in circumstances.

### (i) As a lessee

At commencement, or on the modification, of a contract that contains a lease component, the Group allocates the consideration in the contract to each lease component on the basis of its relative stand-alone prices.

The Group recognises a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, less any lease incentives received.

The right-of-use asset is depreciated using the straight-line method from the commencement date to the end of the lease term. If the lease transfers ownership of the underlying asset to the Group by the end of the lease term or if the Group expects to exercise a purchase option, the right-of-use asset will be depreciated over the useful life of the underlying asset, which is determined on the same basis as the Group's other property, plant and equipment.

Right-of-use assets are reduced by impairment losses, if any, and adjusted for certain re-measurements of the lease liability.

The lease liability is initially measured at the present value of the total lease payments due on the commencement date, discounted using either the interest rate implicit in the lease, if readily determinable, or more usually, an estimate of the Group's incremental borrowing rate on the inception date for a loan with similar terms to the lease.

The incremental borrowing rate is estimated by obtaining interest rates from various external financing sources and making certain adjustments to reflect the terms of the lease and type of the asset leased.

Lease payments included in the measurement of the lease liability comprise the following:

- fixed payments, including payments which are substantively fixed;
- variable lease payments that depend on an index or a rate, initially measured using the index or rate as at the commencement date;
- amounts expected to be payable under a residual value guarantee; and
- the exercise price under a purchase option that the Group is reasonably certain to exercise, lease payments in an optional renewal period if the Group is reasonably certain to exercise an extension option, and penalties for early termination of a lease unless the Group is reasonably certain not to terminate early.

The lease liability is measured at amortised cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate, if there is a change in the Group's estimate of the amount expected to be payable under a residual value guarantee, if the Group changes its assessment of whether it will exercise a purchase, extension or termination option or if there is a revised in-substance fixed lease payment.

When the lease liability is remeasured in this way, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero.

*Short-term leases and leases of low-value assets*

As permitted by IFRS 16, the Group does not recognise right-of-use assets and lease liabilities for leases of low-value assets and short-term leases. Payments associated with these leases are recognised as an expense on a straight-line basis over the lease term.

**(ii) As a lessor**

When the Group acts as a lessor, it determines at lease inception whether each lease is a finance lease or an operating lease.

To classify each lease, the Group makes an overall assessment of whether the lease transfers substantially all of the risks and rewards incidental to ownership of the underlying asset. If this is the case, then the lease is a finance lease; if not, then it is an operating lease.

The Group recognises lease payments received under operating leases as income on a straight-line basis over the lease term as part of Revenue (see note 3(q)(ii)).

*Policy applied before January 1, 2019*

Most of the Group's leases are operating leases which do not transfer substantially all the risks and rewards of ownership to the Group.

Payments made under the leases are charged to profit or loss in equal instalments over the accounting periods covering the lease term, except where an alternative basis is

more representative of the pattern of benefits to be derived from the leased asset. Lease incentives received are recognised in profit or loss as an integral part of the aggregate net lease payments made. Contingent rentals are charged to profit or loss in the accounting period in which they are incurred.

## (k) Impairment of assets

### (i) Impairment of financial assets, contract assets and lease receivables

The Group recognises an allowance for impairment on non-equity financial assets held at FVOCI and AC, and also on contract assets and lease receivables on an expected credit loss basis. Increases and decreases in the impairment allowance are recognised in profit or loss. The expected credit losses are the difference (on a present value basis) between the contractual cash flows (or transaction price) and the present value of cash flows expected to be received based on the Group's past loss experience and reasonable and supportable expectations, at the end of the reporting period, about future credit conditions.

For trade receivables, contract assets and lease receivables, the Group recognises impairment both individually and using provision matrices based on the probability that the customer will default during the lifetime of the asset, and the loss that will be incurred given the default (the lifetime expected loss). The Group defines default as the customer being more than 90 days past due.

For all other financial assets that are not purchased or originated credit-impaired, the Group recognises impairment initially based on the probability that the customer or counterparty will default in the next 12 months unless there has been a significant deterioration in credit quality, or the financial asset becomes credit impaired in which case the impairment allowance is increased to the lifetime expected loss.

An asset is credit impaired when it has one or more of the loss events described below:

- significant financial difficulty of the borrower or issuer;
- a breach of contract, such as a default or past due event;
- the restructuring of a loan or advance by the Group on terms that the Group would not consider otherwise;
- it is probable that the borrower will enter bankruptcy or other financial reorganisation; or
- the disappearance of an active market for a security because of financial difficulties.

In the case of purchased or originated credit-impaired financial assets, the Group only recognises the cumulative changes in lifetime expected credit losses since initial recognition as a loss allowance.

### (ii) Impairment of other non-financial assets

Internal and external sources of information are reviewed at the end of each reporting period to identify indications that non-financial assets, including property, plant and equipment, right-of-use assets, intangible assets and other long-term assets may be impaired.

Goodwill is tested for impairment at least annually. For the purposes of impairment testing, goodwill is allocated to each cash generating unit, or a group of cash generating units, that is expected to benefit from the synergies of the acquisition. Where impairment testing is of a cash generating unit (or group of units), an impairment loss is recognised in profit or loss where the recoverable value is less than the carrying value of the unit (or group of units) and the impairment loss recognised is allocated first to reduce the carrying amount of any goodwill allocated to the unit (or group of units).

Other assets are impaired and an impairment loss is recognised in profit or loss where the recoverable value of the asset is less than its carrying amount, and reversed where there has been a favourable change in the recoverable amount. Impairment of goodwill is not reversed.

The recoverable amount of an asset or group of assets is the greater of its fair value less costs of disposal and value in use. Value in use

is the total estimated future cash flows from the asset or, where the asset does not generate cash flows independent of other assets, a group of assets, discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset, or group of assets.

## (l) Inventories

Inventories are assets which are held for sale in the ordinary course of business, in the process of production for such sales or in the form of material or supplies to be consumed in the production process or in the rendering of services.

Inventories are carried at the lower of cost and net realisable value.

Cost is calculated based on the standard cost method with periodic adjustments of cost variance to arrive at the actual cost, which approximates to weighted average cost. Cost includes expenditures incurred in acquiring the inventories and bringing them to their present location and condition. The cost of manufactured inventories and work in progress includes an appropriate share of overheads based on normal operating capacity.

Net realisable value is the estimated selling price in the ordinary course of business, less the estimated costs of completion and the estimated costs necessary to make the sale.

When inventories are sold, the carrying amount of those inventories is recognised as an expense in the period in which the related revenue is recognised. Any write-down of inventories to net realisable value and all losses of inventories are recognised as an expense in the period the write-down or loss occurs.

## (m) Cash and cash equivalents

Cash and cash equivalents comprise cash at bank and on hand, demand deposits with banks and other financial institutions, demand deposits with third party merchants, and short-term, highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value. Bank overdrafts that are repayable on demand and form an integral part of the Group's cash management are also included as a component of cash and cash equivalents for the purpose of the consolidated statement of cash flows.

## (n) Employee benefits

### (i) Short-term employee benefits, contributions to defined contribution retirement plans and other long-term employee benefits

Salaries, profit-sharing and bonus payments, paid annual leave and contributions to defined contribution retirement plans and the cost of non-monetary benefits are recognised as liabilities and in profit or loss or in the cost of related assets in the period in which the associated services are rendered by employees. Where payment or settlement is expected to be made 12 months after the end of the reporting period, these amounts are discounted and stated at their present values.

### (ii) Defined benefit obligations

The Group's obligation in respect of defined benefit plans is calculated separately for each plan by estimating the total amount of future benefit that employees have earned in return for their service in the current and prior periods which is then discounted to present value. The calculation is performed by management using the projected unit credit method.

Service cost and interest cost on the defined benefit obligations and any curtailment gains and losses are recognised in profit or loss.

Re-measurements arising from changes in assumptions regarding the amounts of future benefits are recognised immediately in other comprehensive income and shall not be reclassified to profit or loss in a subsequent period. However, the Group may transfer those amounts recognised in other comprehensive income within equity.

## (o) Income tax

Income tax for the year comprises current tax and movements in deferred tax assets and liabilities. Current tax and movements in deferred tax assets and liabilities are

recognised in profit or loss except to the extent that they relate to items recognised in other comprehensive income or directly in equity, in which case the relevant amounts of tax are recognised in other comprehensive income or directly in equity, respectively.

Current tax is the expected tax payable on the taxable income for the year, using tax rates enacted or substantively enacted at the end of the reporting period, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised on temporary differences, representing the difference between the carrying amounts of assets and liabilities for financial reporting purposes and their tax bases. Deferred tax assets also arise from unused tax losses and unused tax credits.

Deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which the asset can be utilised. Future taxable profits that may support the recognition of deferred tax assets arising from deductible temporary differences include those that will arise from the reversal of existing taxable temporary differences, provided those differences relate to the same taxation authority and the same taxable entity, and are expected to reverse either in the same period as the expected reversal of the deductible temporary difference or in periods into which a tax loss arising from the deferred tax asset can be carried back or forward. The same criteria are adopted when determining whether existing taxable temporary differences support the recognition of deferred tax assets arising from unused tax losses and credits, that is, those differences are taken into account if they relate to the same taxation authority and the same taxable entity, and are expected to reverse in a period, or periods, in which the tax loss or credit can be utilised.

No deferred tax is recognised for temporary differences on:

- the initial recognition of goodwill;
- the initial recognition of assets or liabilities that affect neither accounting nor taxable profit (provided they are not part of a business combination); and
- investments in subsidiaries to the extent that, in the case of taxable differences, the Group controls the timing of the reversal and it is probable that the differences will not reverse in the foreseeable future, or in the case of deductible differences, unless it is probable that they will reverse in the future.

The amount of deferred tax recognised is measured based on the expected manner of realisation or settlement of the carrying amount of the assets and liabilities, using tax rates enacted or substantively enacted at the end of the reporting period. Deferred tax assets and liabilities are not discounted.

The carrying amount of a deferred tax asset is reviewed at the end of each reporting period and is reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow the related tax benefit to be utilised. Any such reduction is reversed to the extent that it becomes probable that sufficient taxable profits will be available.

A provision is recognised for those matters for which the tax determination is uncertain but it is considered probable that there will be a future outflow of funds to a tax authority. The provisions are measured at the best estimate of the amount expected to become payable.

Current tax balances and deferred tax balances, and movements therein, are presented separately from each other and are not offset. Current tax assets are offset against current tax liabilities, and deferred tax assets against deferred tax liabilities, if the Group has legally enforceable rights to set off current tax assets against current tax liabilities and the following additional conditions are met:

- in the case of current tax assets and liabilities, the Group intends either to settle on a net basis, or to realise the asset and settle the liability simultaneously; or
- in the case of deferred tax assets and liabilities, if they relate to income taxes levied by the same taxation authority on either:
  - the same taxable entity; or

– different taxable entities, which, in each future period in which significant amounts of deferred tax liabilities or assets are expected to be settled or recovered, intend to realise the current tax assets and settle the current tax liabilities on a net basis or realise and settle simultaneously.

## (p) Provisions and contingent liabilities

Provisions are recognised for liabilities of uncertain timing or amount when the Group has a legal or constructive obligation arising as a result of a past event, it is probable that an outflow of economic benefits will be required to settle the obligation and a reliable estimate can be made. Where the time value of money is material, provisions are stated at the present value of the expenditure expected to settle the obligation.

Where it is not probable that an outflow of economic benefits will be required, or the amount cannot be reliably estimated, disclosure is made of the contingent liability, unless the probability of outflow of economic benefits is remote. Possible obligations, whose existence will only be confirmed by the occurrence or non-occurrence of one or more future events are also disclosed as contingent liabilities unless the probability of outflow of economic benefits is remote.

The main types of provisions are as follows:

### (i) Provision for warranties

The Group provides assurance warranty on its standard consumer and enterprise products for a period typically covering 12 to 24 months.

The Group estimates the costs that may be incurred under its assurance warranty obligations and records a liability in the amount of such costs when revenue is recognised. Warranty costs generally include spare parts, labour costs and service centre support. Factors that affect the Group's warranty liability include the number of sold units, historical and anticipated rates of warranty claims. The Group periodically reassesses its warranty liabilities and adjusts the amounts as necessary.

### (ii) Provision for onerous contracts

A provision for onerous contracts is recognised when the expected benefits to be derived by the Group from a contract are lower than the estimated cost of meeting its obligations under the contract. The provision is measured at the present value of the lower of the expected cost of terminating the contract and the expected net cost of continuing with the contract. Before a provision is established, the Group recognises any impairment loss on the assets associated with that contract.

## (q) Revenue

Revenue is income arising from sales of products, provision of services or use by others of the Group's properties under leases in the ordinary course of the Group's business.

### (i) Revenue from customer contracts

The Group divides its business into three operating segments, Carrier Business, Enterprise Business and Consumer Business. The principal activities of each segment are disclosed in note 7.

The Group applies its revenue accounting policies based on the features of the contracts and the business practices of its business groups.

Revenue is measured based on the consideration the Group expects to be entitled to from the contract with the customer and excludes those amounts collected on behalf of third parties. The Group recognises revenue when it transfers control over a product or service (or bundle) to a customer.

i. Contract combinations and modifications

The Group combines separate customer contracts with the same customer or related parties of the same customers entered into at or near the same time when those contracts are negotiated as a package to form a single commercial objective, are significantly interdependent in nature or contain significant pricing dependencies.

Contract modifications are generally treated either as a new separate contract, or as a prospective change to an existing contract. In cases when the additional or the remaining goods and services are not distinct from those transferred before the date of modification, typically in the Carrier Business and Enterprise Business, modifications are accounted for through a cumulative catch-up adjustment.

ii. Performance Obligations (POB)

In the Consumer Business, POBs are typically terminal devices, accessories and services. In the Carrier Business, there are generally more POBs due to the nature of the contracts which typically involve sales of networking hardware, software and a wide range of services. In the Enterprise Business where the Group delivers bespoke end-to-end solutions, there may in some cases only be a few POBs.

iii. Warranties

In the Carrier Business and Enterprise Business, customer service warranties, except for those related to certain Enterprise products, are generally recognised as a distinct service for which revenue is allocated and recognised over the service period. In the Consumer Business, warranties provided on terminal devices and accessories are generally standard and assurance in nature and are accounted for as a warranty provision at the time of the sale (see note 3(p)).

iv. Timing of revenue recognition

The Group determines at contract inception whether it transfers the control of a good or service underlying a POB to the customer over time or at a point in time. A POB is satisfied and related revenue is recognised over time, if one of the following criteria is met:

- The customer simultaneously receives and consumes the benefits provided by the Group's performance as the Group performs;
- The Group's performance creates or enhances an asset that the customer controls as the asset is created or enhanced; or
- The Group's performance does not create an asset with an alternative use to the Group and the Group has an enforceable right to payment for performance completed to date.

If a POB is not satisfied and the control over the related good or service is not transferred over time in accordance with the above criteria, it is satisfied and revenue is recognised at a point in time.

Most Carrier Business contracts include multiple POBs for which revenue is recognised when the Group transfers control of each obligation, either at a point in time such as delivery or acceptance, or over time as the obligation is being fulfilled or the customer obtains control of the goods and/or services. Some Carrier Business construction contracts represent a single or a few POBs for which revenue is recognised over the delivery period.

Within the Enterprise Business certain solution build contracts constitute a single or a small number of POBs for which revenue is recognised over the delivery period. For the remaining contracts with multiple POBs, revenue is recognised as and when control related to each obligation is transferred, either at a point in time, such as delivery or acceptance, or over time, as the obligation is being fulfilled and the customer obtains control of the goods and/or services.

Sales of terminal devices and accessories by the Consumer Business to distribution channels are recognised when control of the goods has transferred. In most cases, this is when the sell-in to the channel occurs; however, in a limited number of cases, this is when the goods are sold to the second tier distribution channels or end-users.

v. Variable consideration

Revenue is measured at the fair value of the consideration received or receivable, adjusted at contract inception for penalties, price concessions, returns, trade discounts, volume rebates and other sales incentives, such as coupons, provided that the level of expected return of goods, volume rebates and other incentives given can be estimated reliably and that revenue is only recognised to the extent that it is highly probable that a significant reversal in the amount of cumulative revenue recognised will not occur. When making an estimate for variable consideration, the Group considers several factors, including but not limited to, contract commitments, business practices, historical experience, customer take-up rates, and expected purchase volumes.

vi. Significant financing component

In the Carrier Business and Enterprise Business, payments are generally received according to the payment milestones set out in the contracts before or after the obligations are fulfilled, usually including advance payments, delivery payments and completion payments. In the Consumer Business and certain business units under the Enterprise Business, advance payments are commonly received. Advance payments are usually received less than one year ahead of satisfaction of a performance obligation.

The amount of consideration in a sales contract is adjusted for the existence of significant financing in determining the transaction price only when the payment terms exceed one year in duration between performance and payment.

The Group recognises interest income where payment is received more than one year in arrears of satisfaction of a performance obligation, reflecting a deemed lending of cash to a customer. Such interest income is presented in finance income. The consideration attributable to other goods and services in the contract is reduced by a corresponding amount and is included within revenue.

The Group adopts the practical expedient under IFRS 15, *Revenue from Contracts with Customer* (IFRS 15), and does not account for the significant financing components where the Group anticipates at contract inception that the timing difference between transfer of control of a good or service to a customer, and the customer paying for that good or service will be one year or less.

vii. Stand-alone selling prices (SSP)

The transaction price of a contract with a customer is allocated to each POB in proportion to its SSP. The Carrier Business and Enterprise Business primarily use estimated SSP and the Consumer Business uses directly observable SSP.

Within the Carrier Business and the Enterprise Business, the Group establishes the SSP for products mainly using an average price approach by product category. Average price of a product is calculated with reference to the historical stand-alone product sale transactions for the product and the product category is determined with reference to the product family and geographical region.

For services that are regularly sold on a stand-alone basis, most of such services are customised and priced on a project basis, therefore the transaction prices generally reflect the SSP. For the services where an observable transaction price is unavailable such as the services sold in a bundle with products, the Group determines the SSP using a cost-plus approach, taking into account several factors, including but not limited to labour cost, competition and company business strategy.

When a significant discount is granted and is specifically attributable to one or more POBs that discount is allocated to the identified POB(s) if the allocation reflects the Group's regular sales pattern. In all other cases the discount is allocated to the contract overall.

viii. Contract costs

Certain incremental acquisition costs (those paid to acquire a contract such as commission) and fulfilment costs (those incurred to deliver services to customers) are capitalised and recognised, to the extent that the costs are recoverable, over the period of expected benefit, which is generally the associated revenue contract duration.

Incremental acquisition costs the Group incurs in its major businesses are minimal and generally expensed as incurred.

The Group recognises a contract cost impairment when the carrying amount of unamortised contract costs exceeds the difference between the remaining consideration expected and the associated costs relating to providing those goods and services under the contract.

ix. Contract assets and liabilities

When revenue is recognised under a contract with a customer before the Group becomes unconditionally entitled to the consideration under the relevant payment terms of the contract, a contract asset is recognised. Contract assets are reclassified to trade receivables when the right to consideration becomes unconditional.

When consideration is received (or the right to consideration is unconditional) before the related revenue is recognised, a contract liability is recognised.

For a single contract with the customer, either a net contract asset or a net contract liability is presented. For multiple contracts, contract assets and contract liabilities of unrelated contracts are not presented on a net basis.

Trade receivables are recognised when the right to consideration under a revenue contract becomes unconditional, regardless of the billing date.

x. Refund liabilities

A refund liability, such as the accrued rebates to customers and other sales-based incentives granted, is recognised when the Group receives consideration from the customer and expects to refund some or all of that consideration to the customer. Refund liabilities are presented in Other liabilities in the consolidated statement of financial position.

### (ii) Rental income from operating leases

Rental income receivable under operating leases is recognised in profit or loss in equal instalments over the periods covered by the lease term, except where an alternative basis is more representative of the pattern of benefits to be derived from the use of the leased asset. Lease incentives granted are recognised in profit or loss as an integral part of the aggregate net lease payments receivable. Variable lease payments that do not depend on an index or a rate are recognised as income in the accounting period in which they are earned.

## (r) Government grants

Government grants are initially recognised in the statement of financial position at fair value when there is reasonable assurance that they will be received and that the Group will comply with the conditions attaching to them.

Grants that compensate the Group for expenses incurred are recognised as income in profit or loss in the same periods in which the expenses are incurred. Grants that compensate the Group for the cost of an asset are initially recognised as deferred income and then recognised in profit or loss on a systematic and rational basis over the useful life of the related asset.

## (s) Translation of foreign currencies

### (i) Foreign currency transactions

Foreign currency transactions during the year are translated to the respective functional currencies of group entities at the foreign exchange rates ruling at the transaction dates. Monetary assets and liabilities denominated in foreign currencies are translated to the functional currency at the foreign exchange rates ruling at the end of the reporting period. Exchange gains and losses are recognised in profit or loss.

Non-monetary assets and liabilities that are measured in terms of historical cost in a foreign currency are translated using the foreign exchange rates ruling at the transaction dates. Non-monetary assets and liabilities denominated in foreign currencies that are stated at fair value are translated using the foreign exchange rates ruling at the dates the fair value was measured.

**(ii) Foreign operations**

The results of foreign operations, except for foreign operations in hyperinflationary economies, are translated into the presentation currency of the Group (CNY) at the exchange rates approximating the foreign exchange rates ruling at the dates of the transactions. Statement of financial position items are translated into CNY at the closing foreign exchange rates at the end of the reporting period. The resulting exchange differences are recognised in other comprehensive income and accumulated separately in equity in the translation reserve. If the operation is a non-wholly-owned subsidiary, then the relevant proportionate share of the translation difference is allocated to the non-controlling interests.

The results and financial position of foreign operations in hyperinflationary economies are translated to CNY at the exchange rates ruling at the end of the reporting period. Prior to translating the financial statements of foreign operations in hyperinflationary economies, their financial statements for the current year are restated to account for changes in the general purchasing power of the local currencies. The restatement is based on relevant price indices at the end of the reporting period.

When a foreign operation is disposed of in its entirety or partially such that control, significant influence or joint control is lost, the cumulative amount in the translation reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal.

### (t) Borrowing costs

Borrowing costs that are directly attributable to the acquisition, construction or production of an asset which necessarily takes a substantial period of time to get ready for its intended use or sale are capitalised as part of the cost of that asset. Other borrowing costs are expensed in the period in which they are incurred.

## 4 Changes in significant accounting policies

The Group initially applied IFRS 16 *Leases* from January 1, 2019. A number of other new standards are effective from January 1, 2019, but they do not have a material effect on the Group's consolidated financial statements.

The Group has applied IFRS 16 using the modified retrospective approach, under which the cumulative effect of initial application is to be recognised in retained earnings at January 1, 2019. Accordingly the comparative information presented for 2018 has not been restated – i.e. it is presented, as previously reported, under IAS 17, *Leases* and related interpretations. Additionally, the disclosure requirements in IFRS 16 have not generally been applied to comparative information.

The main changes resulting from adoption of IFRS 16 are disclosed below.

### Definition of a lease

Previously, the Group determined at contract inception whether an arrangement was or contained a lease under IFRIC 4 *Determining Whether an Arrangement Contains a Lease*. The Group now assesses whether a contract is a lease based on the definition of a lease, as explained in note 3(j).

### As a lessee

Before January 1, 2019, the Group classified leases as operating or finance leases based on its assessment of whether the lease transferred substantially all of the risks and rewards of ownership to the Group as a lessee. After the adoption of IFRS 16, the Group recognises right-of-use assets and lease liabilities from the commencement date of the lease for all leases except for short-term leases (lease terms of 12 months or less) and leases of low-value assets (which are typically of low-value when new, such as printers and photocopiers).

The Group has made the following adjustments in the presentation of financial statements as a result of the adoption of IFRS 16 at January 1, 2019:

- Right-of-use assets and Lease liabilities are presented separately in the Group's consolidated statement of financial position.
- Prepayments for land-use-rights which were separately presented as Long-term leasehold prepayments (see note 3(h)), together with other lease prepayments which were previously included in Other assets, are now included in Right-of-use assets.
- Accrued lease payments, which were previously included in Other liabilities are now included in Lease liabilities.
- Cash payments under operating leases, which were classified within operating activities in the Group's consolidated statement of cash flows under IAS 17, are now classified within financing activities under IFRS 16, except for short-term leases and leases of low-value assets.

## As a lessor

IFRS 16 has not significantly changed accounting for lessors, in particular retaining the distinction between finance leases and operating leases. The adoption of IFRS 16 did not lead to a material change in accounting for leases in which the Group is a lessor.

## Impacts on transition

At transition, for leases that were operating leases under IAS 17, lease liabilities are recognised and measured at the present value of the remaining lease payments, discounted at the Group's incremental borrowing rates as at January 1, 2019. The Group elected to measure the right-of-use assets under these operating leases at an amount equal to the lease liability, adjusted by the amounts of any prepaid or accrued lease payments relating to that lease.

The Group has tested its right-of-use assets for impairment on the date of transition and has concluded that there was no indication that the right-of-use assets were impaired.

The Group used the following practical expedients when applying IFRS 16 to leases classified as operating leases under IAS 17 before January 1, 2019. In particular, the Group

- did not recognise right-of-use assets and liabilities for leases with remaining lease term of less than 12 months from the date of initial application;
- did not recognise right-of-use assets and liabilities for leases of low value assets;
- excluded initial direct cost from measuring the right-of-use assets at the date of initial application; and
- used hindsight when determining the lease term if the contract contains options to extend or terminate the lease.

The increases (decreases) in relevant statement of financial position items on transition is summarised below:

| (CNY million) | January 1, 2019 |
|---|---|
| Right-of-use assets | **14,149** |
| Long-term leasehold prepayments | **(6,896)** |
| Lease liabilities | **7,303** |
| Other assets | **(276)** |
| Other liabilities | **(326)** |

Under the transition methods chosen, there is no effect on equity from the initial application of IFRS 16 at the transition date.

When measuring lease liabilities for leases that were classified as operating leases, the Group discounted lease payments using the incremental borrowing rates applicable to economic environments where the group entities operated at January 1, 2019. The weighted-average of the incremental borrowing rates applied was 4.75%.

A reconciliation of the undiscounted operating lease commitment at December 31, 2018 and lease liabilities recognised in the consolidated statement of financial position at transition date is presented below:

| (CNY million) | |
|---|---|
| Operating lease commitment at December 31, 2018 | 7,944 |
| Recognition exemption: | |
| – Leases with remaining lease term of less than 12 months | (557) |
| Undiscounted lease liabilities | 7,387 |
| | |
| Discounted using the incremental borrowing rate at January 1, 2019 | 6,640 |
| Other differences at transition date | 663 |
| Lease liabilities recognised at January 1, 2019 | 7,303 |

# 5 Accounting judgements and estimates

## (a) Accounting judgements

### (i) Revenue recognition

Revenue is recognised when control of a good or service is transferred to a customer as disclosed in note 3(q). To determine the satisfaction of performance obligations the Group applies the following judgements:

- Where revenue is recognised over time, the Group primarily uses the output method to measure progress; however, in a limited number of business units, the input method is adopted when the Group is unable to reasonably measure the outcome of a performance obligation. Judgements applied when using the output method include assessing progress and milestones achieved and determining if that represents the value of goods and/or services delivered to the customer to date. Judgements applied when using the input method include determining if consumption of the resources relative to the total expected amount faithfully depicts the transfer of control of goods and/or services promised to the customer.

- Where revenue is recognised at a point in time, the Group assesses the transfer of control by reference to the contractual terms and the circumstance of the arrangements including a consideration of past business practice. These include having a legal right to payment, title has passed, the customer has the risks and rewards of ownership, or the customer is using the asset to generate value for themselves.

- For sales to distribution channels, judgement is also applied in determining when the control of the goods is transferred to distributors. These judgements consider several external and internal factors including, but not limited to, market conditions, product life cycles, distributor sales, competitive conditions and the extent to which the Group has continuing managerial involvement over the goods after their delivery.

### (ii) Contract modification

The Group applies judgements in determining whether a contract modification should be treated as a new contract or a prospective change to an existing contract, or accounted for through a cumulative catch-up adjustment to revenue, by considering the nature of the goods and services, and sales price data.

The Group judges a contract modification as a separate contract when the increase in contract scope is due to additional distinct promised goods or services and the price increases reflect the SSP of such goods or services plus any appropriate adjustments. Otherwise, a contract modification is judged as a prospective change to an existing contract when the remaining goods or services are distinct from those transferred before the date of the modification, or accounted for as cumulative catch-up adjustment to the revenue when the new or remaining goods or services are not distinct from those transferred.

## (b) Sources of estimation uncertainty

Key sources of estimation uncertainty are as follows:

### (i) Revenue recognition

To determine the transaction price and the amounts allocated to performance obligations the Group applies the following estimation:

- Variable consideration is estimated using the most likely amount or expected value based on the nature of the specific consideration and the analysis of relevant contract terms, taking into consideration historical, current and expected information.

- SSP is determined using observable evidence of sales prices, where available. In a number of cases statistical analysis is used to identify the historical price a product/service has been sold for as its SSP. Where observable evidence is not available, SSP is estimated using multiple inputs (see note 3(q)(i)vii). SSP is monitored regularly to ensure they remain appropriate.

- Obligations for returns and refunds are judged based on estimates made from historical information associated with similar products and anticipated rates of claims for the products.

- The collectability of a consideration is estimated at contract inception, based on the Group's assessment on the customer's ability and intention to pay when due.

Estimation is inherent in revenue recognition and revenue may materially change if management's estimation were to change or to be found inaccurate.

### (ii) Impairment of trade receivables and contract assets

The credit risk of customers is regularly assessed with a focus on the customer's ability and willingness to pay, reflected by the Group's estimation of the expected credit loss allowance on trade receivables and contract assets. The Group estimates expected credit loss by assessing the loss that will be incurred given customer default based on past payment experience and adjusted by the cash flow expected from collateral or credit risk mitigation received where these are considered to be integral to the asset, and by assessing the probability of default taking into account information specific to the customer as well as pertaining to the country and economic environment in which the customer operates. The estimate also incorporates forward looking data.

Impairment is assessed on an individual basis for trade receivables and contract assets meeting pre-determined criteria, including customers in financial difficulties, and contracts with risk mitigation arrangements or significant financing arrangements, amongst others. Apart from receivables and contract assets that have been assessed and provided for individually, allowances are estimated using provision matrices by management with reference to the customers' credit risk ratings and aging analysis of the remaining trade receivable and contract asset balances. Different provision matrices have been developed by the Group based on different customer groups which exhibit different risk characteristics.

If the financial condition of customers were to deteriorate or improve, or actual future economic performance is different to the Group's estimates, additional allowances or reversals may be required in future periods.

### (iii) Net realisable value of inventories

The net realisable value of inventories is the estimated selling price in the ordinary course of business, less the estimated costs of completion and the estimated costs necessary to make the sale, adjusted by the losses for obsolescence and redundancy. These estimates are based on the current market condition, economic lives of the Group's products and the historical experience of inventory losses. They could change significantly as a result of industrial technology upgrades, competitor actions or other changes in market condition. Management will reassess the estimations at the end of each reporting period.

### (iv) Depreciation and amortisation

Property, plant and equipment and right-of-use assets are depreciated on a straight-line basis over the estimated useful lives, after taking into account the estimated residual value. Intangible assets with finite useful life are amortised on a straight-line basis over the estimated useful lives. Both the period and method of depreciation and amortisation are reviewed annually. The depreciation and amortisation expense for future periods is adjusted if there are significant changes, such as operational efficiency or changes in technologies, from previous estimates.

### (v) Impairment losses of long-lived assets

The carrying amounts of long-lived assets (including goodwill) are reviewed periodically in order to assess whether the recoverable amounts have declined below their carrying amounts. In order to determine the recoverable amount, the Group uses assumptions and develops expectations, which requires significant judgement. The Group uses all readily available information in determining an amount that is a reasonable approximation of recoverable amount, including estimates based on reasonable and supportable assumptions and projections of production volume, sales price, amount of operating costs, discount rate and growth rate.

**(vi) Income tax**

The Group is subject to income taxes in various jurisdictions. Significant judgement is required in determining the Group's provision for income taxes. There are many transactions and computations for which the ultimate tax determination is uncertain during the ordinary course of business. The Group recognises liabilities in relevant accounting period based on estimates of the probabilities of whether additional taxes will be due. Where the final tax outcome of these matters is different from the amounts that were initially recorded, such differences will impact current and deferred tax liabilities and the taxation charge for the year.

**(vii) Provision for warranties**

As explained in note 29(b), the Group makes provision for assurance warranties in respect of its Consumer Business and certain Enterprise Business products, taking into account the Group's recent claim experience and anticipated claim rates for affected products. As the Group is continually upgrading its product designs and launching new models, it is possible that the recent claim experience is not indicative of future claims that it will receive in respect of past sales. Any increase or decrease in the provision would affect profit or loss in future years.

**(viii) Other provisions**

The Group makes provisions for onerous contracts, outstanding litigations and claims based on project budgets, contract terms, available knowledge, legal advice and past experience. The Group recognises provisions to the extent that it has a present legal or constructive obligation as a result of a past event; that it is probable that an outflow of resources will be required to settle the obligation; and that the amount can be reliably estimated. Judgement is required in making such estimates and the ultimate outcome may be different.

The Group makes provisions for onerous contracts in respect of losses arising from non-cancellable procurement agreements when there is a change in the Group's procurement demands such that the Group may not proceed with committed purchase orders or use the goods concerned. Provisions are made taking into account the contract terms, the suppliers' losses resulting from the Group's termination of the agreements and the extent to which the goods under the committed purchase orders will no longer be used in the Group's production. Judgement is required in making the estimates and the ultimate outcome may be different. The Group regularly updates its production plan and procurement demands, estimates probable losses, and adjusts provisions accordingly.

**(ix) Deferred tax assets**

The key source of estimation uncertainty lies in the recognition of deferred tax assets arising from unused tax losses and deductible temporary differences. As explained in note 3(o), all deferred tax assets are recognised to the extent that it is probable that future taxable profits will be available against which they can be utilised. Adverse changes to the operating environment or changes in the Group's organisation structure could result in a future write-down of the deferred tax assets recognised.

**(x) Determining the lease term**

In determining the lease term at the commencement date for leases that include renewal options exercisable by the Group, the Group evaluates the likelihood of exercising the renewal options taking into account all relevant facts and circumstances that create an economic incentive for the Group to exercise the option. The lease term is reassessed when there is a significant event or significant change in circumstance that is within the Group's control. Any increase or decrease in the lease term would affect the amount of lease liabilities and right-of-use assets recognised in future years.

### (c) Financial impact of the Entity List event

On May 16, 2019 and August 19, 2019, pursuant to part 744.11(b) of the United States Export Administration Regulations (EAR), the Bureau of Industry and Security (BIS) of the United States added Huawei Technologies Co.,Ltd. and certain non-US affiliates (the Entities) to the Entity List. Upon the Entities being added to Entity List, export, re-export or in-country transfer of items subject to EAR (including hardware, software and technology etc.) to the Entities shall be subject to BIS license requirement (the Event). As a result, supplies of relevant items to the Group and sales of certain products of the Group have been affected. The Group has taken active measures to mitigate the impact of the Event. In preparing these consolidated financial statements, management has applied significant judgements to assess the impacts arising from the Event. The Group will continuously assess if any subsequent adjustment to relevant estimates are required based on the development of the Event.

## 6 Possible impact of amendments, new standards and interpretations issued but not yet effective for the year ended December 31, 2019

The International Accounting Standards Board (IASB) has issued a number of new standards and amendments which will affect the financial statements in subsequent accounting periods. They are not expected to have a significant impact on the Group's consolidated financial statements.

## 7 Segment information

Operating segments are determined based on the types of customers, products and services provided, as well as the Group's organisation structure, management requirement and reporting system. The Group divides its business into three operating segments:

### Carrier Business

The Carrier Business provides a series of products, services and business solutions encompassing wireless and cloud core network, fixed network, cloud and data centre, and service and software, for global telecom carriers.

### Enterprise Business

The Enterprise Business builds a digital infrastructure by using new ICT technologies such as artificial intelligence, cloud, big data, Internet of Things, video and data communication to provide products and services that help industries (such as government, public utilities, finance, energy, transport, motor vehicle, etc) go digital.

### Consumer Business

The Consumer Business provides smartphones, tablets, personal computer, wearable devices, converged home devices, as well as the applications and services on these devices for consumers and businesses.

There are no inter-segment transactions. The financial information of the different segments is regularly reviewed by the Group's most senior executive management for the purpose of resource allocation and performance assessment. During the year, the classification for certain products among operating businesses was changed. Comparative figures have been adjusted to reflect the current year presentation.

### Revenue information in respect of business segments

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Carrier | **296,689** | 285,830 |
| Enterprise | **89,710** | 82,592 |
| Consumer | **467,304** | 348,852 |
| Unallocated items | **5,130** | 3,928 |
| Total | **858,833** | 721,202 |

### Revenue information in respect of geographical segments

| (CNY million) | 2019 | 2018 |
|---|---|---|
| China | **506,733** | 372,162 |
| Europe, the Middle East and Africa (EMEA) | **206,007** | 204,536 |
| Asia Pacific | **70,533** | 81,918 |
| Americas | **52,478** | 47,885 |
| Others | **23,082** | 14,701 |
| Total | **858,833** | 721,202 |

## 8 Revenue

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Revenue from contracts with customers | **858,473** | 720,940 |
| Rental income | **360** | 262 |
| | **858,833** | 721,202 |

Revenue from contracts with customers is analysed by timing of revenue recognition as follows:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Recognised at a point in time | **722,274** | 608,092 |
| Recognised over time | **136,199** | 112,848 |
| | **858,473** | 720,940 |

Further disaggregation of revenue by business and geography is set out in note 7.

The amount of revenue recognised for the year ended December 31, 2019 from POBs satisfied (or partially satisfied) in previous years amounted to CNY1,616 million (2018: CNY1,084 million). The revenue was constrained in prior years as the relevant customers are high credit risk rated and the collectability of sales consideration was estimated to be low.

### Transaction price allocated to remaining performance obligations

As at December 31, 2019, the aggregated amount of transaction price allocated to the remaining performance obligations under the Group's existing customer contracts is CNY96,525 million (2018: CNY94,449 million). This amount mainly represents the remaining performance obligations under the Group's Carrier Business and Enterprise Business contracts. The Group will recognise the revenue in future when control of the corresponding service or product is transferred to the customer as stipulated in note 3(q). 71% of the amount is expected to occur over the next year (2018: 65%), while the remaining portion is expected to occur in the years that follow. The amounts disclosed above do not include any estimated amounts of variable consideration that are constrained.

The Group does not disclose information about remaining performance obligations that have original expected durations of one year or less as permitted by IFRS 15.

Revenue is recognised when a performance obligation is satisfied in accordance with the accounting policies in note 3(q). The timing of payment from customers relative to revenue recognition generates either contract assets or trade receivables for payments received in arrears or contract liabilities for payments received in advance.

Contract assets and contract liabilities are presented in notes 21 and 27 respectively.

## 9 Other income, net

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Factoring expenses | | **(1,151)** | (1,269) |
| Government grants | (i) | **1,667** | 1,545 |
| Impairment of property, plant and equipment, intangible assets, goodwill and right-of-use assets | | **(140)** | (89) |
| Net (loss)/gain on disposal of property, plant and equipment, intangible assets, goodwill and right-of-use assets | (ii) | **(233)** | 750 |
| Gain on deemed disposal of a joint venture | | **–** | 269 |
| Others, net | | **827** | 618 |
| | | **970** | 1,824 |

(i) During the year ended December 31, 2019, the Group received unconditional government grants of CNY1,189 million (2018: CNY969 million) which were immediately recognised in other income.

During the year ended December 31, 2019, the Group received government grants of CNY281 million (2018: CNY444 million) which were conditional upon completion of research and development projects. These grants were initially included in the consolidated statement of financial position as deferred government grants, and are recognised in profit or loss as other income at the timing as described in note 3(r). During the year ended December 31, 2019, conditional government grants of CNY478 million (2018: CNY576 million) were recognised in profit or loss.

(ii) The amount for the year ended December 31, 2018 mainly comprises the gain on sales of patents to a third party.

## 10 Personnel expenses

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Salaries, wages and other benefits | **134,937** | 112,403 |
| Time-based unit plan (TUP) | **14,048** | 16,906 |
| Post-employment plans and others | | |
| Defined benefit plan | **4,713** | 3,771 |
| Defined contribution plans and others | **14,631** | 13,504 |
| | **19,344** | 17,275 |
| | **168,329** | 146,584 |

### TUP

TUP is a profit-sharing and bonus plan based on employee performance for all eligible employees (recipients) in the Group. Under TUP, time-based units (TBUs) are granted to recipients for a term of five years which entitle them to receive an annual cash incentive based on an annual profit-sharing amount and an end-of-term cumulative appreciation amount. Both the annual profit-sharing and the end-of-term appreciation amount are determined at the discretion of the Group. Recipients receive the annual profit-sharing amount in each year following the financial year in which it is earned during the five-year period. TBUs expire on the earlier of the end of the five-year period or the date recipients leave the Group's employment, when the accrued end-of-term appreciation amount will be paid.

### Defined contribution plans

The Group contributes to defined contribution retirement plans for eligible employees. The plans are managed either by the governments in the countries where the employees are employed, or by independent trustees. Contribution levels are determined by the relevant laws and regulations concerned.

## 11 Finance income and expenses

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Interest income on financial assets measured at amortised cost | | | |
| – deposits and wealth management products | | **6,228** | 4,768 |
| – other financial assets | | **480** | 314 |
| Interest income on financial assets measured at FVOCI | | **128** | 407 |
| Dividend income on money market funds | | **634** | 713 |
| Net gains on non-derivative financial assets mandatorily measured at FVPL | | **28** | 312 |
| Net gains on disposal of financial assets measured at FVOCI | 13(b) | **78** | 1 |
| Interest income on lease receivables | | **22** | 10 |
| Finance income | | **7,598** | 6,525 |
| Interest expense on loans and borrowings | | **(4,807)** | (2,857) |
| Interest cost on employee benefit obligations | | **(637)** | (1,118) |
| Interest expense on lease liabilities | 30(a)(ii) | **(374)** | – |
| Other interest expense | | **(252)** | (230) |
| Net foreign exchange loss | | **(1,340)** | (2,031) |
| Impairment loss on debt securities measured at FVOCI and other financial assets measured at amortised cost | | **–** | (8) |
| Bank charges | | **(10)** | (28) |
| Finance expenses | | **(7,420)** | (6,272) |
| Net finance income | | **178** | 253 |

No borrowing costs were capitalised during the year ended December 31, 2019 (2018: nil).

## 12 Income tax in the summary consolidated statement of profit or loss and other comprehensive income

### Charge for the year

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Current tax | | |
| Provision for the year | **9,419** | 10,909 |
| (Over)/under provision in respect of prior years | **(151)** | 1,153 |
| | **9,268** | 12,062 |
| Deferred tax | **6,099** | 2,239 |
| | **15,367** | 14,301 |

## 13 Other comprehensive income

### (a) Tax effects relating to each component of other comprehensive income

| (CNY million) | 2019 Before-tax amount | 2019 Tax benefit | 2019 Net-of-tax amount | 2018 Before-tax amount | 2018 Tax expense | 2018 Net-of-tax amount |
|---|---|---|---|---|---|---|
| Re-measurement of defined benefit obligations | | | | | | |
| – The Group | **202** | **(16)** | **186** | (816) | 50 | (766) |
| Net change in the fair value and impairment loss of financial assets measured at FVOCI: | | | | | | |
| Net change in the fair value of equity investments | **184** | **(36)** | **148** | (78) | 12 | (66) |
| Net change in the fair value and impairment loss of non-equity financial assets | | | | | | |
| – The Group | **(11)** | **(3)** | **(14)** | 35 | 1 | 36 |
| – Share of associates and joint ventures | **–** | **–** | **–** | (9) | – | (9) |
| | **173** | **(39)** | **134** | (52) | 13 | (39) |
| Translation differences on foreign operations | | | | | | |
| – The Group | **1,881** | **–** | **1,881** | 1,247 | – | 1,247 |
| – Share of associates and joint ventures | **–** | **–** | **–** | (12) | – | (12) |
| | **1,881** | **–** | **1,881** | 1,235 | – | 1,235 |
| | **2,256** | **(55)** | **2,201** | 367 | 63 | 430 |

### (b) Components of other comprehensive income, including reclassification adjustments

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Net change in the fair value and impairment loss of financial assets measured at FVOCI: | | |
| Changes in fair value recognised during the year | **238** | (52) |
| Reclassification adjustments for amounts transferred to profit or loss: | | |
| – Gain on derecognition (note 11) | **(78)** | (1) |
| Loss allowances recognised during the year | **13** | 1 |
| Net deferred tax (debited)/credited to other comprehensive income | **(39)** | 13 |
| **Net movement in the fair value reserve during the year** | **134** | (39) |

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Translation differences on foreign operations: | | |
| Recognised during the year | **1,820** | 1,253 |
| Reclassification adjustments for amounts transferred to profit or loss: | | |
| – Disposal of subsidiaries | **55** | (27) |
| – Disposal of an associate and a joint venture | **6** | (1) |
| – Deemed disposal of a joint venture | **–** | 10 |
| **Net movement in the translation reserve during the year** | **1,881** | 1,235 |

## 14 Goodwill and intangible assets

| (CNY million) | Goodwill | Software | Patents | Royalties | Trademark and others | Total |
|---|---|---|---|---|---|---|
| **Cost:** | | | | | | |
| At January 1, 2018 | 4,089 | 2,651 | 3,754 | 2,947 | 501 | 13,942 |
| Exchange adjustments | 174 | 6 | 20 | 2 | 11 | 213 |
| Additions | – | 422 | 495 | 3,450 | 301 | 4,668 |
| Acquisition of subsidiaries | 119 | – | 108 | – | 151 | 378 |
| Disposals | – | (389) | (109) | (18) | (1) | (517) |
| At December 31, 2018 | 4,382 | 2,690 | 4,268 | 6,381 | 963 | 18,684 |
| At January 1, 2019 | **4,382** | **2,690** | **4,268** | **6,381** | **963** | **18,684** |
| Exchange adjustments | **115** | **12** | **11** | **1** | **3** | **142** |
| Additions | **–** | **642** | **888** | **786** | **1,409** | **3,725** |
| Acquisition of subsidiaries | **108** | **29** | **277** | **–** | **20** | **434** |
| Reclassified as assets held for sale | **(136)** | **–** | **(111)** | **–** | **(156)** | **(403)** |
| Disposals | **–** | **(967)** | **(35)** | **(1,045)** | **(139)** | **(2,186)** |
| At December 31, 2019 | **4,469** | **2,406** | **5,298** | **6,123** | **2,100** | **20,396** |
| **Amortisation and impairment:** | | | | | | |
| At January 1, 2018 | 3,751 | 2,003 | 1,178 | 1,318 | 365 | 8,615 |
| Exchange adjustments | 175 | 5 | 18 | 1 | 10 | 209 |
| Amortisation for the year | – | 328 | 232 | 1,578 | 130 | 2,268 |
| Impairment loss | 79 | 1 | – | – | 6 | 86 |
| Disposals | – | (387) | (52) | (18) | (1) | (458) |
| At December 31, 2018 | 4,005 | 1,950 | 1,376 | 2,879 | 510 | 10,720 |
| At January 1, 2019 | **4,005** | **1,950** | **1,376** | **2,879** | **510** | **10,720** |
| Exchange adjustments | **97** | **9** | **10** | **–** | **4** | **120** |
| Amortisation for the year | **–** | **513** | **655** | **1,147** | **632** | **2,947** |
| Impairment loss | **–** | **11** | **–** | **–** | **–** | **11** |
| Reclassified as assets held for sale | **–** | **–** | **(10)** | **–** | **(54)** | **(64)** |
| Disposals | **–** | **(964)** | **(19)** | **(1,040)** | **(137)** | **(2,160)** |
| At December 31, 2019 | **4,102** | **1,519** | **2,012** | **2,986** | **955** | **11,574** |
| **Carrying amount:** | | | | | | |
| At December 31, 2019 | **367** | **887** | **3,286** | **3,137** | **1,145** | **8,822** |
| At December 31, 2018 | 377 | 740 | 2,892 | 3,502 | 453 | 7,964 |

**(a)** Based on the use of related assets, the amortisation charge for the year is allocated to Cost of sales, Research and development expenses, Selling and administrative expenses, and the impairment losses are charged to Cost of sales and Other income, net in the summary consolidated statement of profit or loss and other comprehensive income.

**(b)** Goodwill impairment testing

Goodwill is allocated to the Group's cash-generating units (CGU) or group of CGUs, which is not larger than an operating segment and is expected to benefit from the synergies of the acquisition.

For impairment test purposes, the recoverable amounts of the CGUs are based on value-in-use calculations by using a discounted cash flow model. The calculations use cash flow projections based on financial budgets approved by management covering a five-year period, based on industry knowledge. Cash flows beyond the five-year periods are extrapolated using an estimated growth rate which does not exceed the long-term average growth rate for the business in which the CGU or group of CGUs operates. Cash flows are discounted using pre-tax discount rates that reflect specific risks relating to respective CGU or group of CGUs.

As at December 31, 2019 and 2018, all of the carrying amount of goodwill is allocated across multiple CGUs and the amount so allocated to each unit is not significant.

The Group performed the impairment test for the year ended December 31, 2019 and did not consider further impairment to the remaining goodwill is required.

**(c)** As at December 31, 2019 and 2018, the Group did not hold any intangible assets whose title is restricted or pledged as security for liabilities.

## 15 Property, plant and equipment

| (CNY million) | Freehold land | Buildings | Machinery | Electronic and other equipment | Motor vehicles | Construction in progress | Investment property | Decoration and leasehold improvements | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Cost:** | | | | | | | | | |
| At January 1, 2018 | 296 | 16,702 | 17,068 | 31,373 | 579 | 14,819 | 172 | 12,903 | 93,912 |
| Exchange adjustments | (3) | (18) | (8) | (134) | (9) | (30) | (2) | (38) | (242) |
| Additions | 141 | 798 | 2,911 | 11,262 | 38 | 14,730 | 213 | 433 | 30,526 |
| Acquisition of subsidiaries | - | - | 16 | 18 | - | - | - | 4 | 38 |
| Transfer from construction in progress | - | 4,569 | 2,837 | 1,898 | - | (14,458) | - | 5,154 | - |
| Transferred from investment property | - | 60 | - | - | - | - | (60) | - | - |
| Disposals | - | - | (164) | (1,658) | (43) | (63) | - | (140) | (2,068) |
| Hyperinflation adjustments | - | - | - | 109 | 1 | - | - | 21 | 131 |
| At December 31, 2018 | 434 | 22,111 | 22,660 | 42,868 | 566 | 14,998 | 323 | 18,337 | 122,297 |
| At January 1, 2019 | **434** | **22,111** | **22,660** | **42,868** | **566** | **14,998** | **323** | **18,337** | **122,297** |
| Exchange adjustments | **16** | **24** | **20** | **193** | **(2)** | **(16)** | **25** | **66** | **326** |
| Additions | **1** | **227** | **4,230** | **4,138** | **84** | **32,330** | **-** | **108** | **41,118** |
| Acquisition of subsidiaries | **-** | **-** | **-** | **1** | **-** | **-** | **-** | **1** | **2** |
| Transfer from construction in progress | **-** | **4,759** | **6,547** | **16,934** | **3** | **(33,229)** | **-** | **4,986** | **-** |
| Disposals | **-** | **(385)** | **(446)** | **(1,528)** | **(60)** | **(108)** | **-** | **(415)** | **(2,942)** |
| Reclassified as assets held for sale | **-** | **-** | **(18)** | **(20)** | **(1)** | **(1)** | **-** | **(2)** | **(42)** |
| Hyperinflation adjustments | **-** | **-** | **1** | **72** | **1** | **-** | **-** | **16** | **90** |
| At December 31, 2019 | **451** | **26,736** | **32,994** | **62,658** | **591** | **13,974** | **348** | **23,097** | **160,849** |

| (CNY million) | Freehold land | Buildings | Machinery | Electronic and other equipment | Motor vehicles | Construction in progress | Investment property | Decoration and leasehold improvements | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Accumulated depreciation and impairment:** | | | | | | | | | |
| At January 1, 2018 | – | 3,776 | 6,869 | 18,608 | 316 | 13 | 89 | 8,152 | 37,823 |
| Exchange adjustments | – | (9) | (3) | (38) | (5) | – | (3) | (12) | (70) |
| Depreciation charge for the year | – | 494 | 1,669 | 7,570 | 78 | – | 3 | 1,838 | 11,652 |
| Impairment loss | – | – | – | 34 | – | – | – | – | 34 |
| Transferred from investment property | – | 1 | – | – | – | – | (1) | – | – |
| Disposals | – | – | (132) | (1,556) | (34) | (6) | – | (139) | (1,867) |
| Hyperinflation adjustments | – | – | – | 54 | 1 | – | – | 8 | 63 |
| At December 31, 2018 | – | 4,262 | 8,403 | 24,672 | 356 | 7 | 88 | 9,847 | 47,635 |
| At January 1, 2019 | **–** | **4,262** | **8,403** | **24,672** | **356** | **7** | **88** | **9,847** | **47,635** |
| Exchange adjustments | **–** | **2** | **5** | **109** | **(1)** | **–** | **1** | **31** | **147** |
| Depreciation charge for the year | **–** | **430** | **3,369** | **10,834** | **73** | **–** | **9** | **2,920** | **17,635** |
| Impairment loss | **–** | **–** | **31** | **62** | **–** | **8** | **–** | **22** | **123** |
| Disposals | **–** | **(273)** | **(362)** | **(1,386)** | **(53)** | **(5)** | **–** | **(386)** | **(2,465)** |
| Reclassified as assets held for sale | **–** | **–** | **(3)** | **(9)** | **–** | **–** | **–** | **(1)** | **(13)** |
| Hyperinflation adjustments | **–** | **–** | **–** | **54** | **1** | **–** | **–** | **13** | **68** |
| At December 31, 2019 | **–** | **4,421** | **11,443** | **34,336** | **376** | **10** | **98** | **12,446** | **63,130** |
| **Carrying amount:** | | | | | | | | | |
| At December 31, 2019 | **451** | **22,315** | **21,551** | **28,322** | **215** | **13,964** | **250** | **10,651** | **97,719** |
| At December 31, 2018 | 434 | 17,849 | 14,257 | 18,196 | 210 | 14,991 | 235 | 8,490 | 74,662 |

Based on the use of related assets, the depreciation charge for the year is allocated to Cost of sales, Research and development expenses, Selling and administrative expenses, and the impairment losses are charged to Cost of sales and Other income, net in the summary consolidated statement of profit or loss and other comprehensive income.

As at December 31, 2019 and 2018, the Group did not hold any property, plant and equipment as collateral for liabilities or contingent liabilities.

## Investment property

The fair value of investment property as at December 31, 2019 is estimated by management to be CNY417 million (2018: CNY360 million).

The fair value of investment property is determined by the Group internally with reference to market conditions and discounted cash flow forecasts, taking into account current lease agreements on an arm's-length basis.

## 16 Long-term leasehold prepayments

| (CNY million) | 2018 |
|---|---|
| At January 1 | 5,152 |
| Additions | 1,876 |
| Amortisation for the year | (132) |
| At December 31 | 6,896 |

On transition to IFRS 16, the long-term leasehold prepayments which represent the premium, resettlement fee and taxes paid in relation to acquisition of the underlying land use right, were reclassified as right-of-use assets at January 1, 2019. See note 4.

## 17 Interests in associates and joint ventures

| | Associates | | A Joint venture | | Total | |
|---|---|---|---|---|---|---|
| (CNY million) | **2019** | 2018 | **2019** | 2018 | **2019** | 2018 |
| Material | **497** | 486 | **–** | – | **497** | 486 |
| Immaterial | **195** | 36 | **57** | 58 | **252** | 94 |
| Subtotal | **692** | 522 | **57** | 58 | **749** | 580 |
| Less: impairment loss | **(18)** | (18) | **–** | – | **(18)** | (18) |
| Total | **674** | 504 | **57** | 58 | **731** | 562 |

Associates and the joint venture are accounted for using the equity method.

Particulars of the material associate, which is an unlisted corporate entity whose quoted market price is not available, are set out below:

| Name of associate | Form of business structure | Place of incorporation and business | Proportion of ownership interest | | Principal activities |
|---|---|---|---|---|---|
| | | | **2019** | 2018 | |
| *Associate* | | | | | |
| TD Tech Holding Limited (TD Tech) | Incorporated | Hong Kong, PRC | **49%** | 49% | Note |

Note: TD Tech's principal activity is to provide wireless enterprise solution for vertical market.

Summarised financial information of TD Tech, reconciled to the carrying amounts in the consolidated financial statements, is as follows:

| (CNY million) | **2019** | 2018 |
|---|---|---|
| *Gross amounts of the associate's* | | |
| Non-current assets | **334** | 317 |
| Current assets | **2,258** | 1,908 |
| Non-current liabilities | **144** | – |
| Current liabilities | **1,284** | 1,161 |
| Equity | **1,164** | 1,064 |
| | | |
| Revenue | **3,368** | 3,796 |
| Profit (note) | **101** | 101 |
| Other comprehensive income | **–** | (18) |
| Total comprehensive income (note) | **101** | 83 |
| | | |
| *Reconciled to the Group's interest in the associate* | | |
| Net assets of the associate | **1,165** | 1,064 |
| Group's effective interest | **49%** | 49% |
| Group's share of net assets of the associate | **571** | 521 |
| Elimination of unrealised profit | **(74)** | (35) |
| Carrying amount in the consolidated financial statements | **497** | 486 |

Note: As the issuance date of the Group's consolidated financial statements is ahead of TD Tech's audit report date, the Group applies the equity method to account for its investment in TD Tech based on unaudited financial information contained in TD Tech's management accounts, which may differ from TD Tech's audited results. Any differences are to be accounted for in the Group's next financial period.

Aggregate carrying amounts and summarised financial information of individually immaterial associates and joint ventures are as follows:

| | Associates | | Joint ventures | |
|---|---|---|---|---|
| (CNY million) | **2019** | 2018 | **2019** | 2018 |
| Aggregate carrying amount | **177** | 18 | **57** | 58 |
| | | | | |
| Aggregate amount of the Group's share of those associates' and joint ventures' | | | | |
| Profit for the year | **1** | – | **–** | – |
| Other comprehensive income | **–** | – | **–** | (1) |
| Total comprehensive income | **1** | – | **–** | (1) |

For the years ended December 31, 2019 and 2018, no dividend was declared or paid by the associates or joint ventures.

## 18 Other investments, including derivatives

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| **Financial assets measured at amortised cost** | | | |
| Investment funds | (i) | **76,800** | 18,700 |
| Fixed deposits | | **60,930** | 24,882 |
| | | **137,730** | 43,582 |
| **Financial assets measured at FVPL** | | | |
| Investment funds | (i) | **66,324** | 33,059 |
| Debt securities | (ii) | **–** | 2 |
| Equity securities | | **372** | 448 |
| Foreign exchange derivatives | | **159** | 83 |
| Compound financial instruments | | **168** | 53 |
| | | **67,023** | 33,645 |
| **Financial assets measured at FVOCI** | | | |
| Debt securities | (ii) | **1,766** | 22,636 |
| Equity securities | (iii) | **1,113** | 617 |
| | | **2,879** | 23,253 |
| | | **207,632** | 100,480 |
| Less: Loss allowances | | **(10)** | (4) |
| | | **207,622** | 100,476 |
| Non-current portion | | **7,266** | 18,725 |
| Current portion | | **200,356** | 81,751 |
| | | **207,622** | 100,476 |

(i) Investment funds comprise short-term investments in wealth management products and money market funds. Wealth management products with guaranteed principal and interest are measured at amortised cost where the Group intends to hold them to maturity; other investment funds are measured at FVPL where the Group intends to sell them or where the investments do not give rise to cash flows which are solely principal and interest.

(ii) Debt securities comprise investments in fixed rate bonds, floating rate notes, certificates of deposit and commercial papers. The Group has classified most of its debt securities as FVOCI since they are held to collect and for sale, and also give rise to cash flows which are solely principal and interest. In limited cases, certain bonds are measured at FVPL where the Group intends to hold them for trading. The loss allowances on the debt securities at FVOCI amounted to CNY302 thousand as at December 31, 2019 (2018: CNY7 million).

(iii) The Group designated equity investments at FVOCI where they are considered strategic to the Group. Dividend income received on these investments amounted to CNY4 million for the year ended December 31, 2019. None of these equity investments is individually significant.

Certain equity investments at FVOCI were disposed of during the year ended December 31, 2019 (2018: nil), and the corresponding cumulative gain in fair value reserve of CNY5 million (2018: nil) was transferred to retained earnings upon disposal of these investments.

(iv) As at December 31, 2019 and 2018, the Group did not hold any investments pledged as collateral for liabilities or contingent liabilities.

## 19 Deferred tax assets/(liabilities)

### (a) Components of recognised deferred tax assets/(liabilities)

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Accruals, provisions and unperformed obligations | **7,023** | 12,466 |
| Depreciation of property, plant and equipment | **(1,831)** | (830) |
| Provision for loss allowances | **303** | 319 |
| Write-down of inventories | **372** | 517 |
| Unrealised profit | **3,195** | 2,935 |
| Tax losses | **1,331** | 1,187 |
| Undistributed profits of subsidiaries | **(1,641)** | (1,784) |
| Others | **370** | 510 |
| Total | **9,122** | 15,320 |

Reconciliation to the consolidated statement of financial position:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Net deferred tax assets recognised in the summary consolidated statement of financial position | **10,877** | 17,257 |
| Net deferred tax liabilities recognised in the summary consolidated statement of financial position | **(1,755)** | (1,937) |
| | **9,122** | 15,320 |

### (b) Deferred tax assets not recognised

Deferred tax assets were not recognised in relation to certain unused tax losses and deductible temporary differences in accordance with the accounting policy set out in note 3(o).

Based on the business forecast, certain group entities have reduced the estimated future taxable profits, resulting in an increase in unrecognised tax losses, tax credits and deductible temporary differences as a whole. Meanwhile, as permitted by the relevant income tax laws in the PRC, a group entity chose to utilise unused tax losses from current and previous years against taxable income from its foreign operations in the current year, in priority to utilising overseas withholding tax credits. This resulted in a decrease in unrecognised tax losses with a corresponding increase in unrecognised overseas withholding tax credits as at December 31, 2019.

The expiry dates of unused tax losses for which no deferred tax asset is recognised are as follows:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Expiring in: | | |
| 2020 | **–** | 668 |
| 2021 | **281** | 294 |
| 2022 | **893** | 399 |
| 2023 | **522** | 918 |
| 2024 and afterwards or no expiry period | **14,369** | 22,884 |
| | **16,065** | 25,163 |

As at December 31, 2019, deductible temporary differences amounting to CNY134,955 million (2018: CNY71,559 million) have not been recognised as deferred tax assets; additionally, unused tax credits relating to overseas withholding income tax and research and development expenditure totalling CNY3,099 million (2018: CNY1,402 million) have not been recognised as tax assets.

## 20 Inventories and other contract costs

| (CNY million) | 2019 | 2018 |
|---|---|---|
| **Inventories** | | |
| Raw materials | **58,520** | 35,448 |
| Manufacturing work in progress | **27,103** | 17,065 |
| Finished goods | **52,241** | 26,308 |
| Dispatched goods and contract work in progress | **20,527** | 11,397 |
| Other inventories | **6,970** | 4,283 |
| | **165,361** | 94,501 |
| **Other contract costs** | **2,029** | 2,044 |
| | **167,390** | 96,545 |

As at December 31, 2019 and 2018, the Group did not hold any inventories pledged as collateral for liabilities or contingent liabilities.

### (a) Amount of inventories recognised as an expense and included in profit or loss:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Carrying amount of inventories sold | **456,577** | 375,606 |
| Write-down of inventories | **3,796** | 5 |
| | **460,373** | 375,611 |

For the year ended December 31, 2019, the Group wrote down certain raw materials and manufacturing work in progress that may not be capable of being used in production as a result of the Event disclosed in note 5(c). The write-down is included in Cost of sales.

### (b) Contract costs

The Group's contract costs represent contract fulfilment costs, which will be charged to Cost of sales when the corresponding contract revenue is recognised.

No provision for impairment was required on contract costs as at December 31, 2019 (2018: nil).

## 21 Contract assets

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Gross carrying amount | **53,389** | 48,693 |
| Less: loss allowances (note 22(b)) | **(377)** | (417) |
| | **53,012** | 48,276 |
| Non-current portion | **2,200** | 601 |
| Current portion | **50,812** | 47,675 |
| | **53,012** | 48,276 |

Contract assets relate to the Group's rights to consideration for performance obligations that have been satisfied, primarily from Carrier Business and Enterprise Business contracts. Contract assets are transferred to receivables when the right to payment becomes unconditional, but for the passage of time. This usually occurs when the Group issues an invoice to the customer in accordance with the billing milestones agreed in the contract, which are generally upon passing of the product acceptance tests.

Significant changes in the gross balances of contract assets during the year are as follows:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| At January 1 | **48,693** | 19,728 |
| Acquisition of subsidiaries | **–** | 118 |
| Addition during the year | **50,193** | 46,262 |
| Transfers to receivables or reversal during the year | **(45,163)** | (17,394) |
| Reclassified as assets held for sale | **(702)** | – |
| Exchange adjustments | **368** | (21) |
| At December 31 | **53,389** | 48,693 |

## 22 Trade and bills receivable

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| **Trade receivables** | | | |
| Trade receivables from third parties | (i) | **85,217** | 90,988 |
| Trade receivables from related parties | 32 | **77** | 64 |
| | | **85,294** | 91,052 |
| **Bills receivable** | | | |
| Bank acceptance bills | | **1,821** | 733 |
| Commercial acceptance bills | | **2,245** | 2,776 |
| Letters of credit | | **705** | 1,022 |
| | (ii) | **4,771** | 4,531 |
| | | **90,065** | 95,583 |
| Non-current portion | | **4,540** | 3,588 |
| Current portion | | **85,525** | 91,995 |
| | | **90,065** | 95,583 |

(i) As at December 31, 2019, the Group's trade receivables that may be sold through reverse factoring arrangement amounted to CNY7,805 million (2018: CNY6,228 million). These trade receivables are managed in a business model whose objective is achieved by both collection and sale, and are therefore measured at FVOCI.

(ii) The Group's bills receivable are due within twelve months from issuance date.

## (a) Ageing analysis

At the end of the reporting period, the ageing analysis of trade receivables is as follows:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Not past due | **68,378** | 74,276 |
| Less than 90 days past due | **13,249** | 13,559 |
| 90 days to 1 year past due | **5,409** | 5,229 |
| 1 year and above past due | **1,783** | 1,803 |
| | **88,819** | 94,867 |
| Less: loss allowances | **(3,525)** | (3,815) |
| | **85,294** | 91,052 |

Trade receivables are generally due within 30 days from the date of billing.

## (b) Loss allowances of trade receivables and contract assets

Loss allowances in respect of trade receivables and contract assets are recorded using an allowance account unless the Group is satisfied there is no reasonable expectation of further recoveries in which case the receivables are written off (see note 3(e)(i)).

The movement in loss allowances in respect of trade receivables and contract assets during the year is as follows.

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| At January 1 | | **4,265** | 4,799 |
| Loss allowances recognised | | **46** | 74 |
| Uncollectible amounts written-off | | **(420)** | (718) |
| Collection of previously written-off debtors | | **49** | 143 |
| Reclassified as assets held for sale | | **(4)** | – |
| Exchange adjustments | | **17** | (33) |
| At December 31 | | **3,953** | 4,265 |
| Representing | | | |
| – Loss allowance on trade receivables | | **3,525** | 3,815 |
| – Loss allowance on contract assets | 21 | **377** | 417 |
| – Loss allowance included in OCI on trade receivables at FVOCI | | **51** | 33 |
| Total | | **3,953** | 4,265 |

Loss allowances recognised on trade receivables and contract assets are included in Selling and administrative expenses.

During the year ended December 31, 2019, the loss allowance of trade receivables and contract assets decreased mainly due to the write-off of uncollectible amounts. CNY177 million of the write-off was due from customers in EMEA markets.

### (c) Transferred trade receivables that are not derecognised in their entirety

As at December 31, 2019, the Group's trade receivables with the face value of CNY25 million (2018: CNY30 million) have been transferred to banks and the Group received the corresponding remittance of CNY25 million (2018: CNY30 million). As these transactions are with recourse, the Group therefore has retained substantially all the risks and rewards and continues to recognise these trade receivables and the relevant financing as loans and borrowings (note 25).

As at December 31, 2019, the Group's trade receivables with the carrying amount of CNY3,333 million (2018: CNY3,190 million) have been transferred to banks. These trade receivables are covered by insurance policies issued by third party credit insurance agencies with the transferees as the loss payees. In these transactions, the Group retains risk not covered by the insurance, therefore the Group has neither transferred nor retained substantially all the risks and rewards in relation to the trade receivables and the Group is considered to have retained control of these trade receivables as the transferees have no practical ability to sell these trade receivables without the Group's consent. As such, the Group continues to recognise the transferred trade receivables of CNY808 million (2018: CNY840 million) and the associated liabilities of CNY874 million (2018: CNY845 million) to the extent of its continuing involvement. The associated liabilities are included in Other liabilities. As at December 31, 2019, loss allowances of CNY554 million (2018: CNY577 million) were made on these transferred receivables.

### (d) Collateral

Except as disclosed in note 22(c), as at December 31, 2019 and 2018, the Group did not hold any other trade and bills receivable pledged as collateral for liabilities or contingent liabilities.

## 23 Other assets

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Advance payments to suppliers | | **2,868** | 2,860 |
| Tax receivables on unbilled deliveries | (i) | **4,760** | 6,077 |
| Income tax related assets | | **2,215** | 3,810 |
| Other tax related assets | | **8,659** | 9,789 |
| Pledged deposits with banks | | **2,116** | 2,078 |
| Restricted deposits relating to government grants | (ii) | **1,259** | 1,737 |
| Other third party receivables | | **9,515** | 6,188 |
| Other long-term deferred assets | | **340** | 546 |
| Related party receivables | 32 | **376** | 332 |
| Prepayment for acquisition of long-term leasehold land | | **50** | 46 |
| Assets held for sale | (iii) | **2,164** | 2 |
| | | **34,322** | 33,465 |
| Non-current portion | | **5,196** | 5,423 |
| Current portion | | **29,126** | 28,042 |
| | | **34,322** | 33,465 |

(i) Under PRC tax regulations, value added tax ("VAT") and other surcharges are payable at the earlier of delivery of goods and services or issuance of VAT invoices. These balances represent VAT and surcharge receivable from customers on unbilled deliveries and will be reclassified to trade receivables upon billing.

(ii) Conditional government grants received by the Group are required to be deposited in restricted bank accounts until the government acceptance documents for the related research and development projects are obtained.

(iii) With the purpose of focusing on the Group's core businesses, the Group has signed an agreement with a third party for sale of its submarine business during the year and the sale was subsequently completed on March 6, 2020. The assets and liabilities of this business are therefore separately presented as Assets held for sale and Liabilities directly associated with the assets held for sale within Other liabilities (note 28) as at December 31, 2019, which mainly include cash and cash equivalents, operating receivables and payables, contract assets and contract liabilities. Both assets and liabilities are presented as current.

## 24 Cash and cash equivalents

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Cash on hand | **5** | 7 |
| Deposits with banks and other financial institutions | **142,374** | 95,900 |
| Highly liquid short-term investments | **28,200** | 88,126 |
| Deposits with third party merchants | **105** | 73 |
| Cash and cash equivalents in the summary consolidated statement of financial position | **170,684** | 184,106 |
| Reclassified as assets held for sale | **386** | – |
| Cash and cash equivalents in the summary consolidated statement of cash flows | **171,070** | 184,106 |

Short-term investments included in cash and cash equivalents are highly liquid, readily convertible into known amounts of cash and subject to an insignificant risk of changes in value. As at December 31, 2019, highly liquid short-term investments comprised wealth management products of CNY26,200 million and reverse repurchase agreements with maturities of less than three months of CNY2,000 million. The wealth management products are purchased from commercial banks with maturities of less than three months or with maturities of less than one year which can be redeemed at any time without penalty and are measured at amortised cost.

As at December 31, 2019, cash and cash equivalents of CNY488 million (2018: CNY659 million) were held in countries where exchange controls or other legal restrictions were in force.

At December 31, 2019, the Group held CNY2,940 million (2018: CNY4,969 million) of cash in two multicurrency pooling arrangements used to meet its day to day cash requirements and also to economically hedge foreign exchange rate movements arising from foreign currency cash flows. The facilities allow participating subsidiaries to place deposits and borrow funds from the counterparty banks in any freely convertible currency subject to the overall balance on the pools being positive.

As at December 31, 2019 and 2018, the Group did not hold any cash and cash equivalents pledged as collateral for liabilities or contingent liabilities.

## 25 Loans and borrowings

Contractual terms of the Group's loans and borrowings are summarised below.

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Short-term loans and borrowings: | | |
| – Intra-group guaranteed | **–** | 40 |
| – Unsecured | **733** | 2,738 |
| | **733** | 2,778 |
| Long-term loans and borrowings: | | |
| – Intra-group guaranteed | **903** | 1,890 |
| – Trade receivables financing (note 22(c)) | **25** | 30 |
| – Unsecured | **73,247** | 34,576 |
| – Corporate bonds | **37,254** | 30,667 |
| | **111,429** | 67,163 |
| | **112,162** | 69,941 |
| Non-current portion | **104,531** | 66,170 |
| Current portion | **7,631** | 3,771 |
| | **112,162** | 69,941 |

Intra-group guaranteed loans are external borrowings which have been raised by one group entity but contractual payments of principal and interest are guaranteed by another group entity.

## Terms and repayment schedule

A summary of the main terms and conditions of outstanding loans and borrowings are as follows:

**At December 31, 2019**

| (CNY million) | | Interest rate | Total | 1 year or less | 1 to 5 years | Over 5 years |
|---|---|---|---|---|---|---|
| **Intra-group guaranteed bank loans:** | | | | | | |
| South African Rand (ZAR) | variable | **8.53% p.a.** | **198** | **61** | **137** | **–** |
| CNY | variable | **4.41% ~ 4.90% p.a.** | **705** | **136** | **569** | **–** |
| | | | **903** | **197** | **706** | **–** |
| **Trade receivables financing:** | | | | | | |
| USD | variable | **5.94% p.a.** | **25** | **5** | **14** | **6** |
| **Unsecured bank loans:** | | | | | | |
| CNY | variable | **4.28% ~ 4.75% p.a.** | **42,029** | **6,695** | **35,334** | **–** |
| Russian Ruble (RUB) | variable | **8.46% ~ 10.20% p.a.** | **293** | **293** | **–** | **–** |
| Euro (EUR) | variable | **1.55% p.a.** | **1** | **1** | **–** | **–** |
| Hungarian Forint (HUF) | fixed | **4.36% p.a.** | **84** | **–** | **–** | **84** |
| Hong Kong Dollar | variable | **3.43% ~ 3.83% p.a.** | **10,391** | **41** | **6,223** | **4,127** |
| Philippine Peso | variable | **4.58% ~ 4.60% p.a.** | **370** | **370** | **–** | **–** |
| Saudi Arabian Riyal | variable | **4.03% p.a.** | **29** | **29** | **–** | **–** |
| USD | variable | **2.86% ~ 2.91% p.a.** | **20,783** | **–** | **20,783** | **–** |
| | | | **73,980** | **7,429** | **62,340** | **4,211** |
| **Corporate bonds:** | | | | | | |
| CNY | fixed | **3.48% ~ 3.49% p.a.** | **5,984** | **–** | **5,984** | **–** |
| USD | fixed | **3.25% ~ 4.13% p.a.** | **31,270** | **–** | **6,970** | **24,300** |
| | | | **37,254** | **–** | **12,954** | **24,300** |
| | | | **112,162** | **7,631** | **76,014** | **28,517** |

**At December 31, 2018**

| (CNY million) | | Interest rate | Total | 1 year or less | 1 to 5 years | Over 5 years |
|---|---|---|---|---|---|---|
| **Intra-group guaranteed bank loans:** | | | | | | |
| EUR | variable | 0.73% p.a. | 779 | 779 | – | – |
| ZAR | variable | 8.88% p.a. | 293 | – | 293 | – |
| Nepalese Rupee | fixed | 10.39% p.a. | 40 | 40 | – | – |
| CNY | variable | 4.41% ~ 4.90% p.a. | 818 | 114 | 682 | 22 |
| | | | 1,930 | 933 | 975 | 22 |
| **Trade receivables financing:** | | | | | | |
| USD | variable | 6.00% p.a. | 30 | 5 | 17 | 8 |
| **Unsecured bank loans:** | | | | | | |
| CNY | variable | 4.13% ~ 4.41% p.a. | 16,624 | 2,595 | 13,981 | 48 |
| RUB | variable | 10.44% p.a. | 191 | 191 | – | – |
| HUF | fixed | 4.36% p.a. | 95 | – | – | 95 |
| USD | variable | 3.57% ~ 4.50% p.a. | 20,404 | 47 | 20,357 | – |
| | | | 37,314 | 2,833 | 34,338 | 143 |
| **Corporate bonds:** | | | | | | |
| USD | fixed | 3.25% ~ 4.13% p.a. | 30,667 | – | 6,836 | 23,831 |
| | | | 69,941 | 3,771 | 42,166 | 24,004 |

Certain of the Group's banking facilities are subject to compliance with covenants relating to financial ratios. In the event of breach, the drawn down facilities would become payable on demand. The Group regularly monitors its compliance with these covenants. As at December 31, 2019 and 2018, no covenants had been breached.

## Corporate bonds

Corporate bonds were issued by the Company and its two wholly-owned subsidiaries, Proven Honour Capital Limited (Proven Honour) and Proven Glory Capital Limited (Proven Glory). Main terms of the outstanding corporate bonds are as follows:

| Corporate bond | Issuer | Issue date | Principal amount (million) | Interest rate per annum | Term |
|---|---|---|---|---|---|
| USD bond | Proven Honour | May 19, 2015 | 1,000 | 4.125% | 10 years |
| USD bond | Proven Honour | May 6, 2016 | 2,000 | 4.125% | 10 years |
| USD bond | Proven Glory | February 21, 2017 | 1,000 | 3.250% | 5 years |
| USD bond | Proven Glory | February 21, 2017 | 500 | 4.000% | 10 years |
| CNY medium-term note | The Company | October 24, 2019 | 3,000 | 3.480% | 3 years |
| CNY medium-term note | The Company | November 7, 2019 | 3,000 | 3.490% | 3 years |

USD bonds issued by Proven Honour and Proven Glory are fully guaranteed by the Company.

## Reconciliation of movements of major liabilities to cash flows arising from financing activities

**Year ended December 31, 2019**

| Related liabilities/ (CNY million) | Other loans and borrowings | Corporate bonds | Royalty instalments | Lease liabilities | Interest payable related to financing activities |
|---|---|---|---|---|---|
| Balance at January 1, 2019 | **39,274** | **30,667** | **4,055** | **7,303** | **392** |
| Net proceeds from borrowings | **77,622** | **5,991** | **–** | **–** | **–** |
| Repayment of borrowings | **(35,549)** | **–** | **–** | **–** | **–** |
| Royalties acquired | **–** | **–** | **454** | **–** | **–** |
| Instalment payments | **–** | **–** | **(1,111)** | **–** | **–** |
| New leases | **–** | **–** | **–** | **5,076** | **–** |
| Payment of lease liabilities | **–** | **–** | **–** | **(2,378)** | **–** |
| Interest incurred during the year | **–** | **–** | **–** | **374** | **4,040** |
| Interest paid | **–** | **–** | **–** | **(179)** | **(3,855)** |
| Amortisation of capitalised interest and transaction costs | **57** | **32** | **92** | **–** | **–** |
| Issuance cost payable | **–** | **(8)** | **–** | **–** | **–** |
| Non-cash transaction (note) | **(6,900)** | **–** | **–** | **–** | **–** |
| Termination of leases | **–** | **–** | **–** | **(354)** | **–** |
| Reclassified as liabilities directly associated with the assets held for sale | **–** | **–** | **–** | **(13)** | **–** |
| Exchange adjustments | **404** | **572** | **184** | **(142)** | **(59)** |
| Balance at December 31, 2019 | **74,908** | **37,254** | **3,674** | **9,687** | **518** |

**Year ended December 31, 2018**

| Related liabilities/ (CNY million) | Other loans and borrowings | Corporate bonds | Royalty instalments | Interest payable related to financing activities |
|---|---|---|---|---|
| Balance at January 1, 2018 | 10,780 | 29,145 | 1,359 | 276 |
| Proceeds from borrowings | 51,216 | – | – | – |
| Repayment of borrowings | (20,351) | – | – | – |
| Royalties acquired | – | – | 3,291 | – |
| Instalment payments | – | – | (729) | – |
| Interest incurred during the year | – | – | – | 2,333 |
| Interest paid | – | – | – | (2,067) |
| Amortisation of capitalised interest and transaction costs | 20 | 29 | 89 | – |
| Non-cash transaction (note) | (3,148) | – | – | – |
| Exchange adjustments | 757 | 1,493 | 45 | (150) |
| Balance at December 31, 2018 | 39,274 | 30,667 | 4,055 | 392 |

Note: Under certain financing arrangements, the Group's contractual obligations are transferred to customers without recourse when the Group obtains unconditional entitlements to the considerations of relevant customer contracts. During the year ended December 31, 2019, the Group derecognised loans and borrowings equivalent to CNY6,900 million (2018: CNY3,148 million) under these arrangements when the Group became unconditionally entitled to the relevant contract consideration.

## 26 Trade and bills payable

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| **Trade payables** | | | |
| Related party trade payables | 32 | **585** | 500 |
| Third party trade payables | | **135,069** | 93,820 |
| | | **135,654** | 94,320 |
| **Bills payable** | | | |
| Bank acceptance bills | | **5,187** | 1,565 |
| Letters of credit payable | | **1,344** | 1,034 |
| | | **6,531** | 2,599 |
| | | **142,185** | 96,919 |

## 27 Contract liabilities

| (CNY million) | 2019 | 2018 |
|---|---|---|
| Consideration received in advance of performance | **10,726** | 11,878 |
| Billing in advance of performance and unperformed obligations | **58,601** | 46,400 |
| | **69,327** | 58,278 |

Significant changes in contract liabilities during the year were as follows:

| (CNY million) | 2019 | 2018 |
|---|---|---|
| At January 1 | **58,278** | 52,184 |
| Acquisition of subsidiaries | **–** | 343 |
| Revenue recognised that was included in the contract liability balance at the beginning of the year | **(45,101)** | (38,812) |
| Increases due to cash received or billed but unperformed obligations | **55,878** | 44,894 |
| Reclassified as liabilities directly associated with the assets held for sale | **(348)** | – |
| Exchange adjustments | **620** | (331) |
| At December 31 | **69,327** | 58,278 |

## 28 Other liabilities

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Accrued expenses | | **42,287** | 37,749 |
| Refund liabilities | (i) | **24,141** | 18,118 |
| Other taxes payable | | **9,288** | 8,296 |
| Due in relation to property, plant and equipment | | **5,265** | 4,507 |
| Due in relation to intangible assets | | **4,835** | 4,432 |
| Foreign exchange derivatives | | **165** | 51 |
| Others | | **21,813** | 18,691 |
| Liabilities directly associated with the assets held for sale | 23(iii) | **1,368** | – |
| | | **109,162** | 91,844 |
| Non-current portion | | **3,157** | 4,161 |
| Current portion | | **106,005** | 87,683 |
| | | **109,162** | 91,844 |

(i) Refund liabilities mainly comprise the rebates and other sales-based incentives to customers.

## 29 Provisions

| (CNY million) | Note | 2019 | 2018 |
|---|---|---|---|
| Provision for warranties | (b) | **5,740** | 5,517 |
| Onerous contracts with customers | | **1,692** | 1,129 |
| Onerous contracts with suppliers | (c) | **4,548** | 306 |
| Others | (d) | **3,569** | 3,292 |
| | | **15,549** | 10,244 |

### (a) Movement in provisions during the year is shown as below:

| (CNY million) | Provision for warranties | Onerous contracts with customers | Onerous contracts with suppliers | Others | Total |
|---|---|---|---|---|---|
| At January 1, 2019 | **5,517** | **1,129** | **306** | **3,292** | **10,244** |
| Provisions made | **5,696** | **1,049** | **4,482** | **447** | **11,674** |
| Provisions utilised | **(5,511)** | **(486)** | **(239)** | **(113)** | **(6,349)** |
| Exchange adjustments | **38** | **–** | **(1)** | **(57)** | **(20)** |
| At December 31, 2019 | **5,740** | **1,692** | **4,548** | **3,569** | **15,549** |

### (b) Provision for warranties

Provision for warranties relates mainly to products sold during the year and is determined based on estimates made from historical warranty data associated with similar products and the amount of products covered by warranty at the end of the reporting period and their corresponding remaining warranty periods. Most claims are expected to be settled within one year.

### (c) Provision for onerous contracts with suppliers

The Group has entered into certain non-cancellable procurement agreements in its normal course of business. As a result of the Event as disclosed in note 5(c), the Group has needed to make changes to its procurement plan and provision has been made for the estimated losses on executing or terminating certain procurement agreements in accordance with the accounting policy set out in note 3(p). The provision is charged to "Cost of sales".

### (d) Others

Others are mainly provisions for outstanding claims, cases and disputes.

## 30 Leases

### (a) As a lessee

The Group leases office premises, staff apartments, warehouses, production equipment and motor vehicles in its normal course of business. These leases typically run for an initial period of one to five years. Some property leases contain extension options after the contract period and only a limited number of leases comprise variable payments. The Group also holds land use rights in the PRC, which are recognised as right-of-use assets at the date the Group became entitled to the rights.

Information about leases for which the Group is a lessee is presented below. Comparative information has not been provided.

**(i) Right-of-use assets**

| (CNY million) | Land use rights | Buildings | Motor vehicles and others | Total |
|---|---|---|---|---|
| At January 1, 2019 (note 4) | **6,896** | **6,513** | **740** | **14,149** |
| Depreciation charge for the year | **(176)** | **(2,340)** | **(378)** | **(2,894)** |
| Additions | **1,676** | **4,650** | **426** | **6,752** |
| Derecognition | **(209)** | **(149)** | **(204)** | **(562)** |
| Hyperinflation adjustments | **–** | **8** | **1** | **9** |
| Reclassified as assets held for sale | **–** | **(13)** | **–** | **(13)** |
| Impairment loss | **–** | **(53)** | **–** | **(53)** |
| Exchange adjustments | **(13)** | **26** | **16** | **29** |
| At December 31, 2019 | **8,174** | **8,642** | **601** | **17,417** |

During the year ended December 31, 2019, certain right-of-use assets were derecognised as a result of lease cancellation or entering into finance sub-leases.

**(ii) Amounts recognised in profit or loss**

| (CNY million) | Note | 2019 |
|---|---|---|
| Interest expenses on lease liabilities | 11 | **374** |
| Expenses relating to short-term leases | | **1,747** |
| Expenses relating to leases of low-value assets, excluding short-term leases of low-value assets | | **41** |
| Variable lease payments not included in the measurement of lease liabilities | | **5** |
| Income from subleasing right-of-use assets | | **66** |

During the year ended December 31, 2018, CNY4,014 million was recognised as an expense in the consolidated statement of profit or loss and other comprehensive income in respect of operating leases under IAS 17.

**(iii) Amounts recognised in consolidated statement of cash flows are disclosed in note 25.**

### (b) As a lessor

Most of the Group's leases are operating leases under which certain properties are leased out (see note 8).

As at December 31, a maturity analysis of undiscounted lease payments to be received after the reporting date is as follows:

| (CNY million) | 2019<br>Operating leases under IFRS 16 |
|---|---|
| Within 1 year | **59** |
| After 1 year but within 2 years | **45** |
| After 2 years but within 3 years | **31** |
| After 3 years but within 4 years | **11** |
| After 4 years but within 5 years | **11** |
| After 5 years | **68** |
| | **225** |

| (CNY million) | 2018<br>Operating leases under IAS 17 |
|---|---|
| Within 1 year | 42 |
| After 1 year but within 5 years | 64 |
| After 5 years | 69 |
| | 175 |

## 31 Capital commitments

Contractual commitments of the Group in respect of acquisition of property, plant and equipment and intangible assets outstanding not provided for in the consolidated financial statements as at December 31, 2019 amounted to CNY15,768 million (2018: CNY8,764 million).

Other capital commitments outstanding not provided for in the consolidated financial statements at December 31, 2019 amounted to CNY141 million (2018: CNY108 million), which represented the investment commitments to the Group's subsidiaries.

## 32 Related parties

A related party is a person or an entity that has control or joint control or significant influence over the Group, or is a member of its key management personnel, or is member of the Group, including joint ventures and associates.

Details of the Group's significant transactions with related parties are set out below.

### Transactions with an associate and a joint venture

| (CNY million) | 2019 | | |
|---|---|---|---|
| | **Sales of goods and service** | **Purchase of goods and service** | **Rental income** |
| An associate | **1,589** | **894** | **–** |

| (CNY million) | 2018 | | |
|---|---|---|---|
| | Sales of goods and service | Purchase of goods and service | Rental income |
| An associate | 1,575 | 680 | – |
| A joint venture (note) | 75 | 553 | 3 |
| | 1,650 | 1,233 | 3 |

Note: On August 1, 2018, the Group obtained control over a previous joint venture, Huawei Marine Systems Co., Limited, which was consolidated into the Group's financial statements from August 1, 2018. The transaction amounts disclosed above related to the period from January 1, 2018 to July 31, 2018.

### Balances with an associate

| (CNY million) | December 31, 2019 | | | | | |
|---|---|---|---|---|---|---|
| | **Trade receivables** | **Contract assets** | **Other assets** | **Trade payables** | **Contract liabilities** | **Other liabilities** |
| An associate | **77** | **16** | **376** | **585** | **17** | **415** |

| (CNY million) | December 31, 2018 | | | | | |
|---|---|---|---|---|---|---|
| | Trade receivables | Contract assets | Other assets | Trade payables | Contract liabilities | Other liabilities |
| An associate | 64 | 6 | 332 | 500 | 8 | 289 |

## 33 Group enterprises

### (a) Parent and ultimate controlling party

The Group's ultimate controlling party is the Union of Huawei Investment & Holding Co., Ltd.

### (b) Major subsidiaries

| Name of subsidiaries | Place of incorporation and business | Proportion of ownership interest | | Principal activities |
|---|---|---|---|---|
| | | **2019** | 2018 | |
| Huawei Technologies Co., Ltd. | PRC | **100%** | 100% | Development, manufacture and sale of telecommunication and related products and provision of support and maintenance services. |
| Huawei Device Co., Ltd. | PRC | **100%** | 100% | Development, manufacture and sale of mobile communication products and ancillaries. |
| Huawei Machine Co., Ltd. | PRC | **100%** | 100% | Manufacture of telecommunication products. |
| Shanghai Huawei Technologies Co., Ltd. | PRC | **100%** | 100% | Development of telecommunication products. |
| Beijing Huawei Digital Technologies Co., Ltd. | PRC | **100%** | 100% | Development of telecommunication products. |
| Huawei Tech. Investment Co., Limited | Hong Kong | **100%** | 100% | Trading of materials. |
| Huawei International Co., Limited | Hong Kong | **100%** | 100% | Distribution of telecommunication products. |
| Huawei International Pte. Ltd. | Singapore | **100%** | 100% | Distribution of telecommunication products. |
| Huawei Technologies Japan K.K. | Japan | **100%** | 100% | Development and sale of telecommunication products and ancillary services. |
| Huawei Technologies Deutschland GmbH | Germany | **100%** | 100% | Development and sale of telecommunication products and ancillary services. |
| Huawei Device (Shenzhen) Co., Ltd. | PRC | **100%** | 100% | Development, manufacture and sale of mobile communication products and ancillaries. |
| Huawei Device (Hong Kong) Co., Limited | Hong Kong | **100%** | 100% | Sale and related services of mobile communication products and ancillaries. |
| HUAWEI TECHNICAL SERVICE CO., LTD. | PRC | **100%** | 100% | Installation and maintenance of telecommunication products and ancillaries, including consultancy. |

| Name of subsidiaries | Place of incorporation and business | Proportion of ownership interest | | Principal activities |
|---|---|---|---|---|
| | | **2019** | 2018 | |
| Huawei Software Technologies Co., Ltd. | PRC | **100%** | 100% | Development, manufacture and sale of telecommunication software and related products and services. Sale of cloud business. |
| HiSilicon Technologies Co., Ltd. | PRC | **100%** | 100% | Development and sale of semiconductors. |
| HiSilicon Optoelectronics Co., Ltd. | PRC | **100%** | 100% | Development, manufacture and sale of optoelectronic products related to information technology. |
| HiSilicon (Shanghai) Technologies CO., LIMITED | PRC | **100%** | 100% | Development and sale of semiconductors. |
| Huawei Digital Technologies (Suzhou) Co., Ltd. | PRC | **100%** | 100% | Development and sale of inverter. |
| Huawei Technologies Coöperatief U.A. | Netherlands | **100%** | 100% | Intermediate parent company for certain overseas subsidiaries. |
| Huawei Global Finance (UK) Limited | United Kingdom | **100%** | 100% | Treasury and risk management. |
| Proven Honour | British Virgin Islands | **100%** | 100% | Financing. |
| Proven Glory | British Virgin Islands | **100%** | 100% | Financing. |

## (c) Acquisition of subsidiaries

During the year ended December 31, 2019, the Group acquired 100% equity interests in three companies, with aggregate consideration equivalent to CNY309 million in cash paid or payable to third party selling shareholders. These business combinations are not significant to the Group.

## 34 Contingent liabilities

(a) On September 2, 2014, T-Mobile USA, Inc. ("T-Mobile") filed a civil action against the Group's subsidiary, Huawei Device USA Inc., in relation to the alleged misappropriation of trade secrets relating to certain of T-Mobile's mobile phone test equipment. The two parties reached a settlement on November 8, 2017.

On January 16, 2019, the United States Department of Justice issued an indictment against Huawei Device USA Inc. and Huawei Device Co., Ltd, containing 10 charges in relation to the alleged theft of trade secrets relating to the above equipment and alleged wire fraud and obstruction of justice. The charges relate to the years from 2012 to 2014.

(b) On January 24, 2019, the United States Department of Justice issued an indictment against Huawei Technologies Co., Ltd., Huawei Device USA Inc. and other parties. The indictment contains 13 charges in relation to alleged bank and wire fraud, violation of the International Emergency Economic Powers Act of the United States with respect to certain transactions involving Iran, and associated matters.

On February 13, 2020, the United States Department of Justice issued a superseding indictment which, on top of the charges filed on January 24, 2019, added the Group's subsidiaries Huawei Device Co., Ltd and Futurewei Technologies, Inc. as defendants, and added 3 new charges of alleged racketeering conspiracy, alleged conspiracy to steal trade secrets and alleged conspiracy to commit wire fraud. The superseding indictment also includes new allegations including the defendants' alleged involvement in transactions involving North Korea and Iran.

The Group has engaged external legal advisers to assist it in respect of the matters referred to in (a) and (b) above. Given the relatively early stage of these proceedings, as at the date of approval of these financial statements, management considers that both the timing and the outcome of these matters are inherently uncertain, and that the amount of any possible obligation of the Group, if any, cannot be reliably estimated. Accordingly, these indictments give rise to contingent liabilities for the Group and no provision has been made in this regard in these financial statements. It is also not practicable at this stage for the Group to disclose an estimate of the possible future financial effect on the Group's financial statements of these matters.

## 35 Subsequent events

### (a) Financing events

(i) Subsequent to December 31, 2019 and up to the date of approval of the Group's consolidated financial statements, the Group has drawn down accumulatively CNY7,000 million from a syndicated loan facility entered into by Huawei Technologies Co., Ltd., a wholly-owned subsidiary of the Group on March 5, 2020.

(ii) In March 2020, the Company issued two tranches of 5-year medium-term notes with an aggregate principal amount of CNY4,000 million.

### (b) Outbreak of novel coronavirus

The outbreak of a novel coronavirus (COVID-19) since January 2020 has disrupted commercial and economic activities in China and certain countries around the world. The Group has taken robust measures to ensure the health of its employees participating in the production and operation, and has resumed operation in a timely and orderly manner. The COVID-19 epidemic has a negative impact on the Group's sales in the first quarter of 2020 but will not have a substantial impact on the Group's ability to continue as a going concern.

## 36 Comparative figures

The presentation of certain prior year comparative figures has been adjusted to reflect current year presentation requirements. None of these changes were material.

# Risk Factors

Huawei's risk factors refer to those factors that have been identified in our strategic plans, business models, financial systems, and the external environment. These factors could make the company's ultimate achievement of its business objectives uncertain. In this section, we will detail the major risk factors that could significantly impact the company's competitiveness, reputation, financial position, operating results, or long-term prospects.

## Huawei's Risk Management System

In line with the Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework, and referencing ISO 31000 risk management standards, Huawei has initiated an Enterprise Risk Management (ERM) system that accounts for our unique organizational structure and operating model. Under this system, we have defined a robust set of ERM policies and processes, continuously refined our ERM organizations and operating mechanisms, and ramped up efforts to assess risk management. Huawei's ERM system ensures the following:

- The Board of Directors approves solutions related to managing the company's major risks, crises, and unforeseen events.
- Business managers, as the primary risk owners in their respective business domains, proactively identify and manage risks to ensure they remain at an acceptable level.

At Huawei, risk management factors are incorporated into both strategic planning and business planning processes: Each business department and field office systematically identifies and assesses risks during strategic planning, lists appropriate countermeasures in their annual business plans, and then monitors and reports on high-agenda risks during routine operations. Huawei ensures uninterrupted business operations by identifying major risk factors during strategic decision making and planning, and taking necessary measures to control risks during business planning and execution.

## Strategic Risks

Humankind will enter an intelligent world in the next two or three decades. Digital technology is reshaping the world around us, and we want to make sure that this future is inclusive – that everyone can benefit from the changes digital technology brings. Mature commercial applications of new technologies – particularly 5G, cloud computing, artificial intelligence, and blockchain – are speeding up the digital transformation of all industries. This will present enormous opportunities. That said, the external environment is becoming more complicated than ever, significantly challenging how globalization will progress. Downward pressure on the global economy has intensified. In the long term, the US government will continue to suppress the development of leading technology – a challenging environment for Huawei to survive and thrive.

Moving forward, we will leverage our ICT strengths to enable the digital transformation of all industries, and ultimately bring digital to every person, home, and organization for a fully connected, intelligent world. Going forward, we remain committed to embracing and leveraging a global supply chain to hone our competitive edge. Beyond developing leading products, we need to extend our roots deep into the soil and build a diverse ecosystem that does not depend on any one country. We also need to go beyond the limits of the skies above us, striving for theoretical breakthroughs, technological inventions, and ground-breaking products and business models. We will keep enhancing our software engineering capabilities, pressing ahead with our US$2 billion five-year budget for building quality, trustworthy products and solutions.

## External Risks

**Macro environment:** The global economy is under downward pressure, strained by escalating global trade frictions and higher barriers, businesses' lack of confidence to invest, and the uncertainties brought about by geopolitical tensions. Against this backdrop, Huawei is increasingly likely to face additional external risks. Therefore, business departments and field offices must ramp up efforts to identify and control risks and promptly adjust strategies accordingly.

**Legal risks:** Operational compliance provides a solid foundation on which Huawei can survive, and continue serving and contributing to the world. Huawei has always been dedicated to strictly complying with all applicable laws and regulations of the countries and regions in which it operates. These include all applicable laws and regulations of the UN, US, and EU.

Through sustained investment, we have established a compliance management system that applies to all our businesses and employees worldwide and covers all legal obligations including but not limited to trade compliance, financial compliance, anti-bribery, trade secret protection, cyber security and privacy, and anti-unfair competition. This enables the systematic management of compliance risks through established policies, organizations, regulations, processes, etc.

Despite these efforts, we may still experience negative impacts due to the complex legal environments of some of the countries and regions in which we operate. For example, a lack of clarity or transparency in regards to local laws or ambiguity surrounding the legal system or law enforcement. Huawei will continue, as always, to learn from industry best practices and take preventative measures to address risks. The certainty of legal compliance is our best bulwark against the uncertainty of the external environment.

**Trade risks:** Trade barriers have been a persistent challenge for both importers and exporters. Deglobalization and protectionism, the two prominent risks within global trade, coupled with increasing trade restrictions, are further fueling global trade tensions. At the same time, while new technologies are driving changes in our economy, trade models, and daily lives, they are also rendering some existing trade rules obsolete. Following numerous setbacks, the world trading system has been weakened, calling for a revisit of existing trade rules.

In addition, mega free trade agreements are being negotiated and implemented across the globe. Some major economies are reassessing their trading relationships. All of these developments are creating greater policy uncertainty. On December 11, 2019, the Appellate Body of the World Trade Organization (WTO) was deemed dysfunctional for various reasons, serving as a direct example of the huge challenges facing international trade. As a global company, Huawei opposes protectionism, supports global trade rules, and places trade compliance above its own commercial interests.

**Natural disasters:** It is our mission and primary social responsibility to maintain stable network operations. Earthquakes, floods, epidemics, and other natural disasters can impact Huawei's business operations in many different ways and thus can impact the operations of the networks we have deployed. We have robust mechanisms for responding to natural disasters and continue to improve our capabilities in this regard. This has helped us to ensure business continuity and effectively support our customers' network stability.

**Country-specific risks:** Huawei currently operates in more than 170 countries and regions worldwide. Therefore, the complex international economic and political landscape could expose Huawei to particular risks in certain countries and regions. These risks include economic and political instability, exchange rate fluctuations, and sovereign debt risks. Bilateral or multilateral tensions between certain countries or regions caused by special circumstances could hinder Huawei's local business operations and bring uncertainty to our local business development. To address these issues, Huawei requires exceptional risk management and response capabilities. We will closely monitor any potential risks or changes in the environment, and promptly employ effective countermeasures to help achieve business objectives.

## Operational Risks

**Business continuity:** With today's highly globalized division of labor, Huawei must rely on a variety of third parties (including outside companies and agencies) for procurement, manufacturing, logistics, and global technical services. Therefore, a discontinuity in third-party business could directly or indirectly compromise Huawei's operations and business performance.

Through years of ongoing investment, Huawei has established a business continuity management (BCM) system for domains such as procurement, manufacturing, logistics, and global technical services. This system covers end-to-end processes, from suppliers to Huawei, and on to our customers. As part of this system, we have developed and established effective measures to manage risks that arise during our daily work. Specifically, we have built up management organizations, processes, and IT platforms, prepared business continuity plans and incident management plans, and organized BCM training and drills for employees.

The Bureau of Industry and Security of the US Department of Commerce successively added Huawei Technologies Co., Ltd., and some of its non-US affiliates, to the Entity List on May 16 and August 19, 2019, pursuant to §744.11 of the Export Administration Regulations (EAR). This means the export, re-export, or in-country transfer of any item subject to the EAR (including hardware, software, and technologies) to Huawei or its listed affiliates requires a license from the Department of Commerce.

This has interrupted our business development, but that impact has been limited. As a staunch advocate of globalization, we source products from the global supply chain without depending on any one country or region, and then build our competitiveness upon this. Being added to the Entity List does not restrict or prohibit Huawei from providing products and services to our customers in accordance with compliance requirements. We have the confidence and capabilities to provide premium products, solutions, and services to customers worldwide.

(For further information on the BCM system, see pages 67 to 68 of this Annual Report.)

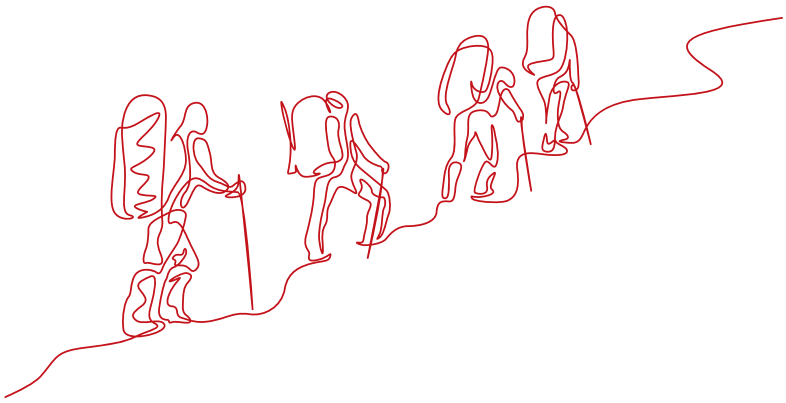
**Information security and IPR:** Although Huawei has adopted stringent information security measures to protect its IPR, it is impossible to completely prevent other companies from improperly using our proprietary information or patented technologies. Even when we are able to protect our IPR through the judicial means, we may still suffer losses due to improper usage.

## Financial Risks

For further information on financial risks, see pages 86 to 88 of this Annual Report.

# Corporate Governance Report





The company only exists to serve its customers. The purpose of growing our harvest and increasing the fertility of our soil is to better serve our customers. "Staying customer-centric and creating value for customers" are the company's common values. The conferment of authority is required to drive the facilitation and implementation of the company's common values. However, without effective controls in place, authority un-checked will ultimately hinder such common values. The company has a well-developed internal governance structure, under which all governance bodies have clear and focused authority and responsibility, but operate under checks and balances. This creates a closed cycle of authority and achieves rational and cyclical succession of authority.

The company's fate cannot be tied to any single individual and the governance bodies of the company shall follow a model of collective leadership. This collective leadership model is created upon common values, focused responsibility, democratic centralized authority, checks and balances, and growth by self-reflection.

In addition, the company stays customer-centric, inspires dedication, and continuously improves its governance structure, organizations, processes, and appraisal systems to sustain its long-term growth.

## Shareholders

Huawei Investment & Holding Co., Ltd. is a private company wholly owned by its employees. Huawei's shareholders are the Union of Huawei Investment & Holding Co., Ltd. (the "Union") and Mr. Ren Zhengfei.

Through the Union, the company implements an Employee Shareholding Scheme (the "Scheme"), which involved 104,572 employees as of December 31, 2019. The Scheme effectively aligns employee contribution and development with the company's long-term development, fostering Huawei's continued success.

Mr. Ren Zhengfei is the Company's natural person shareholder and also participates in the Scheme. As of December 31, 2019, Mr. Ren's investment accounts for nearly 1.04% of the Company's total share capital.

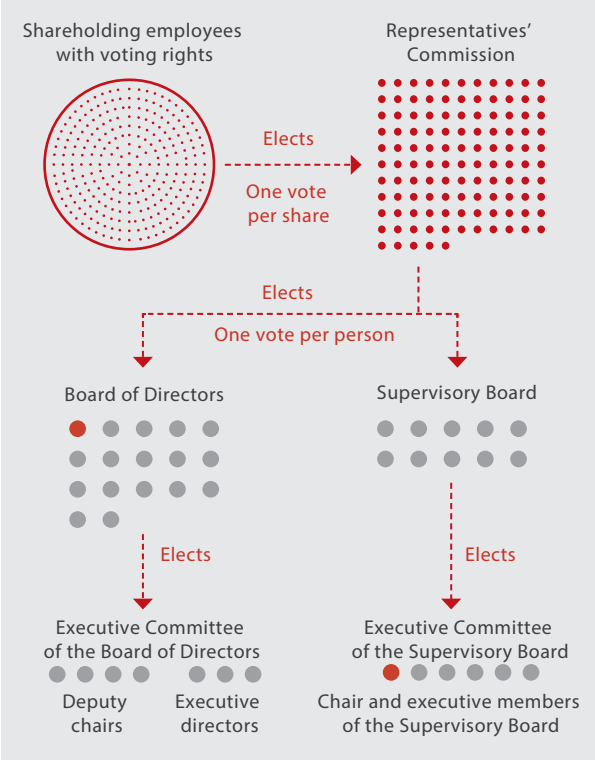
## The Shareholders' Meeting and the Representatives' Commission

The Shareholders' Meeting, the company's authoritative body, comprises two shareholders: the Union and Mr. Ren Zhengfei.

The Representatives' Commission (the "Commission") is the organization through which the Union fulfills shareholder responsibilities and exercises shareholder rights. The Commission consists of 115 representatives of shareholding employees ("Representatives") and exercises rights on behalf of all shareholding employees. In 2019, the Commission held one meeting, at which it reviewed and approved the report of the Board of Directors on the company's financial and operating results, the work report of the Supervisory Board, and proposals for matters such as annual profit distribution and annual capital increases.

The Representatives and Alternate Representatives are elected by the shareholding employees with voting rights, and serve for a term of five years. In the event that there is a vacancy in the Commission, the Alternate Representatives shall take up the vacancy in a predetermined sequence.

The shareholding employees with voting rights elect the Commission on a one-vote-per-share basis, after which the Commission elects the company's Board of Directors and Supervisory Board on a one-vote-per-person basis. The Commission, along with the Board of Directors and Supervisory Board, decide on, manage, and monitor major company matters.




In January 2019, the company held the election for the Fourth Commission. A total of 86,514 shareholding employees with voting rights participated at 416 polling stations worldwide, producing 115 Representatives and 18 Alternate Representatives on a one-vote-per-share basis.

The entire election process, from initial nominations to announcing the final results, took nearly one year. To ensure all shareholding employees, especially those from different regions and departments, were fairly represented, departments in the company were divided into nine sectors based on the nature of their function and business. Each sector then established a nomination team. The nomination team members were then selected by their sector, following which each nomination team produced an initial list of candidates for their own sector. After that, candidates gave presentations, and were observed and recommended by managers and experts at certain levels. After multiple rounds of discussions, the initial number of candidates was reduced from over 500 down to 100+. All shareholding employees with voting rights then elected Representatives and Alternate Representatives.

Current members of the Commission are:

Mr. Ren Zhengfei, Ms. Sun Yafang, Mr. Liang Hua, Mr. Guo Ping, Mr. Xu Zhijun, Mr. Hu Houkun, Ms. Meng Wanzhou, Mr. Ding Yun, Mr. Yu Chengdong, Mr. Wang Tao, Mr. Xu Wenwei, Ms. Chen Lifang, Mr. Peng Zhongyang, Ms. He Tingbo, Mr. Li Yingtao, Mr. Yao Fuhai, Mr. Tao Jingwen, Mr. Yan Lida, Mr. Li Jie, Mr. Zhou Daiqi, Mr. Ren Shulu, Mr. Yin Xuquan, Mr. Li Jin'ge, Mr. Li Dafeng, Mr. Song Liuping, Mr. Tian Feng, Mr. Yi Xiang, Mr. Li Jian, Mr. Li Jianguo, Mr. Peng Bo, Mr. Zhao Ming, Ms. Zhao Minglu, Ms. Shi Yanli, Mr. Peng Qiu'en, Ms. Zhang Xiaoqing, Mr. Gao Aozhan, Mr. Yang Shubin, Ms. Ji Hui, Mr. Zou Zhilei, Mr. Lu Yong, Mr. Peng Song, Mr. Liu Hongyun, Mr. Dong Ming, Mr. Yang Yougui, Mr. Li Peng, Mr. Cao Jibin, Mr. Wu Weitao, Mr. Chen Hao, Mr. Wang Shengniu, Mr. Wang Jianfeng, Mr. Chen Lei, Mr. Wu Hui, Mr. Cai Yinghua, Mr. Meng Ping, Mr. Lv Ke, Mr. Jiang Xisheng, Mr. Pan Shaoqin, Mr. Jiang Yafei, Mr. Zhang Wenlin, Mr. Wang Weijian, Mr. Su Liqing, Mr. Luo Wencheng, Mr. Zhang Hongxi, Mr. Wan Biao, Mr. Xiong Lening, Mr. Ying Weimin, Mr. Wu Kunhong, Mr. Wei Chengmin, Mr. Wu Qinming, Mr. Xie Guohui, Mr. Wang Kexiang, Mr. Tang Qibing, Mr. Wang Shengqing, Mr. Sun Fuyou, Mr. Ma Yue, Mr. Zhou Jianjun, Mr. Xun Su, Mr. Lu Qi, Mr. Lin Baifeng, Mr. Shen Huifeng, Mr. Zheng Liangcai, Mr. Ma Qingqing, Mr. Li Shanlin, Mr. Wang Hua'nan, Mr. Bai Limin, Ms. Yang Li, Mr. Hou Jinlong, Mr. Deng Taihua, Mr. Zheng Yelai, Mr. Hu Kewen, Mr. Zhang Shunmao, Mr. Zha Jun, Mr. Zhou Hong, Mr. Ma Haixu, Mr. Liu Shaowei, Mr. Tang Xinhong, Mr. Yang Chaobin, Mr. Gong Ti, Mr. Cai Changtian, Mr. Gao Ji, Mr. Xiong Yan, Mr. Zhou Taoyuan, Mr. Wang Yixiang, Mr. Li Zhoujian, Mr. Yu Quan, Mr. He Gang, Mr. Zhang Ping'an, Mr. Bian Honglin, Mr. Wang Chenglu, Mr. Xu Qinsong, Mr. Li Xiaolong, Mr. Zhu Ping, Mr. Shao Yang, Mr. Su Jie, and Mr. Zhu Yonggang.

## Board of Directors

The Board of Directors (BOD) is the highest body responsible for corporate strategy, operations management, and customer satisfaction. The BOD's mission is to lead the company forward. It exercises decision-making authority for corporate strategy and operations management, and ensures customer and shareholder interests are protected.

The main responsibilities of the BOD are to:

- Develop proposals for corporate governance.
- Review proposals to increase or decrease the company's registered capital, as well as proposals related to profit distribution and loss recovery.
- Review the company's stock options plan and other long-term incentive plans.
- Review or approve plans for entering and exiting different industry sectors, and approve the company's strategic plan.
- Approve major organizational restructuring, management system development, and business transformation.
- Approve major financial policies, financial plans, and business transactions.
- Approve the company's annual budget proposal, annual operations report, and annual audit report.
- Approve the appointment/removal, compensation, and long-term incentives of senior management.
- Approve major HR policies and plans at the corporate level.
- Approve proposals for managing major risks and crises, and manage major emergencies.
- Approve the development of internal controls and compliance systems.

In 2019, the BOD held nine meetings. At the meetings, the BOD reviewed and approved matters such as the company's medium-to-long-term strategic plan, as well as the company's annual business plan, audit report, profit distribution, capital increases, bond issuance, and syndicated loans.

Currently, the BOD is comprised of 17 members, who were elected by the Commission and voted in by the Shareholders' Meeting.

Current board members include:

- Chairman: Mr. Liang Hua
- Deputy Chairs: Mr. Guo Ping, Mr. Xu Zhijun, Mr. Hu Houkun, and Ms. Meng Wanzhou
- Executive Directors: Mr. Ding Yun, Mr. Yu Chengdong, and Mr. Wang Tao
- Directors: Mr. Xu Wenwei, Ms. Chen Lifang, Mr. Peng Zhongyang, Ms. He Tingbo, Mr. Li Yingtao, Mr. Ren Zhengfei, Mr. Yao Fuhai, Mr. Tao Jingwen, and Mr. Yan Lida

Alternate directors include Mr. Li Jianguo, Mr. Peng Bo, and Mr. Zhao Ming. In the event that there is a vacancy in the BOD, alternate directors will take up the vacancy in a predetermined sequence.

From the left in the first row: Ms. Meng Wanzhou, Mr. Hu Houkun, Mr. Guo Ping, Mr. Xu Zhijun, Mr. Liang Hua
From the left in the second row: Ms. He Tingbo, Mr. Xu Wenwei, Mr. Yan Lida, Mr. Ding Yun, Mr. Ren Zhengfei, Mr. Tao Jingwen, Mr. Li Yingtao, Mr. Wang Tao, Mr. Peng Zhongyang, Mr. Yu Chengdong, Ms. Chen Lifang, and Mr. Yao Fuhai

**Mr. Liang Hua**
(Howard Liang)

Chairman

Born in 1964, Mr. Liang holds a doctorate degree from Wuhan University of Technology. Mr. Liang joined Huawei in 1995 and has served as President of Supply Chain, CFO of Huawei, President of the Business Process & IT Mgmt Dept, President of the Global Technical Service Dept, Chief Supply Chain Officer, Chairman of the Audit Committee, and Chairman of the Supervisory Board. Mr. Liang is now Chairman of Huawei's Board of Directors.

**Mr. Guo Ping**

Deputy Chairman,
Rotating Chairman

Born in 1966, Mr. Guo holds a master's degree from Huazhong University of Science and Technology. Mr. Guo joined Huawei in 1988 and has served as R&D Project Manager, General Manager of Supply Chain, Director of Huawei Executive Office, Chief Legal Officer, President of the Business Process & IT Mgmt Dept, President of the Corporate Development Dept, Chairman and President of Huawei Device, Rotating CEO of Huawei, and Chairman of the FC. Currently, Mr. Guo serves as Deputy Chairman of the Board and Rotating Chairman of Huawei.

**Mr. Xu Zhijun**
(Eric Xu)

Deputy Chairman,
Rotating Chairman

Born in 1967, Mr. Xu holds a doctorate degree from Nanjing University of Science & Technology. Mr. Xu joined Huawei in 1993 and has served as President of the Wireless Network Product Line, Chief Strategy & Marketing Officer, Chief Products & Solutions Officer, Chairman of the Investment Review Board, Rotating CEO of Huawei, and Chairman of the SDC. Currently, Mr. Xu serves as Deputy Chairman of the Board and Rotating Chairman of Huawei.

**Mr. Hu Houkun**
(Ken Hu)

Deputy Chairman,
Rotating Chairman

Born in 1968, Mr. Hu holds a bachelor's degree from Huazhong University of Science and Technology. Mr. Hu joined Huawei in 1990 and has served as President of the Marketing & Sales Dept in China, President of the Latin America Region, President of the Global Sales Dept, Chief Sales & Service Officer, Chief Strategy & Marketing Officer, Chairman of the Global Cyber Security and User Privacy Protection Committee (GSPC), Chairman of the BOD of Huawei USA, Deputy Chairman of the Board, Rotating CEO, and Chairman of the HRC. Currently, Mr. Hu serves as Deputy Chairman of the Board and Rotating Chairman of Huawei.

**Ms. Meng Wanzhou**
(Sabrina Meng)

Deputy Chairwoman

Ms. Meng holds a master's degree from Huazhong University of Science and Technology. Ms. Meng joined Huawei in 1993 and has held the positions of Director of the International Accounting Dept, CFO of Huawei Hong Kong, and President of the Accounting Mgmt Dept. Ms. Meng now serves as CFO of Huawei and Deputy Chairwoman of the Board.

In 2003, Ms. Meng established Huawei's globally unified finance organization, and developed the standardized and unified organizational structure, financial processes, financial systems, and IT platforms.

Since 2005, Ms. Meng has led the founding of five shared service centers around the world, and she also promoted the completion of the Global Payment Center in Shenzhen, China. These centers have boosted Huawei's accounting efficiency and monitoring quality, providing accounting services to sustain the company's rapid overseas expansion.

Since 2007, Ms. Meng has been in charge of the Integrated Financial Services (IFS) Transformation Program, an eight-year partnership between Huawei and IBM. This transformation program helped Huawei develop its data systems and rules for resource allocation, operating efficiency improvement, process optimization, and internal controls. IFS also took Huawei's financial management to a new level, creating new DNA for the company's sustainable growth.

In recent years, Ms. Meng has focused on advancing fine-grained and comprehensive financial management at Huawei, working to align these efforts with the company's long-term development plan. Ms. Meng has continually worked to improve treasury risk and tax compliance management systems, and has helped to make financial operations within the company more efficient, agile, and intelligent.

**Mr. Ding Yun**
(Ryan Ding)

Executive Director

Born in 1969, Mr. Ding holds a master's degree from Southeast University. Mr. Ding joined Huawei in 1996 and has served as Product Line President, President of the Global Solution Sales Dept, President of the Global Marketing Dept, President of Products & Solutions, and President of the Carrier BG.

**Mr. Yu Chengdong**
(Richard Yu)

Executive Director

Born in 1969, Mr. Yu holds a master's degree from Tsinghua University. Mr. Yu joined Huawei in 1993 and has served as 3G Product Director, Vice President of the Wireless Technical Sales Dept, President of the Wireless Network Product Line, President of the European Area, Chief Strategy & Marketing Officer, Chairman of Huawei Device, and CEO of the Consumer BG.

**Mr. Wang Tao**
(David Wang)

Executive Director

Born in 1972, Mr. Wang holds a master's degree from Xi'an Jiaotong University. Mr. Wang joined Huawei in 1997 and has served as R&D Manager in Wireless, Vice President of the UMTS Technical Sales Dept, President of Technical Sales of the European Area, Managing Director of Huawei Italy and Switzerland, President of the Wireless Network Product Line, President of the Network Product Line, and President of Products & Solutions. Currently, Mr. Wang serves as Chairman of the Investment Review Board, President of ICT Strategy & Marketing, and Deputy Chairman of the ICT Infrastructure Managing Board.

**Mr. Xu Wenwei**
(William Xu)

Director

Born in 1963, Mr. Xu holds a master's degree from Southeast University. In 1991, Mr. Xu joined Huawei's Research & Development, leading the development of the first generation of Huawei's public program controlled switches. Mr. Xu also took charge of work related to chips, general technology, strategy planning, and research. He has served as President of the International Technical Sales & Marketing Dept, President of the European Area, Chief Strategy & Marketing Officer, Chief Sales & Service Officer, President of the Joint Committee of Regions, CEO of the Enterprise BG, Chief Strategy Marketing Officer, and Chairman of the Investment Review Board. Mr. Xu is currently President of the Institute of Strategic Research.

**Ms. Chen Lifang**
(Catherine Chen)

Director

Born in 1971, Ms. Catherine Chen graduated from Northwest University in China. She joined Huawei in 1995 and has served as Chief Representative of the Beijing Representative Office, Vice President of the International Marketing Dept, Deputy Director of the Domestic Marketing Management Office, a member of the Board, President of the Public Affairs and Communications Dept, and Corporate Senior Vice President.

**Mr. Peng Zhongyang**

Director

Born in 1968, Mr. Peng holds a bachelor's degree from Huazhong University of Science and Technology. Mr. Peng joined Huawei in 1997 and has served as Technical Service Engineer of the South China Area, Transmission Project Manager and Development Engineer of the Russia Representative Office, General Manager of the Yemen Representative Office, Assistant to President of the Middle East and Northern Africa Region, President of the Northern Africa Region, President of the China Region, and President of the Corporate Leadership Mgmt Dept. Currently, Mr. Peng serves as President of the Enterprise BG.

**Ms. He Tingbo**
(Teresa He)

Director

Born in 1969, Ms. He holds a master's degree from Beijing University of Posts and Telecommunications. She joined Huawei in 1996 and has since served as Chief ASIC Engineer, R&D Director of HiSilicon, and Vice President of the 2012 Laboratories. Currently, she serves as President of HiSilicon and President of the 2012 Laboratories.

**Mr. Li Yingtao**

Director

Born in 1969, Mr. Li holds a doctorate degree from Harbin Institute of Technology. Mr. Li joined Huawei in 1997 and has served as Chief of the Sweden Research Center, Director of the Product Mgmt Dept of Wireless Marketing, Director of the Research Dept of Products & Solutions, Director of the General Technology Office of Products & Solutions, President of the Central Research & Development Unit, President of the 2012 Laboratories, and President of Products & Solutions. Currently, Mr. Li serves as President of Network Products & Solutions.

**Mr. Ren Zhengfei**

Director

Born on October 25, 1944 into a rural family where both parents were school teachers, Mr. Ren Zhengfei spent his primary and middle school years in a remote mountainous town in Guizhou Province. In 1963, he studied at the Chongqing Institute of Civil Engineering and Architecture. After graduation, he was employed in the civil engineering industry until 1974 when he joined the military's Engineering Corps as a soldier tasked to establish the Liao Yang Chemical Fiber Factory. Subsequently, Mr. Ren had taken positions as a Technician, an Engineer, and was lastly promoted as a Deputy Director, which was a professional role equivalent to a Deputy Regimental Chief, but without military rank. Because of his outstanding performance, Mr. Ren was invited to attend the National Science Conference in 1978 and the 12th National Congress of the Communist Party of China in 1982. Mr. Ren retired from the army in 1983 when the Chinese government disbanded the entire Engineering Corps. He then worked in the logistics service base of the Shenzhen South Sea Oil Corporation. As he was dissatisfied with his job, he decided to establish Huawei with a capital of CNY21,000 in 1987. He became the CEO of Huawei in 1988 and has held the title ever since.

**Mr. Yao Fuhai**

Director

Born in 1968, Mr. Yao holds a bachelor's degree from the University of Electronic Science and Technology of China. Mr. Yao joined Huawei in 1997 and has served as Director of the Pricing Center, Vice President of the Business Process & IT Mgmt Dept, Vice President of the Strategy Cooperation Dept, Vice President of the Global Technical Sales Dept, President of the Global Technical Service Dept, and President of the Global Procurement Qualification Mgmt Dept. Currently, Mr. Yao serves as a member of the Board, Chief Supply Chain Officer, and Director of the Group Procurement Management Committee.

**Mr. Tao Jingwen**

Director

Born in 1971, Mr. Tao graduated from Beijing University of Posts and Telecommunications. Mr. Tao joined Huawei in 1996 and has served as a product development engineer, Deputy General Manager of the Market Technology Section, Executive Deputy Director of the International Technical Sales Dept, Executive Vice President and President of the Sub-Sahara Region, President of the Global Technical Sales & Marketing Dept, President of Huawei Device, President of the West European Region, and President of the Quality, Business Process & IT Mgmt Dept.

**Mr. Yan Lida**

Director

Born in 1970, Mr. Yan holds a bachelor's degree from Tsinghua University. Mr. Yan joined Huawei in 1997 and has served as Vice President of the European Region, General Manager of the Japan Representative Office, President of the East Asia Region, and President of the Enterprise BG. Currently, Mr. Yan serves as a member of the Board and a member of the ICT Infrastructure Managing Board.

## Executive Committee

The BOD has established the Executive Committee, which acts as the standing executive body of the BOD. Entrusted by the BOD, the Executive Committee examines and reflects on major issues within the company, decides on issues authorized by the BOD, and oversees their execution. In 2019, the Executive Committee held 14 meetings.

Members of the BOD Executive Committee include Mr. Guo Ping, Mr. Xu Zhijun, Mr. Hu Houkun, Ms. Meng Wanzhou, Mr. Ding Yun, Mr. Yu Chengdong, and Mr. Wang Tao.

## Rotating Chairs

The BOD and its Executive Committee are led by rotating chairs. During their terms, the rotating chairs serve as the foremost leader of the company. Rotating chairs' terms last six months at a time. The rotation schedule is as follows:

- Mr. Xu Zhijun: October 1, 2019 to March 31, 2020<br>April 1, 2021 to September 30, 2021<br>October 1, 2022 to March 31, 2023
- Mr. Guo Ping: October 1, 2018 to March 31, 2019<br>April 1, 2020 to September 30, 2020<br>October 1, 2021 to March 31, 2022
- Mr. Hu Houkun: April 1, 2019 to September 30, 2019<br>October 1, 2020 to March 31, 2021<br>April 1, 2022 to September 30, 2022

## Audit Committee

The Audit Committee (AC) operates under the BOD to oversee internal controls, including the internal control system, internal and external audits, corporate processes, legal compliance, and adherence to the *BCGs*.

The main responsibilities of the AC are to:

- Approve the annual internal audit plan, and review its scope, required resources, and audit outputs.
- Approve corporate policies for internal controls; approve the corporate development plan for internal controls and the plan's key milestones; and regularly assess the company's internal control status.
- Evaluate the effectiveness of the ethics and compliance function, legal compliance, and adherence to corporate policies.
- Approve the selection of the external auditor, notify the BOD of any proposed change to the external auditor for approval, approve related budgets, and evaluate the work of the external auditor.
- Supervise the completeness, accuracy, and legal compliance of the company's financial statements; and review compliance with and application of accounting policies as well as financial disclosures.
- Approve internal control Key Performance Indicators (KPIs), and instruct Global Process Owners (GPOs) and business executives to report internal control results.

The AC generally holds monthly meetings and convenes special sessions as necessary. Business executives and various experts are invited to attend as non-voting participants.

The committee held eight meetings in 2019. Focusing on topics such as risk management (including the development of the internal control and compliance systems), internal audit transformation (including internal audit development), organizational development for Risk Control Owners (RCOs), accounting monitoring, and financial reporting management, the AC has taken the following key initiatives:

- Reviewing and approving the company's annual plans for internal audit and internal controls, as well as the risk control goals and plans for different regions and business organizations like the Greater China Device Business Dept, the Device Chipset Business Unit, and the Consumer BG Honor Business Unit.
- Listening to and reviewing reports on the risk controls of different business domains, including GTS Delivery, the Engineering and Service Procurement Qualification Dept, the Consumer Cloud Service Business Development Dept, ICT Marketing, and solar inverter businesses (including those of the Enterprise BG Solar Inverter Sales & Service Dept and the Network Energy Product Line Solar Inverter Business Dept), as well as the Consumer, Enterprise, and Carrier BGs.
- Listening to and reviewing dedicated reports on matters such as the internal audit transformation, oversight work adjustments to address current situations, and progress of accountability investigations into relevant audit findings.
- Improving employee compliance with the *BCGs* through the management of high-risk employee conduct as well as publicity of major audit findings and non-compliance cases.
- Arranging discussions between the committee Chairman and the external auditor regarding external audit plans and management improvement proposals.

## Supervisory Board

Pursuant to the requirements of *the Company Law of the People's Republic of China*, Huawei has established its Supervisory Board. The key responsibilities of the Supervisory Board include overseeing the responsibility fulfillment of BOD members and senior management, monitoring the company's operational and financial status, and supervising compliance. Members of the Supervisory Board attend BOD and EMT meetings as non-voting participants.

The Supervisory Board held 11 meetings in 2019. At the meetings, it assessed the responsibility fulfillment of BOD members in 2018, reviewed the company's annual financial statements, listened to and reviewed reports on the company's compliance system, inspected major areas that may face risks, and supervised key regional managers.

Throughout the year, members of the Supervisory Board attended all meetings of the BOD as non-voting participants, overseeing the legitimacy of BOD decisions and operations.

The Supervisory Board is comprised of 10 members, who were elected by the Commission and voted in by the Shareholders' Meeting.

Current Supervisory Board members include:

- Chairman: Mr. Li Jie.
- Executive members: Mr. Zhou Daiqi, Mr. Ren Shulu, Mr. Yin Xuquan, Mr. Li Jin'ge, and Mr. Li Dafeng.
- Members: Mr. Song Liuping, Mr. Tian Feng, Mr. Yi Xiang, and Mr. Li Jian.

The Supervisory Board has established the Executive Committee, which acts as authorized by the Supervisory Board. Members of the Executive Committee are Mr. Li Jie, Mr. Zhou Daiqi, Mr. Ren Shulu, Mr. Yin Xuquan, Mr. Li Jin'ge, and Mr. Li Dafeng.

From the left in the first row: Mr. Zhou Daiqi, Mr. Li Jie, and Mr. Ren Shulu
From the left in the second row: Mr. Li Jin'ge, Mr. Song Liuping, Mr. Li Jian, Mr. Yi Xiang, Mr. Tian Feng, Mr. Li Dafeng, and Mr. Yin Xuquan

**Mr. Li Jie**

Chairman of
the Supervisory Board

Born in 1967, Mr. Li holds a bachelor's degree in wireless communications and a master's degree in computer image processing from Xi'an Jiaotong University. Mr. Li joined Huawei in 1992 and has served as an R&D engineer, General Manager of a representative office in China, General Manager of the Moscow Representative Office, President of the Commonwealth of Independent States Region, President of the Global Technical Sales Dept, President of the Global Technical Service Dept, President of the Human Resource Mgmt Dept, President of the Joint Committee of Regions, President of Huawei University, and President of the Corporate Leadership Mgmt Dept. Currently, Mr. Li serves as Chairman of the Supervisory Board and Chairman of the Audit Committee.

**Mr. Zhou Daiqi**

Executive Member of
the Supervisory Board

Born in 1947, Mr. Zhou graduated from Xidian University. Mr. Zhou joined Huawei in 1994 and has served as ATM Product Manager, Chief Engineer and General Manager of the Multimedia Dept, Director of the Hardware Dept, Chief of the Xi'an Research Center, Director of the HR Branch of Products & Solutions, Chief Ethics & Compliance Officer, and Director of the Corporate Committee of Ethics and Compliance. Currently, Mr. Zhou serves as a member of the Disciplinary and Supervisory Committee.

**Mr. Ren Shulu**
(Steven Ren)

Executive Member of
the Supervisory Board

Born in 1956, Mr. Ren holds a bachelor's degree from Yunnan University. Mr. Ren joined Huawei in 1992 and has served as President of Shenzhen Smartcom Business Co., Limited, Chairman of the Capital Construction Investment Management Committee, and Chairman of the Internal Service Management Committee. Currently, Mr. Ren serves as Huawei's Chief Logistics Officer.

**Mr. Yin Xuquan**

Executive Member of
the Supervisory Board

Born in 1964, Mr. Yin holds a master's degree from Xi'an Jiaotong University. Mr. Yin joined Huawei in 1995 and has served as President of the Southern Africa Region, Vice President of the Turnkey Business Dept, President of the Optical Network Product Line, HR Director of Sales & Services, and Vice President of the Global Procurement Qualification Mgmt Dept.

**Mr. Li Jin'ge**

Executive Member of
the Supervisory Board

Born in 1968, Mr. Li holds a bachelor's degree from Beijing University of Posts and Telecommunications. Mr. Li joined Huawei in 1992 and has served as Regional Vice President, Regional President, President of the Global Technical Sales Dept, President of the Sub-Sahara Area, a member of the Joint Committee of Regions, a member of the HRC, President of the Asia Pacific Area, a member of the Audit Committee, and President of the Internal Audit Dept.

**Mr. Li Dafeng**

Executive Member of
the Supervisory Board

Born in 1966, Mr. Li holds a bachelor's degree from the Department of Radio Engineering, Changchun Institute of Posts and Telecommunications, and a master's degree in signal and information processing, Harbin Institute of Technology. Mr. Li joined Huawei in 1996 and has served as Deputy Sales Director of the Beijing Office, General Manager of the Tianjin Office, General Manager of the Shijiazhuang Office, Deputy Director of the China Telecom Account Dept, Deputy Sales President of the Southern Africa Region, Director of the MTN Account Dept, President of the Eastern and Southern Africa Region, President of the Sales & Delivery Finance Mgmt Dept, President of the Middle East and Africa Area, and Director of the ICT Infrastructure Managing Board Office.

### Mr. Song Liuping

Member of
the Supervisory Board

Born in 1966, Mr. Song completed his postdoctoral research at Beijing Institute of Technology. Mr. Song joined Huawei in 1996 and has served successively as Manager of the Product Strategy Planning Dept, Director of the IPR Dept, Director of the External Cooperation Dept, PSST member, President of the Legal Affairs Dept, President of the Patent Review Board, Director of the Trade and Customs Compliance Committee, a member of the Disciplinary and Supervisory Sub-committee of the HRC, and a member of the AC and FC, Chief Legal Officer, and Chief Compliance Officer.

### Mr. Tian Feng

Member of
the Supervisory Board

Born in 1969, Mr. Tian holds a bachelor's degree from Xidian University. Mr. Tian joined Huawei in 1995 and has served as General Manager of the Shijiazhuang Office, HR Director of the Domestic Marketing Dept, Director of the Market Finance Dept, EVP of the Middle East and Northern Africa Area, President of the Middle East Region, President of the China Region, CEO of Huawei Agisson, Vice President (acting) of the Human Resource Mgmt Dept, EVP of Huawei University, Director of the Institute of Education of Huawei University, Director of the Disciplinary and Supervisory Sub-committee of the HRC, an executive member of the Management Team of the Joint Committee of Regions, Director of the Subsidiary Board Directors Resources Bureau, President of the Central Asia and Russia Area, a member of the Management Team of the Corporate Leadership Mgmt Dept, a member of the AC, a member of the ICT Infrastructure Managing Board, Director of the Disciplinary and Supervisory Committee, President of the Asia Pacific Area, and a member of the Supervisory Board.

### Mr. Yi Xiang
(Steven Yi)

Member of
the Supervisory Board

Born in 1975, Mr. Yi holds a bachelor's degree from Wuhan University. Mr. Yi joined Huawei in 1998 and has served as General Manager of the Pakistan Representative Office, President of the Middle East Region, President of the Sales & Delivery Finance Mgmt Dept, Deputy CFO of Huawei, President of the Regions Mgmt Dept, and President of the America Area. Currently, Mr. Yi serves as President of the Middle East and Africa Area and a member of the ICT Infrastructure Managing Board.

### Mr. Li Jian

Member of
the Supervisory Board

Born in 1973, Mr. Li holds a master's degree from Xidian University. Mr. Li joined Huawei in 2001 and has served as General Manager of the Nigeria Representative Office, President of the Western Africa Region, Special Assistant to President of Sales & Services, President of the Accounts & Regions Business Support Dept, President of the CEE & Nordic European Region, a member of the HRC, an executive member of the Management Team of the Joint Committee of Regions, Vice President of the Joint Committee of Regions, Global Process Owner of LTC, and President of the America Area. Currently, Mr. Li serves as President of the Europe Area and a member of the ICT Infrastructure Managing Board.

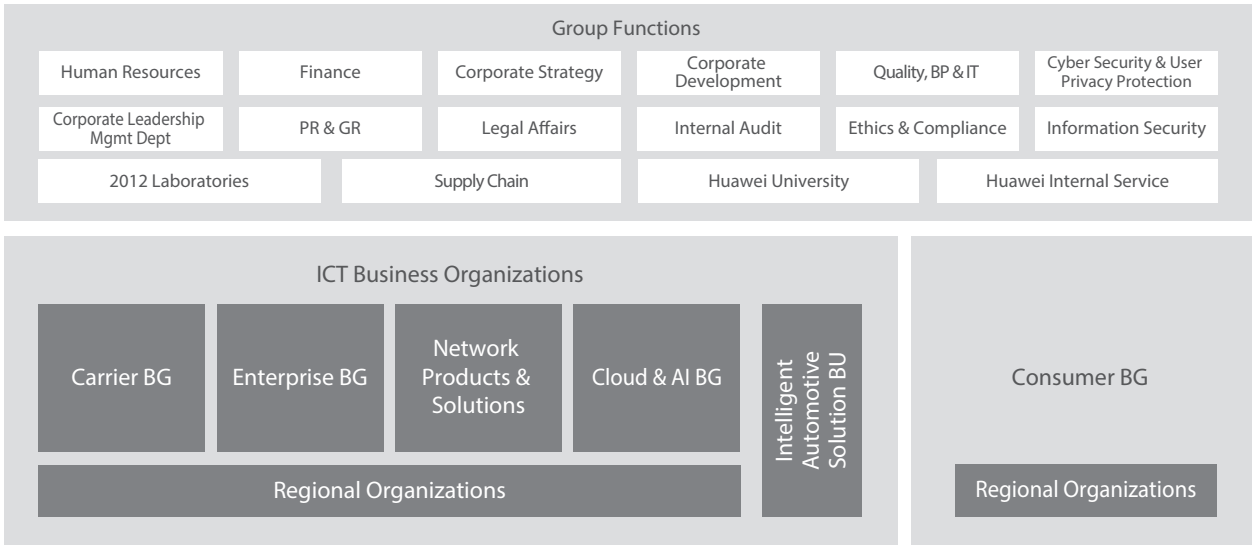
## Independent Auditor

An independent auditor is responsible for auditing a company's annual financial statements. In accordance with applicable accounting standards and audit procedures, the independent auditor expresses an opinion as to whether the financial statements are true and fair.

The scope of the financial audit and the annual audit results are subject to review by the Audit Committee. Any relationship or service that may potentially affect the objectivity and independence of the independent auditor must be discussed with the Audit Committee. The independent auditor may discuss any issues identified or any difficulties encountered during the course of the financial audits with the Audit Committee.

KPMG has been Huawei's independent auditor since 2000.

## Business Structure




To strengthen end-to-end operations management of our ICT infrastructure business, the company set up the ICT Infrastructure Managing Board, which is the primary owner of our business strategy, operations management, and customer satisfaction for ICT infrastructure business.

- The Carrier BG and the Enterprise BG manage and support solution marketing, sales, and services that target carrier customers and enterprise/industry customers respectively. The two BGs provide innovative, differentiated, and advanced solutions based on the business characteristics and operational patterns of different customers while continuously improving the company's industry competitiveness and customer satisfaction.
- Network Products & Solutions is a department that provides integrated ICT solutions to carriers and enterprise/industry customers. This department is responsible for product planning, development, and delivery as well as for building product competitiveness. The goal of Network Products & Solutions is to deliver better user experiences, support customers' business success, and lead the world forward by building the best, most intelligent, and most cost-effective connections.
- The Cloud & AI BG is responsible for the competitiveness and success of Huawei's cloud and computing business. This BG is also responsible for the business's R&D, marketing, ecosystem building, technical sales, consulting, and integrated enablement services. This BG will focus on Kunpeng, Ascend, and HUAWEI CLOUD to build ecosystems and cultivate fertile soil, so that Huawei can become a cornerstone of the digital world.

- ICT regional organizations are the company's regional ICT business operations centers. They are responsible for developing and effectively leveraging regional resources and capabilities, and also for implementing the company's ICT business strategy in their regions. While establishing closer partnerships with customers and helping them achieve business success, ICT regional organizations will develop ICT management systems, cyber security and privacy protection management systems, and internal control systems in their regions, and will continue to support the company in achieving profitable and sustainable growth.

- The Intelligent Automotive Solution BU is an end-to-end organization responsible for the company's intelligent automotive business. This BU will help extend Huawei's strengths in ICT to the intelligent automotive sector by providing incremental ICT components and solutions. This BU's business goal is to use ICT to help automotive manufacturers produce even better products.

To strengthen strategy and risk management within our consumer business and increase the efficiency of its decision-making process, the company set up the Consumer Business Managing Board, which is the primary owner of consumer business strategies, operations management, and customer satisfaction.

- The Consumer BG focuses on serving device consumers and ecosystem partners, and deals with all aspects of the consumer domain. This BG is responsible for business performance, risk controls, market competitiveness, and customer satisfaction in the consumer business.

- The Consumer BG's regional organizations are responsible for their overall business results, consumer satisfaction, ecosystem partner experience, and the brand image enhancement of regional consumer business. They need to gain insight into environmental changes and competition dynamics for the consumer electronics industry, and develop and implement regional consumer business plans and resource investment strategies. These organizations are also responsible for launching products, managing product lifecycles, developing ecosystems, planning and implementing marketing events, and developing and managing channels, retail outlets, and services in their regions. They also need to develop and maintain partnerships, create a favorable business environment, and ensure operational compliance and sustainable development of regional consumer business.

To gradually build a shared service platform to support the development of our multiple businesses and create an anchor for corporate policy execution, the company set up the Platform Coordination Committee. This committee is designed to push group functions to optimize their execution and operations, simplify cross-function operations, and strengthen collaboration, so that group functions will become the best service organizations available to support and promote business operations. Group functions provide business support, services, and oversight. They are positioned to offer accurate, timely, and effective services to field offices and strengthen oversight while delegating sufficient authority to them.

## Improving the Internal Control System

Huawei continued to design and implement an internal control system based on its organizational structure and operating model. The internal control framework and its management system apply to all business and financial processes of the company and its subsidiaries and business units. The internal control system is based on the five components of the COSO framework: Control Environment, Risk Assessment, Control Activities, Information & Communication, and Monitoring. It also covers internal controls of financial statements to ensure their truthfulness, integrity, and accuracy.

### Control Environment

A control environment is the foundation of an internal control system. Huawei is committed to a corporate culture of integrity, business ethics, and compliance with laws and regulations. Huawei has issued the *Business Conduct Guidelines (BCGs)* to identify acceptable business conduct. The *BCGs* must be observed by all employees, including senior executives. Regular training programs are offered, and all employees are requested to sign the *BCGs* to ensure that the *BCGs* have been read, understood, and observed.

Huawei has implemented a mature governance structure, with clearly defined authorization and accountability mechanisms. The governance structure comprises the Board of Directors (BOD), its committees, group functions, and multi-level management teams. Huawei clearly defines the roles and responsibilities of its organizations to ensure the effective separation of authority and responsibilities as well as checks and balances through mutual oversight. The CFO of Huawei is in charge of internal controls. The business control department reports to the CFO

for any possible defects and improvements already made in terms of internal controls, and assists the CFO in building the internal control environment. The internal audit department independently monitors and assesses the status of internal controls for all business operations.

## Risk Assessment

Huawei has a department dedicated to internal controls and risk management to regularly assess risks to the company's global business processes. This department identifies, manages, and monitors significant risks, forecasts potential risks caused by changes to the internal and external environments, and submits risk management strategies along with risk mitigation measures for decision making. All process owners are responsible for identifying, assessing, and managing business risks and taking necessary internal control measures. Huawei has instituted a mechanism for improving internal controls and risk controls to efficiently manage critical risks.

## Control Activities

Huawei has established the Global Process Management System and the Business Transformation Management System, released the global Business Process Architecture (BPA), and appointed Global Process Owners (GPOs) in line with the BPA.

Responsible for building processes and internal controls, GPOs:

- Identify key control points and the Separation of Duties Matrix for each process, and apply these to all regional offices, subsidiaries, and BUs.
- Conduct monthly compliance tests on key control points and issue test reports to ensure the effectiveness of internal controls is continuously monitored.
- Optimize processes and internal controls based on business pain points and key requirements for financial statements. The aim is to improve operating efficiency and financial results, ensure compliance and the accuracy and reliability of financial statements, and help achieve business objectives.
- Perform annual assessments of internal controls, comprehensively assess overall process design and process execution within each business unit, and then report the results to the Audit Committee (AC).

## Information & Communication

Huawei has developed multi-dimensional information and communication channels to ensure the timely acquisition of external information from customers, suppliers, and other parties. It has also created formal channels for transferring internal information, and offered an online space, the *Xinsheng Community*, for employees to freely communicate their thoughts and ideas. Corporate management holds regular meetings with departments at all levels to effectively communicate management orientation to employees and ensure effective implementation of management decisions. All business policies and processes are available on the company's Intranet.

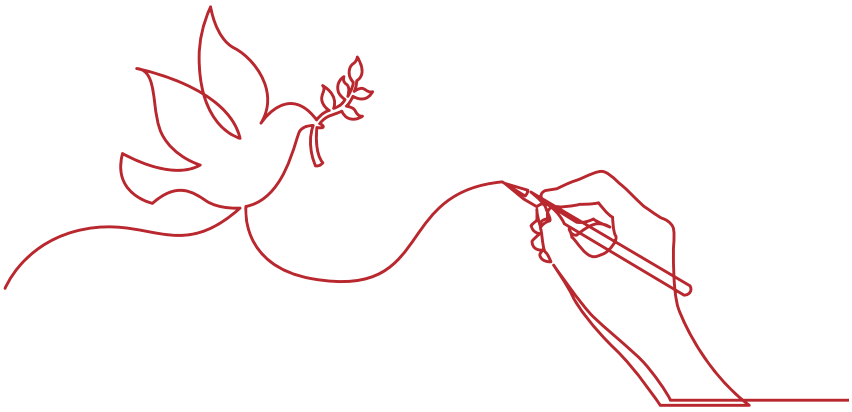
Managers and process owners regularly organize training programs on business processes and internal controls to ensure that up-to-date information is made available to all employees. The company has established a mechanism for process owners at all levels to regularly communicate with each other, review the execution of internal controls, follow up on internal control issues, and implement improvement plans.

## Monitoring

Huawei has established an internal complaint channel, an investigation mechanism, an anti-corruption mechanism, and an accountability system. The *Agreement on Honesty and Integrity* that Huawei has signed with its suppliers clearly stipulates that suppliers may report improper conduct by Huawei employees through the channels stipulated in the *Agreement* to assist the company in monitoring the integrity of its employees. The internal audit department independently assesses the overall status of the company's internal controls, investigates any suspected violations of the *BCGs*, and reports the audit and investigation results to the AC and senior management. Huawei has also implemented a mechanism for internal control appraisals of GPOs and regional managers, holding them accountable and pursuing impeachment when and where necessary. The AC and the CFO regularly review the company's internal control status, and listen to and review reports on action plans for improving internal controls and plan execution progress. Both have the authority to request the relevant GPOs or business executives to explain their internal control issues and take corrective actions.

# Sustainable Development





## Introduction

In 2019, Huawei faced many difficulties and challenges in its sustainable development because of complex political and economic environments. Despite this, we did not slow down our growth; instead, we remained fully confident while taking solid steps to support sustainable development. In 2019, Huawei actively aligned its sustainability efforts with the UN's Sustainable Development Goals (SDGs). We developed clear goals and implemented projects and initiatives based on our four sustainability strategies: Digital Inclusion, Security and Trustworthiness, Environmental Protection, and Healthy and Harmonious Ecosystem.

Huawei is a leading global provider of ICT infrastructure and smart devices. We firmly believe that ICT will play a critical role in achieving the UN's SDGs and advance human well-being. To this end, Huawei fully leverages ICT technologies and works closely with partners along the value chain in the field of sustainable development. Every small step that we have taken means we are moving faster towards the SDGs, contributing to a sustainable, fully connected, and intelligent world.

### Overview of Huawei's Sustainability Strategies and Initiatives in 2019

#### TECH4ALL: Digital Inclusion

**Leaving no one behind in the digital world**: Technology should not be for the few, but for the many. Huawei has continued to invest more in technology, applications, and skills to promote digital inclusion for all. Our goal is to bring digital technology to every person, home, and organization. In 2019, we:

- Launched the TECH4ALL digital inclusion action plan;
- Continued to work with partners to promote digital inclusion by focusing on four high impact domains: supporting equal access to high-quality education, protecting the fragile environment, promoting health and well-being, and driving balanced development;
- Expanded the Huawei ICT Academy to cover 938 universities in 72 countries and regions; and
- Signed a memorandum of understanding with UNESCO Regional Office for Eastern Africa with the aim of making digital skills and AI capabilities accessible to everyone in Africa.

#### Security and Trustworthiness

**Taking responsibility to build trust**: Cyber security and privacy protection are our top priorities, and we keep investing and remain open and transparent in this regard. We also continually improve our software engineering capabilities and practices, build resilient networks, develop trustworthy and high-quality products, and support stable network operations and business continuity. In 2019, we:

- Guaranteed network availability during more than 200 major events and natural disasters;
- Published an AI security and privacy protection white paper;
- Obtained more than 20 cyber security and privacy certifications for our main products; and
- Saw multiple Huawei entities obtain ISO 22301 (business continuity management) certification.

## Environmental Protection

**Contributing to a clean, efficient, low-carbon, and circular economy**: We are committed to minimizing our environmental impacts during our production and operations and throughout our product and service lifecycles. We use our innovative products and solutions to help industries conserve energy and reduce emissions, and contribute to a circular economy. We make ongoing efforts to work with all industry partners to build a low-carbon society. Our progress in 2019 was impressive:

- Energy efficiency of our main products increased by up to 22%;
- 28 of our mobile phones and tablets received level-A certification from the China Quality Certification Center (CQC), the highest level available;
- 86% of products returned to us were recycled; and
- 1.25 billion kWh of the electricity we used in 2019 came from clean energy sources, representing an emissions reduction of about 570,000 tons.

## Healthy and Harmonious Ecosystem

**Collaborating for the common good**: We operate with integrity and in compliance with all applicable laws and regulations. We work to ensure employee growth and value realization. We actively contribute to the communities where we operate. We also work with all industry partners to jointly build a healthy and harmonious industry ecosystem. We saw solid progress in these fields in 2019:

- We invested about CNY13.9 billion in employee benefits;
- About 67% of our employees outside China were hired locally;
- More than 700 of our engineering service providers passed the Occupational Health and Safety Management System certification; and
- Our Seeds for the Future flagship program expanded to cover 111 countries and regions.

## Sustainability Honors and Awards

| Honor/Award Name | Issued by |
|---|---|
| Huawei Mobile Money solution: Champion of WSIS Prize 2019 for Category 8 ICT applications: benefits in all aspects of life — e-Business | World Summit on Information Society (WSIS) |
| Award for driving digital economy among other private sector companies in the ICT industry | Nigerian government |
| Huawei 5G Power: Global Industry Awards: Sustainable Impact | International Telecommunication Union (ITU) |
| Outstanding Company in Green Supply Chain | China Green Supply Chain Alliance |
| 2019 Best Practice Award in recognition of Huawei's progress towards the SDGs (ecological protection and focus on climate change) | United Nations Global Compact Network China |
| No. 1 in the 2019 CSR Development Index of China's Top 100 Private Companies | Chinese Academy of Social Sciences |
| 2019 EcoVadis CSR Gold Rating | EcoVadis |
| Zero Accident Award (Huawei has won this award for three straight years) | Indonesia's Ministry of Manpower |
| Best Company with Innovation in Corporate Social Responsibility | Africa Mobile & ICT Expo (MOBEX) |

## TECH4ALL: Digital Inclusion

Digital technologies are driving economic growth and improving social well-being at an incredible rate and on an unprecedented scale. This will significantly accelerate progress towards achieving the SDGs, in turn reducing poverty and hunger, improving health, creating new jobs, easing the effects of climate change, improving energy efficiency, and achieving the sustainable development of cities and communities. However, there is still a digital divide. About half of the world's population has no access to the Internet or the necessary skills to use it. If we do not act now, they will be unable to secure a place in the future digital world.

**Tech for all. Pass it on.**

Huawei's vision is to bring digital to every person, home and organization for a fully connected, intelligent world. We want to help everyone benefit from digital technology, and do what we can so that no one is left behind in the digital world. This is the reason why we promote digital inclusion. To this end, we will work on three priorities: technology, applications, and skills.

First, technology is the foundation. Huawei will build a fully connected, intelligent world using its innovative technologies in connectivity, computing, AI, cloud, and mobile devices.

Second, applications are the key. Huawei will empower ecosystem partners and help developers create customized applications for different regions, communities, industries, and groups.

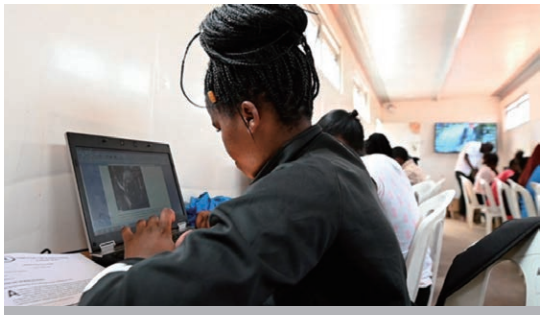
Third, skills provide assurance. Huawei will work with many organizations, such as local governments, universities, and communities, to enhance digital skills and develop digital talent for the future.

Huawei does not simply pursue technological advances; we focus more on the social value created by technology. To help more people and organizations benefit from digital technology, Huawei launched its digital inclusion initiative and action plan, TECH4ALL. Building on business sustainability, we will make long-term, non-profit investments that ensure the sustainability of digital inclusion. By working with global partners such as UN agencies, NGOs, research institutes, governments, carriers, and enterprise customers, we will promote digital inclusion by focusing on four high impact domains: supporting equal access to high-quality education, protecting the fragile environment, promoting health and well-being, and driving balanced development. So far, we have only taken small steps forward. In the future, we hope that more individuals and organizations will join the TECH4ALL initiative to jointly advance progress towards the achievement of the SDGs.

## Education4ALL: Supporting Equal Access to High-quality Education

Knowledge and skills are the cornerstone of progress. ICT technologies promote equal access to education, and serve as a building block of digital skills education. In education, Huawei focuses on four types of programs: skills on wheels, connecting all schools, empowering the unempowered, and building a thriving ICT ecosystem. Together with its partners, Huawei is committed to providing equal access to high-quality educational opportunities for people of different regions and groups using ICT.

### On the Road to Digital Skills with DigiTruck



Trainees in digital skills training in the DigiTruck


Huawei's DigiTruck mobile digital classroom

To help Kenyans in remote rural areas improve their digital awareness and digital skills, Huawei set up the DigiTruck mobile digital classroom, in partnership with the Belgian nonprofit organization Close the Gap, the UNESCO Regional Office for Eastern Africa, GSMA, Computers for Schools Kenya (CFSK), the Kenyan telecom carrier Safaricom, and Kenya's Ministry of ICT.

DigiTruck is the latest program under Huawei's TECH4ALL initiative that supports access to high-quality education. It focuses on providing digital skills training for rural teachers, unemployed young people, and women in Kenya.

Huawei's DigiTruck is a shipping container that has been converted into a mobile digital classroom. The 12-meter classroom is equipped with smart devices like laptops, LED screens, smartphones, and virtual reality (VR) headsets. Students can use smartphones and laptops to learn Internet skills thanks to wireless broadband access. The VR equipment on the truck provides a new level of resources to be incorporated into the classroom. The entire truck is solar-powered, so classes can be held in remote areas without power supplies.

DigiTruck hugely benefitted local communities in a number of ways: Local residents better understand the benefits of digital skills. Teachers in villages can use digital technologies so that students can access the world of digital information as early as possible. Young entrepreneurs can study e-commerce and earn more revenue through the Internet. Rural women can become more financially independent thanks to computer technologies. Moving forward, DigiTruck will provide digital skills training to even more people in remote regions.

## Environment4ALL: Protecting the Fragile Environment

The environment that we rely on for survival, which includes forests, soil, air, and water, is deteriorating. Problems like climate changes and rising sea levels are threatening the survival and development of humanity and every species on Earth. We believe that technology can help humans better understand and protect the nature. From forest monitoring and the protection of endangered species to more agile defenses against natural disasters, Huawei is actively seeking to work with more environmental protection organizations and partners. Huawei hopes to use its ICT expertise to monitor, protect, and maintain the ecological balance and ensure the environment can benefit from technology.

### Safeguarding Rainforests and Protecting Endangered Animals with AI

Illegal logging is both destroying rainforests in nations, including Costa Rica, and creating an existential threat to species such as the spider monkey. These rare monkeys play an important role in maintaining the ecosystem of the Costa Rican rainforest – they are highly efficient seed dispersers that help trees multiply by spreading seeds throughout the forest.

Since 2019, Huawei and Rainforest Connection (RFCx) have worked together to develop a platform that includes data collection devices, storage services, and intelligent analytics. These "Guardians" monitor and prevent illegal logging, in turn protecting endangered animals such as the spider monkey.

When the monitoring system detects the sounds of illegal logging, such as chainsaws and trucks, it immediately pushes the specific location to local forest rangers to help them quickly locate the sounds. Huawei's AI technology can also analyze the sounds of animals, aiding research into protecting them, including spider monkeys. With the help of AI, forest rangers and biologists are no longer alone in their fight to safeguard the world's rainforests.

In partnership with RFCx, Huawei has deployed its rainforest solutions in 10 countries and expects to cover about 6,000 square kilometers of rainforests by the end of 2020.

Topher White, the founder and CEO of RFCx, installing Guardians

Preventing illegal logging with AI to protect rainforest biodiversity

## Health4ALL: Promoting Health and Well-being

Digital technologies will open a new chapter for health and well-being. More affordable, inclusive, and accessible healthcare services allow people to prevent, detect, and even solve serious health problems early on. Equal access to high-quality healthcare makes medical resources more available and lets people live healthier lives. Huawei is committed to working with all parties to use ICT to build a more dynamic and healthy society, from which everyone can benefit.

## TrackAI: Stopping Blindness in Its Tracks

According to World Health Organization estimates, around 19 million children around the world suffer from some sort of visual impairment. Early diagnosis is essential for children. With timely intervention, 70% to 80% of all cases are preventable or curable. However, diagnosing children can be difficult because they cannot articulate what they are experiencing. Now, AI is making this critical early diagnosis a very real possibility.

Most eye diseases occur within the first five years of life. Unfortunately, a lack of parental knowledge and awareness leads to many children missing this optimum diagnosis period. Only a third of children with an eye disease receive early treatment.

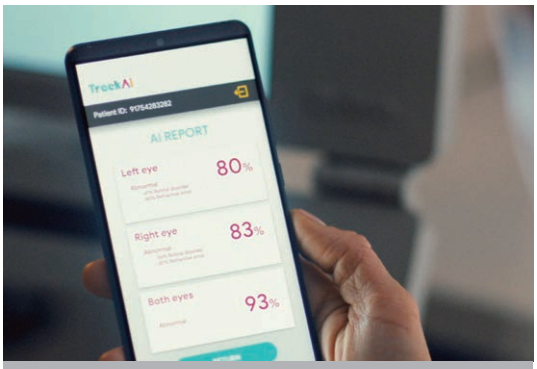
Traditionally it has largely fallen to professional ophthalmologists to detect eye diseases in children. Doctors have to catch the child's attention by moving their finger or an instrument and then observe the child's reactions. However, in many developing nations, professional ophthalmologists are in extremely short supply. In developed countries, rigorous referral systems mean that ordinary ophthalmologists are often not qualified to give specialist tests for eye diseases. Once a patient is transferred to a specialist, their wait times can be as long as three to six months.

To tackle the lack of eye doctors and difficulty of diagnosing eye diseases in children, the Spanish medical research institute, IIS Aragon, and the startup DIVE Medical have developed the Device for an Integral Visual Examination (DIVE). DIVE has been designed to provide automatic, fast, and accurate visual function testing for children and infants as young as six months old. At the start of 2019, Huawei teamed up with IIS Aragon and DIVE Medical to jointly launch the TrackAI project. It makes use of Huawei smart devices and AI to help more children who suffer from eye diseases.

TrackAI's detection system consists of the DIVE device, a Huawei P30 smartphone, and a Huawei MateBook E tablet. The system can display visual stimuli on the screen and track the child's focus with the eye tracker. It can also learn the differences between children with and without eye diseases. During the test, the patient watches the stimuli displayed on the MateBook E screen and the DIVE tracks the movement and reaction of the patient's gaze in real time and then sends the data to the Huawei P30. Then the Huawei P30 smartphone runs a pre-trained machine learning model to detect whether the patient has a visual impairment.

As is the case with most conventional techniques, TrackAI's system relies on expert interpretation of the test results, so these results still need to be verified by an ophthalmologist. However, using AI to judge the results makes it easier for non-specialist pediatric ophthalmologists to interpret visual assessments and identify which children have visual impairments. The co-founder of DIVE Medical, Victoria Pueyo said, "As researchers, we need support from technology companies. Huawei is enabling us to globalize the impact of DIVE and take the technology to every corner of the world."

At present, a number of medical institutes in China, Spain, Vietnam, Mexico, and Russia have started to collect the data required to train the AI algorithm, with gaze data from over 2,000 visually impaired children gathered so far. By continually collecting data and adjusting the machine learning model, the researchers can increase accuracy. There's still a long way to go before TrackAI is perfected, but a world where no visually impaired child goes undiagnosed is closer than ever.




Analyzing TrackAI data on a mobile phone

Using TrackAI to detect children with visual impairment

## Development4ALL: Driving Balanced Development

ICT has become a key driver of digital and intelligent transformation across industries and inclusive growth in different regions. However, a huge digital divide between different countries and regions and between different industries still exists. We provide affordable and easy-to-use digital technologies for different application scenarios, especially in regions and industries that are relatively underdeveloped. We aim to eliminate the development gaps between different industries, businesses, regions, and groups, and provide equal access to digital resources so they are inclusive to everyone.

### 5G-powered Unmanned Smart Mining – Changing the Mining Industry

Mining has traditionally been a hot, tough, and dangerous occupation, with collapses, landslides, and dust clouds possible at any moment. While remote-controlled trucks are considered to be a safer and more efficient alternative in some mining scenarios, they have failed to deliver the expected efficiency and safety gains due to long latency caused by slow network transmission. Now 5G is bringing us hope.

With the shift from manual mining and remote-controlled mining trucks to 5G-powered unmanned smart mining, the mining industry is entering the digital age. With Huawei and China Mobile, China Molybdenum has built a 24/7 safety monitoring system that covers the whole mining process for all outdoor mining areas, thanks to the high-speed transmission made possible by 5G. Sensors and controllers within the mining vehicles are connected with high-speed 5G networks, sending onsite environment and equipment status information back to the control room in real time.

Drivers can now remotely work from a control center, with three screens in the front of the driver's seat showing a close-up of the excavator's robotic arm, the mid-range view from the driver's perspective, and the panoramic view of the excavator and surrounding environment. These images allow drivers to understand actual conditions in the mining area while eliminating almost all blind spots and latency.

This project represents China's first unmanned mine and a significant evolution for the entire mining industry. According to Yang Hui, President of Operations of Henan Yuexin Intelligent Machinery and Chief Designer of its 5G unmanned smart mining initiative, "We run 40 electric unmanned vehicles for transportation and mining work, 30 of which are transport vehicles. Their speed has increased from 15 km/h to 30 km/h. Our overall operating efficiency has been greatly improved, productivity has increased by about 30%, and we're saving about 12 million yuan per year in labor costs."

4G has changed our lives. 5G will change society. With 5G, miners can remotely control excavators in air-conditioned rooms. This ensures worker safety, reassuring their families while also increasing mining efficiency.

China Molybdenum workers remotely operating an excavator over a 5G network

## Security and Trustworthiness

In the globalized digital era, security and trustworthiness are the cornerstone of a fully connected, intelligent world. We need to work together – as an industry and society as a whole – to develop a fact-based, risk-informed, and verifiable cyber security management system. Huawei is committed to providing secure and trustworthy digital products and services. Huawei has placed cyber security and privacy protection high on its agenda. We continue to invest in these fields while remaining open and transparent. We also continue to improve our software engineering capabilities and practices, build resilient networks, and develop trustworthy and high-quality products. In 2019, Huawei made ongoing efforts in process transformation, solutions, security engineering capabilities, security technologies and standards, independent verification, supply chain, and personnel management to enhance our end-to-end cyber security and privacy protection capabilities.

Supporting network stability is our paramount social responsibility. We strive to make sure everyone has the ability to access and share information anytime, anywhere. To this end, we have established a comprehensive customer network support system that covers a range of areas, including organizational structures, personnel, processes, and IT tools. Huawei has established two global and nine regional technical assistance centers. More than 4,500 Huawei customer support engineers and over 700 service project managers and technology directors provide 24/7 services worldwide. Huawei's network assurance team is always there for customers, helping them ensure stable network operations, maintain smooth communications, and quickly recover from network failures.

In 2019, we supported smooth communications for more than one-third of the world's population, and the stable operations of over 1,500 networks in more than 170 countries and regions. We guaranteed network availability during more than 200 natural disasters and major events such as the major power outage in Indonesia, the earthquake in the Philippines, and typhoons Hagibis and Bualoi in Japan.

### Huawei Employees Guaranteed Smooth Network Operations After a Major Power Outage Hit Indonesia

At noon on August 4, 2019, the Java Island was hit by a major power outage – the largest it had seen in the last two decades. High-speed trams stopped suddenly and shopping malls went dark. More than 30 million people in Jakarta and the surrounding areas were affected. Local carrier networks were set to experience large-scale disconnection when their communications equipment exhausted their batteries.

Network assurance team for the large-scale power outage in Jakarta

About 15 minutes after the accident occurred, the O&M director of a local carrier and Huawei's network assurance team determined to initiate their assurance plan for power failure. Huawei Indonesia's business continuity and network assurance teams arrived at their network monitoring center immediately and kicked off a repair plan. This plan included dispatching diesel generators to ensure central equipment rooms and backbone sites could continue operating, sending additional subcontractor workers to replenish generator fuel and repair any faulty generators, and organizing experts to review and activate an anti-shock plan for any potential spikes in data traffic. This helped minimize communication interruption caused by the large-scale power outage.

Huawei's network assurance team and the customer did everything they could to repair the affected sites and restore communications services. A total of 141 onsite emergency recovery teams were deployed and 899 generators were dispatched. On August 6, after three long days, all communications network services were restored. Huawei and the customer managed to ensure the rapid recovery of the affected networks and guarantee the smooth communications for more than 30 million residents in Indonesia despite the largest power outage the nation had seen in two decades.

Through years of ongoing investment, Huawei has established a business continuity management (BCM) system spanning procurement, manufacturing, logistics, global technical services, and many other domains. This system covers end-to-end processes, from suppliers to Huawei, and on to our customers. As part of this system, we have developed and established effective measures to manage risks that arise from our day-to-day work. We have built up management organizations, processes, and IT platforms, prepared business continuity plans and emergency response plans, and organized BCM training and drills for key employees. Over the past decade, Huawei has quickly responded to the world's largest disasters, such as tsunamis in Japan, floods in Thailand, earthquakes in Nepal, and global ransomware attacks, proving the effectiveness of Huawei's business continuity management system.

(For further details about cyber security and privacy protection, see pages 75 to 78 of this Annual Report. For further details about business continuity, see pages 67 to 68 of this Annual Report.)

## Environmental Protection

As digitization continues to advance rapidly, ICT infrastructure is becoming smarter and can offer faster and smoother connectivity. But ICT infrastructure consumes huge amounts of energy and resources. The ICT industry is now facing the significant challenge of how to minimize energy and resource consumption, as well as other environmental impacts, without compromising network performance or user experience. Huawei works tirelessly to combat climate change. We are committed to minimizing the environmental impact of our production and operations and throughout our product and service lifecycles. We use our innovative products and solutions to help industries conserve energy and reduce emissions, and contribute to a circular economy. We make ongoing efforts to work with all industry partners to build a low-carbon society.

### Green Products

An important goal of our green product efforts is to develop efficient, energy-saving, and environment-friendly products and solutions for customers, helping them reduce operating costs and minimize their environmental impact. We continue to explore how to design more energy-efficient products to ensure all our products meet or even outperform what is required by applicable laws, regulations, standards, and customer requirements. To adapt to the evolving network technologies and architecture, we have created innovative power-saving solutions that reduce power consumption and carbon emissions.

#### 5G Power Helps Build a Green 5G Telecom Network

In the 5G era, increasing site power consumption brings unprecedented challenges to energy infrastructure construction. Huawei is the industry's first company to propose the idea of building a simple, intelligent, and green 5G telecom power target network and has released its new 5G Power solution.

Huawei 5G Power is a revolutionary intelligent solution that focuses more on the performance improvement of an entire site and network, instead of individual power supply components. It uses key technologies such as efficient rectifying, intelligent voltage boosting, and AI scheduling to minimize the power consumption losses of rectifiers, contactors, and shunts, which ensures efficient power supply and greatly improves end-to-end site energy efficiency. In addition, the 5G Power solution supports maximum power point tracking (MPPT) technology, iPV shading for loss reduction, and smooth access to solar power. About 10% more power can be generated from these efficient solar modules. This industry-leading solar power solution maximizes the use of clean energy.

According to the results of a joint experiment by Huawei and China Tower, the 5G Power solution can dramatically cut site power consumption. The solution is expected to save 4,130 kWh of electricity per site per year. About 2 million 5G sites are expected to be built or reconstructed between 2019 and 2022 in China, and about 800,000 of these sites will be supported by the Huawei 5G Power solution. This is expected to reduce annual carbon emissions by more than 900,000 tons. According to a joint experiment by Huawei and a European customer, the 5G Power solution can bring an average energy saving of 51% per site.

A power supply being tested as part of the experiment conducted by Huawei and China Tower


Huawei 5G Power won the Global Industry Awards: Sustainable Impact

At the ITU Telecom World 2019, the Huawei 5G Power solution won the Global Industry Awards: Sustainable Impact for its outstanding contribution to energy saving and emissions reduction for mobile networks.

## Green Operations

Huawei sticks with its sustainability strategy and is working hard to build greener campuses. We have taken many managerial and technical measures to develop innovative practices in energy saving and build green, low-carbon campuses. Using 5G, IoT, big data, and AI technologies, we have studied and implemented innovative energy-saving solutions on campuses to reduce energy consumption and carbon emissions and build a green, sustainable campus ecosystem.

### Intelligent Campus Energy Management Solution

In 2019, Huawei adopted the Intelligent Campus Energy Management Solution as part of its digital transformation of campus management. Based on the Huawei Horizon Digital Platform's intelligent big data analytics and diagnosis model and algorithms, Huawei moved its solution from the traditional extensive power supply mode to a demand-driven power supply mode. Compared with the rigid management model used in chiller plant systems, Huawei's solution for campus chiller plant systems formulates dynamic energy consumption control policies with the data provided by the big data platform such as per-phase operational status, environment changes, and people density. This solution reduces waste, enables intelligent and automatic control of chiller plant systems and power supplies, and cuts energy consumption costs by more than 15%. In addition, Huawei's Intelligent Campus Energy Management Solution uses big data and IoT technologies to dynamically and intelligently control lighting based on proactive detection of personnel movement.

By deploying its Intelligent Campus Energy Management Solution, Huawei saved 1.4 million kWh of electricity in the second half of 2019 in Section B of its Bantian campus, a 30% reduction of consumption compared with 2018, and reduced carbon emissions by about 1,150 tons in total. By the end of 2019, the Intelligent Campus Energy Management Solution had been rolled out across all Huawei campuses, bringing remarkable benefits, including energy savings of more than 15% across the whole year.

As digital and intelligent campuses become more widespread, Huawei's intelligent campus solution offers a more comprehensive, fine-grained, and intelligent mode of energy management. Huawei's Intelligent Campus Energy Management Solution will be applied in more campuses to help save energy and reduce power consumption, contribute to a low-carbon economy, and transform our campuses into greener ones.


Huawei's Intelligent Campus Energy Management Solution

## Green Partners

Huawei has incorporated environmental protection requirements into its Quality First procurement strategy and end-to-end procurement process, including supplier qualification, selection, review, performance management, and material selection. We aim to ensure compliance with all applicable environmental laws and regulations, encourage suppliers to make continuous improvements through our sourcing strategy, and build a competitive and green supply chain.

Since 2011, Huawei has supported the Green Choice Alliance, which was established by the Institute of Public and Environmental Affairs (IPE). We continue to use the IPE's Blue Map environmental data search during supplier audits and supplier self-checks. We routinely submit environmental data inquiries to our 900 key suppliers and if a supplier violates environmental protection rules, an immediate corrective action plan is issued. This helps suppliers manage their own environmental impacts. In 2019, Huawei ranked third in the global IT industry and first among Chinese companies in the IPE's Green Supply Chain rankings.

We encourage our suppliers to develop energy metering systems, audit their energy usage, identify opportunities to reduce energy use and carbon emissions, study industry-leading practices and case studies, and develop and implement their own energy conservation and emissions reduction plans. In 2019, a total of 35 suppliers took part in energy conservation and emissions reduction programs, together reducing $CO_2$ emissions by more than 80,000 tons.

### Huawei Brings Customers and Suppliers Together for Supply Chain Sustainability Programs

In 2019, Huawei worked with Deutsche Telekom and a supplier to carry out a Sustainable Development Program (SDP) for their supply chain. We worked together to analyze and identify risks and opportunities in their respective business domains, and determined energy saving and emissions reduction opportunities while complying with applicable laws and regulations to reduce operating costs and improve competitiveness. We helped the supplier save about 140,000 kWh of electricity annually and reduce their carbon emissions by 115 tons by retooling their injection molding equipment, replacing fluorescent lights with LED lamps, and setting up a solar power generator. We also worked with the customer and supplier to recycle excess materials and packaging materials, reducing waste by 84 tons. On January 13, 2020, Deutsche Telekom presented the supplier a silver medal for its SDP.

The Silver Award from Deutche Telekom given to the supplier for their outstanding SDP

## Green World

According to Huawei's Global Industry Vision (GIV) 2025, carbon emissions per ICT connection are expected to be reduced by an average of 80% by 2025. ICT-enabled power savings and carbon emission reductions will far exceed the industry's own. ICT is becoming an important enabling technology for a greener world. It will enable an 11-fold increase in power savings and emissions reduction worldwide. For many years, Huawei has been committed to promoting energy conservation and emissions reduction in different industries using innovative energy solutions, and actively contributing to a low-carbon society featuring resource conservation and environmental friendliness.

### Huawei's Smart PV Solution Brings Clean Power to Every Household

Global decarbonization is inevitable. Huawei is committed to building a green and intelligent world. As such, we expect our smart PV solution to become a main power source and want to make it accessible to all. Take the 300 MW PV plant located at Cauchari, Jujuy Province, Argentina as an example. This PV plant was commissioned on October 2019. It has an expected lifespan of 25 years and will generate about 660 million kWh of electricity annually, enough to provide clean electricity for 160,000 households. Before the PV plant was built, Jujuy Province had to buy their electricity from other provinces, but now the province is self-reliant when it comes to electricity, greatly alleviating the local electrical load and reducing electricity prices. The PV plant, fully powered by Huawei's smart string inverter, occupies an area equal to half the size of Buenos Aires and is the highest-situated PV plant in Latin America at 4,200 meters above sea level.


The 300 MW PV plant in Cauchari, Jujuy Province, Argentina

## Healthy and Harmonious Ecosystem

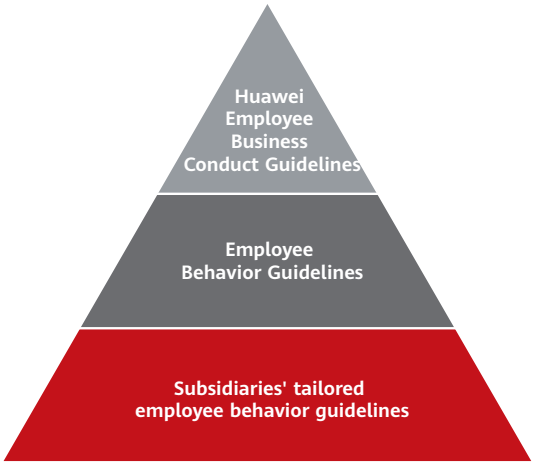
Huawei works with its customers, employees, local communities, and upstream and downstream partners wherever the company operates to deliver a fully connected, intelligent world as we have promised. In pursuit of this, we have embedded the company's core values, operational responsibilities, and social responsibilities into our daily operations. We hold ourselves to the highest standards. While sticking to our core values of customer-centricity and dedication, we care about our employees' development and value realization, contribute to the robust development of local communities, and encourage suppliers to fulfill their own responsibilities. Ultimately, we want to promote healthy, harmonious, and sustainable development within our industry.

### Business Ethics

Trade compliance, cyber security, data and privacy protection, environmental protection, and anti-bribery are all common topics of discussion. This is because these are the key areas we must get right in order to foster a fair business environment and maintain order throughout the business world. As far as companies are concerned, these issues must be addressed if they want to survive and thrive in the market.

We conduct business with integrity, adhere to common business ethics, and observe all applicable laws and regulations in the countries and regions where we operate. This is a guiding principle for our management team. Through ongoing investment, Huawei has established a compliance management system that covers our business and employees worldwide. In line with the Group's compliance guidelines as well as local laws and law enforcement practices, each Huawei subsidiary has identified and evaluated its compliance risks, and developed and implemented control measures to address them. We have adopted a "one country, one policy" approach to compliance management. Huawei values and works hard to create a culture of integrity, and requires all employees to comply with its *Business Conduct Guidelines*. On this basis, each subsidiary has released detailed employee behavior guidelines to ensure employees incorporate compliance requirements into everything they do.

**Huawei Employee Business Conduct Guidelines + Subsidiaries' tailored employee behavior guidelines: Incorporating compliance requirements into employee behavior**




### Caring for Employees

Huawei operates in more than 170 countries and regions. Outside of China, we prefer to hire local professionals and work to build a diversified workforce. All employees at Huawei, regardless of their gender, race, ethnicity, or religious beliefs, are offered equal opportunities to work, learn, and develop. We are committed to creating a humane and efficient workplace for employees, so they can enjoy a happy and vibrant life while receiving reasonable rewards.

We value employee capability and career development, helping them grow together with the company and achieve shared success. Externally, we open up the organization to outside talent, and explore ways to unite the world's best minds under a common purpose. Internally, we fast-track the promotion of strong performers and give them more growth opportunities. We also provide differentiated development paths for employees to inject vitality into the organization. Building on our technologies, knowledge, experience, and years of success in the ICT industry, we continue to invest in and collaborate with educational and training institutions, industry associations, and other partners to build a platform that will enable healthy development within the ICT talent ecosystem.

## Creating a Broad Development Platform for Diversified Local Workforces

As a global company, Huawei is able to use its global value chain to smoothly transfer capabilities around the world and maximize value. We take a positive, diverse, and open approach to managing our human resources and we are committed to developing talent in local communities. In 2019, we created a large number of jobs in local communities and more than 4,000 of our new hires were made locally, contributing to local economic development.

To help employees grow and realize their value, we offer them ample and equal opportunities for training and promotion. We assign mentors to local employees and provide them with systematic training, including more than 4,000 online courses in multiple languages available on a variety of platforms including Huawei's own iLearning platform. Our training also includes new employee orientation, specialized training for non-Chinese managers, and training for senior technical experts, helping improve employees' technical skills, expertise, and management capabilities. Huawei's training sessions for local employees have an annual attendance of over 38,000.

UK Rep Office employees participating in a dragon boat race during the Dragon Boat Festival

Huawei Sri Lanka Rep Office employees participating in a sports day event

Localization is a key focus in Huawei's global operations. We prefer to hire local professionals. We attract talented people from around the world, and provide them with a platform where they can fully realize their value. We also develop tailored models for different groups of employees to maximize their value.

To create a lively and healthy work environment, we carry out different forms of team building activities around the world, such as Racing Against Time, We Are Family, 3+1 Health Week, and Running for Love initiatives.

## Supply Chain Responsibilities

Huawei is committed to working with customers and suppliers to build a sustainable supply chain. We sign a sustainability agreement with all of our suppliers. In 2019, we continued implementing our Quality First procurement strategy, and sustainability was a key part of it. We ensure sustainability is given proper weight during our supplier qualification, performance appraisals, and other procurement decisions. We cooperated more extensively with customers, suppliers, and industry organizations to pursue sustainability, and helped suppliers become more sustainable through our sourcing strategy. In 2019, we rigorously audited the sustainability performance of our 111 new suppliers, and assessed the sustainability risks of more than 1,300 major suppliers. We conducted onsite audits on 169 suppliers that presented medium to high risks and issued corrective action plans for those with sustainability problems. We recorded their progress in an IT system to ensure that all problems were resolved.

We also worked with our customers to ensure a more transparent supply chain. Since 2010, Huawei has conducted joint supplier audits with customers through the Joint Audit Cooperation (JAC) – a CSR alliance for the global telecom industry. We share these audit results with suppliers to help them improve their sustainability, reduce supply chain risks, and make our supply chain more competitive. In 2019, Huawei worked with five customers to run joint audits on 14 suppliers, and three of our suppliers won an award for excellent practices from the JAC.

## Improving Suppliers' CSR Management Capability

Huawei attaches great importance to the improvement of CSR capabilities of our suppliers. To help suppliers more efficiently manage their CSR, reduce risks, and become more competitive, we have taken a series of measures including holding supplier conferences, organizing CSR management workshops, evaluating and coaching suppliers, rolling out various programs to improve suppliers' CSR capabilities, and implementing a strategic supplier development program.

In 2019, Huawei Consumer BG invited executives from 196 suppliers to attend our Device Supplier Conference, aiming to get buy-in of leadership in CSR efforts and raise their awareness of CSR. Huawei also required the executives of suppliers deemed high-risk to report all of their CSR improvement plans and progress directly to Huawei.

Huawei Consumer BG arranged for professionals to evaluate and coach potential and new suppliers. This helps them understand and meet Huawei's CSR requirements as well as establish or improve their CSR management systems. Huawei regularly holds workshops on supplier CSR management, provides guidance to suppliers on how to effectively adopt industry best practices and incorporate CSR requirements into business strategies to reduce business risks and improve operational efficiency. In 2019, Huawei Consumer BG worked with specialist agencies on programs intended to improve capabilities in domains like labor rights and interests, environmental protection, fire safety, and occupational health, benefiting more than 150 suppliers.

In addition, Huawei has launched a strategic supplier development program to help suppliers identify new opportunities in domains such as innovation, quality, and CSR, and achieve sustainable development. In 2017, Huawei Consumer BG piloted this program with two of their suppliers. Three suppliers participated in the program in 2018 and in 2019. We identified improvement opportunities in CSR domains like employee welfare, greenhouse gas emissions, waste reduction, supplier management, and health and safety, and encouraged suppliers to continuously improve their management based on these identified opportunities.

Huawei explaining CSR requirements to supplier executives


A Huawei-led workshop on supplier CSR management

## EHS Management of Engineering Service Providers

In 2019, we continued to enhance our EHS management of engineering service providers. Specifically, we adopted multiple digital technologies to manage EHS risks, set up a warning system based on multiple key parameters, and established additional preventive measures. To improve the EHS awareness and skills of our operating staff, we developed an EHS video tutorial covering multiple scenarios. In addition, we used AI technology to identify EHS violations. We continued to nurture our EHS culture in order to improve the awareness of all employees. In 2019, more than 108,000 Safety Passport holders were registered in Huawei's online system.

We worked with engineering service providers along our value chain to build and improve our EHS management system and undergo occupational health and safety management system certifications. By the end of 2019, more than 700 engineering service providers had received either OHSAS 18001 or ISO 45001 certification. We made EHS a core topic in our 13 regional supplier conferences to promote our thoughts and practices on EHS management. To drive supplier improvement in terms of EHS competence, we ran a supplier EHS competence development program, covering EHS leadership improvements, process management, competence assessments, reward and accountability systems, and more.

Representatives attending an engineering service provider EHS conference

Huawei explaining EHS requirements to an engineering service provider

## Community Responsibilities

Huawei is committed to creating value for the communities we operate in. We collaborate and innovate together with our partners to continuously create a positive impact and solve economic, environmental, and social problems. We believe that the development of ICT technologies can connect the unconnected and make it possible to access information across borders. This is conducive to inclusive social and economic development. We also work with governments, customers, companies, and non-profit organizations to roll out projects aimed at giving back to local communities and protecting the environment. We work hard to provide educational opportunities to all and develop skilled ICT workforces. In addition, we make different types of donations to local communities. All these efforts contribute to the development of local communities.

### Seeds for the Future Program

The Seeds for the Future program provides students in various countries and regions where Huawei operates with unique opportunities to learn about and get closer access to advanced ICT technologies and products. Through this program, Huawei shares the ICT knowledge and experience we have gained during our global business operations and helps students broaden their horizons and gain more ICT knowledge and skills. These students will, eventually in turn, drive their own local ICT industries and the global ICT industry forward. This program acts as a bridge for communication between different countries and cultures, allowing young people from around the world to learn from each other.

In 2019, 1,130 students from 111 countries and regions visited and studied at Huawei's headquarters as part of the Seeds for the Future program. 2019 also marked the 11th anniversary of the Seeds for the Future program. By the end of 2019, more than 5,700 students had participated in this program.

For more information, please visit:
Seeds for the Future Program

or scan the QR code:


Seeds for the Future participants

**For further details, please see the complete Huawei 2019 Sustainability Report.**

# Abbreviations, Financial Terminology, and Exchange Rates

| Abbreviation | Full Name |
|---|---|
| 3GPP | 3rd Generation Partnership Project |
| 5GAA | 5G Automotive Association |
| AAU | Active Antenna Unit |
| ADN | Autonomous Driving Network |
| AI | Artificial Intelligence |
| AII | Alliance of Industrial Internet |
| AR | Augmented Reality |
| ARPU | Average Revenue Per User |
| B2B | Business to Business |
| B2C | Business to Consumer |
| BCGs | Business Conduct Guidelines |
| BCM | Business Continuity Management |
| BG | Business Group |
| CAGR | Compound Annual Growth Rate |
| CC | Common Criteria |
| CFO | Chief Financial Officer |
| CGU | Cash-Generating Unit |
| CNCF | Cloud Native Computing Foundation |
| COSO | Committee of Sponsoring Organizations of the Treadway Commission |
| CPE | Customer Premise Equipment |
| CSR | Corporate Social Responsibility |
| DCI | Data Center Interconnect |
| DCN | Data Center Network |
| DPO | Days of Payables Outstanding |
| DSO | Days of Sales Outstanding |
| EAL | Evaluation Assurance Level |
| EHS | Environment, Health, and Safety |
| EMEA | Europe, the Middle East and Africa |
| EMT | Executive Management Team |
| ETC | Electronic Toll Collection |
| ETSI | European Telecommunications Standards Institute |
| F5G | Fifth Generation Fixed Network |
| FC | Finance Committee |
| FVOCI | Fair Value Through Other Comprehensive Income |
| FVPL | Fair Value Through Profit or Loss |
| GIV | Global Industry Vision |
| GPO | Global Process Owner |
| GPON | Gigabit-capable Passive Optical Network |
| GPU | Graphics Processing Unit |

| Abbreviation | Full Name |
|---|---|
| GSMA | Global System for Mobile Communications Association |
| HCIE | Huawei Certified ICT Expert |
| HMS | Huawei Mobile Services |
| HPC | High-Performance Computing |
| HRC | Human Resources Committee |
| IaaS | Infrastructure as a Service |
| IAS | International Accounting Standards |
| ICT | Information and Communications Technology |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| IETF | Internet Engineering Task Force |
| IFRS | International Financial Reporting Standards |
| IoT | Internet of Things |
| IP | Internet Protocol |
| IPD | Integrated Product Development |
| IPR | Intellectual Property Right |
| ISO | International Organization for Standardization |
| IT | Information Technology |
| ITO | Inventory Turnover |
| ITU | International Telecommunication Union |
| LTC | Lead to Cash |
| MDC | Mobile Data Center |
| MIMO | Multiple-Input Multiple-Output |
| NB-IoT | Narrowband Internet of Things |
| NCE | Network Cloud Engine |
| NGO | Non-governmental Organization |
| NPU | Neural Processing Unit |
| NSA | Non-Standalone |
| O&M | Operations and Maintenance |
| ONAP | Open Network Automation Platform |
| OS | Operating System |
| OTN | Optical Transport Network |
| OXC | Optical Cross-Connect |
| PaaS | Platform as a Service |
| PC | Personal Computer |
| POB | Performance Obligation |
| PON | Passive Optical Network |

| Abbreviation | Full Name |
|---|---|
| R&D | Research and Development |
| RAN | Radio Access Network |
| ROADS | Real-time, On-demand, All-online, DIY, and Social |
| RRU | Remote Radio Unit |
| SA | Standalone |
| SDG | Sustainable Development Goal |
| SLA | Service Level Agreement |
| SoC | System on Chip |
| SRv6 | Segment Routing IPv6 |

| Abbreviation | Full Name |
|---|---|
| SSP | Stand-alone Selling Price |
| TCO | Total Cost of Ownership |
| TMF | TeleManagement Forum |
| TUP | Time-based Unit Plan |
| UI | User Interface |
| V2X | Vehicle-To-Everything |
| VoLTE | Voice over Long Term Evolution |
| VR | Virtual Reality |
| WTTx | Wireless to the X |

## Financial Terminology

### Operating profit

Gross profit less research and development expenses, selling and administrative expenses, plus other (expenses)/ income, net

### Cash and short-term investments

Cash and cash equivalents plus other current investments

### Working capital

Current assets less current liabilities

### Liability ratio

Total liabilities expressed as a percentage of total assets

### Days of sales outstanding (DSO)

Trade receivables plus contract assets at the end of the year divided by revenue, and multiplied by 360 days

### Inventory turnover days (ITO)

Inventories at the end of the year divided by cost of sales, and multiplied by 360 days

### Days of payables outstanding (DPO)

Trade payables at the end of the year divided by cost of sales, and multiplied by 360 days

### Cash flow before change in operating assets and liabilities

Net profit plus depreciation, amortization, exchange loss, interest expense, loss on disposal of property, plant and equipment and intangible assets, and other non-operating expense, less exchange gain, investment income, gain on disposal of property, plant and equipment and intangible assets, and other non-operating income

## Exchange Rates

| CNY/USD | 2019 | 2018 |
|---|---|---|
| Average rate | **6.9218** | 6.6362 |
| Closing rate | **6.9840** | 6.8561 |

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