

# NEWS 2019

**Dr. Susan Bliss**

**SUBJECTS: BUSINESS STUDIES, ECONOMICS AND TECHNOLOGY**

## **HUAWEI: CHINESE ICT COMPANY THAT 'SPOOKED THE WORLD'**

Huawei Technologies Co., Ltd., is a Chinese multinational technology company that specialises in consumer electronics, telecommunications equipment, and technology-based services and products.

\*Huawei is commonly pronounced 'wah way'



Huawei: the Company that spooked the world. The success of China's telecoms-equipment makes spies and politicians elsewhere nervous.

<https://www.economist.com/briefing/2012/08/04/the-company-that-spooked-the-world>



Image: <https://www.huawei.com/en/press-events/news/2018/3/Huawei-2017-Annual-Report>

Huawei has evolved from an indigenously-owned one room business (manufacturing fixed line switches), to one of the fastest growing, innovative multinational technology companies, globally. Today, with integrated solutions across four key domains – telecom networks, information and communications technology (ICT), smart devices, and cloud services, Huawei is committed to bringing digital to every person and organisation for a fully connected, intelligent world.

<https://tmt.knect365.com/techxlr8-asia/sponsors/huawei4>

As Huawei is the world's largest supplier of telecommunications equipment it plans to **'dominate the global market'** for the next generation of wireless communications, **called 5G**. This new technology will shape economic, technological and geopolitical competition between the world's leading technology superpowers-**US and China**. Both countries view control of the next wave of advanced technologies and related applications such as driverless cars, smart cities, and advanced factory automation, as significant for economic development.

[https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public\(1\).pdf](https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public(1).pdf)

Despite Huawei's economic success, the global corporation faces many **challenges**, especially fears that its 5G equipment could enable **unauthorised surveillance** of governments and organisations around the world, by the Chinese government and the People's Liberation Army. The anglophile **"Five Eyes"** (FVEY) Intelligence Agencies of Australia, Canada, New Zealand, United Kingdom and United States, expressed **national cybersecurity concerns**, and are working to exclude Chinese equipment vendors Huawei and ZTE from their commercial and government 5G networks.

What is behind the recent drive against Huawei, the global tech giant? Does it involve the 5G technology race between the world's leading superpowers-US and China-as this technology is a threat to US's dominant position globally? It is about cybersecurity, China-US

Technology/Trade war and/or geopolitics?



# HUAWEI: PROFITABLE GLOBAL COMPANY

- Huawei was established in 1987 in **Shenzhen (Special Economic Zone), China**. Today this global company operates in **180 countries**, has over **100 subsidiaries**, and **22 regional offices**.
- Huawei is a **private employee-owned company**. Not owned by shareholders or Chinese government.
- Employs about **180,000 people**.
- The company serves more than **30% of the world's population**.
- In **2018** Huawei sold **200 million smartphones**, overtaking Apple as the second largest manufacturer of smartphones in the world. Number one was Samsung.
- This profitable company ranks **72nd on the Fortune Global 500 list**, just behind Microsoft.
- Huawei is the only Chinese company to generate higher revenue outside China. Approximately **66% of its revenue is derived from international markets**.
- In **2017**, Huawei's **revenue** was over **US\$92 million** (over CNY603 million), with the growth in its **three business sectors: Carrier, Enterprise and Consumer**. In 2018 revenue is anticipated to hit \$109bn, almost three times higher than in 2013. This growth is partly due to Huawei's high investment in **Research and Development (R&D)**.
- Huawei is an example of **successful capitalism within communist China**.



	2017	
	USD Million*	(CNY Million)
Revenue	92,549	603,621
Operating profit	8,645	56,384
Operating margin	9.3%	9.3%
Net profit	7,276	47,455
Cash flow from operating activities	14,770	96,336
Cash and short-term investments	30,656	199,943
Working capital	21,093	137,576
Total assets	77,462	505,225
Total borrowings	6,121	39,925
Owner's equity	26,926	175,616
Liability ratio	65.2%	65.2%

## Business highlights in 2017

### Carrier business: Moving from the investment-driven to value-driven network construction model

- We deployed over 500,000 base stations around the world, with more than 10 million commercial connections, and worked with over 1,000 ecosystem partners to build the ecosystem.
- We have signed over 350 NFV and 380 SDN commercial contracts around the world and deployed more than 30 CloudAIR commercial networks with wireless air interfaces.
- We conducted 5G pre-commercial tests with over 30 leading carriers in more than 10 cities around the world.

### Enterprise business: Enabling digital transformation across all industries

- We continued to enhance product and solution innovations in cloud, big data, campus networks, data centers, IoT, and other domains. We also worked to promote the extensive application of our innovative products and solutions in smart city and safe city projects, as well as in the finance, energy, transportation, manufacturing, and other sectors.
- We worked to build platforms for customer and partner platforms, cultivate a fertile environment in which a robust ecosystem will grow, and build symbiotic relationships founded on shared success.
- 197 Fortune Global 500 companies – 45 of which are Fortune 100 companies – have chosen Huawei as their partner for digital transformation.

### Consumer business: Building a world-class smart device brand

- A synergy was created between our Huawei and Honor brands. In 2017, Huawei shipped a total of 153 million smartphones (including Honor phones). We are firmly positioned among the top three phone makers in the world.
- We released the HUAWEI Mate 10 – the first smartphone with an embedded AI chipset.
- Our global brand awareness increased to 86%. The number of consumers considering a Huawei device in non-Chinese markets saw a year-on-year increase of 100%, which put Huawei among the top three global vendors in this category for the first time.

### Huawei Cloud: Building open, trustworthy cloud platforms

- Huawei set up a Cloud BU. Our cloud service portfolio consisted of 99 services across 14 major categories, including over 50 solutions.
- We launched the Enterprise Intelligence (EI) platform to deliver a one-stop AI platform as services.
- We continued to build an open, collaborative cloud ecosystem that will thrive on shared success. The total number of our cloud service partners has exceeded 2,000.

<https://www.huawei.com/en/about-huawei/corporate-information/financial-highlights>  
<https://www.huawei.com/au/press-events/annual-report/2017>



# OVERVIEW OF HUAWEI CO., LTD., BUSINESS MODEL

## VISION

Enrich life through communication  
Support customers in their digital transformation (customer centricity)  
Lay the cornerstone of an **intelligent world** by bringing digital to every person, home and organisation for a fully connected intelligent world  
Develop a distinctive high quality brand

## STRATEGIES

**Enable digital transformation with ICT infrastructure and intelligent devices via:**  
Fully connected networks  
Coordinated development of 'cloud-pipe device'  
Large capacity and intelligent information networks  
Variety of smart devices  
New generation business platforms and applications  
Research and Development-constant innovation for 21st century  
Global advertisement campaigns via TV, print, online/digital and outdoor, and sponsorships

## BUSINESS DIVISIONS

### CARRIER NETWORK BUSINESS

Large traffic capacity  
Intelligent networks  
Cloud computing  
Personalised services

### ENTERPRISE BUSINESS

Cloud platforms  
ICT convergence  
Industry information  
partnerships

### CONSUMER BUSINESS

Smart devices  
Cloud applications

## MAIN PRODUCTS AND SERVICES

Mobile and fixed broadband networks, home devices, consultancy and management services, multimedia technology, smartphones, tablets, computers and dongles-and applications for devices

## GOAL

To become the top ICT vendor for telecommunications overseas

## FUTURE TRENDS

All Things Sensing, All Things Connected, All Things Intelligent

# INTERESTING FACTS AND FIGURES

Sued by T-Mobile USA for stealing their robotics technology

Employee owned company. The company highlights this point to distance itself from claims that it is under Chinese government control. 64% of employees participate in the employees ownership scheme.

Most successful brand in China

Company promotes and invests in R&D. At least 10% of income is invested in R&D-creativity and proactivity

Aims to develop the 1<sup>st</sup> digital assistant with emotions. Assistant powered by AI.

Founder of Huawei Ren Zhengfel, is worth \$1.93 billion

Plans to develop an android alternative

Largest telecommunications equipment company in the world

Huawei's facial recognition technology is part of China's Smart City Initiative

Approved as a supplier by Vodafone

Released 1<sup>st</sup> smartphone with 4 cameras

# GLOBAL EXPANSION

*It makes sense, that once a company has been successful in its own backyard, it would expand its products and services to a new geographic location or market. That's exactly what happened with Chinese telecommunications powerhouse, Huawei Technologies.'*  
<https://study.com/academy/lesson/marketing-case-study-entry-of-chinese-telecom-into-india.html>

<b>1997</b>	Won first overseas contract-fixed line network to Hong Kong. Launched wireless products
<b>1999</b>	Opened R&D centre in Bangalore, India
<b>1998-2003</b>	Contract with IBM
<b>2000+</b>	Increased its speed of expansion into overseas markets. Firstly, to developing countries.
<b>2001</b>	Joined International Telecommunications Union (ITU)
<b>2004</b>	Built third generation network for Telfort, a Dutch mobile operator
<b>2005</b>	International contract orders exceeded domestic sales Signed an agreement with Vodafone-UK (telecommunications equipment) and British Telecom (BT)
<b>2008</b>	Provided TELUS next generation wireless network to North America, and Bell Canada with high speed mobile access
<b>2010</b>	80% of world's top 50 telecom companies worked with Huawei e.g. Motorola USA, Orange France
<b>2011</b>	Contract with Everything Everywhere-UK's biggest communication network to enhance its 2G network



Table and diagram: S. Bliss

Adapted: <https://www.slideshare.net/tawhid19831/huawei-success-story>

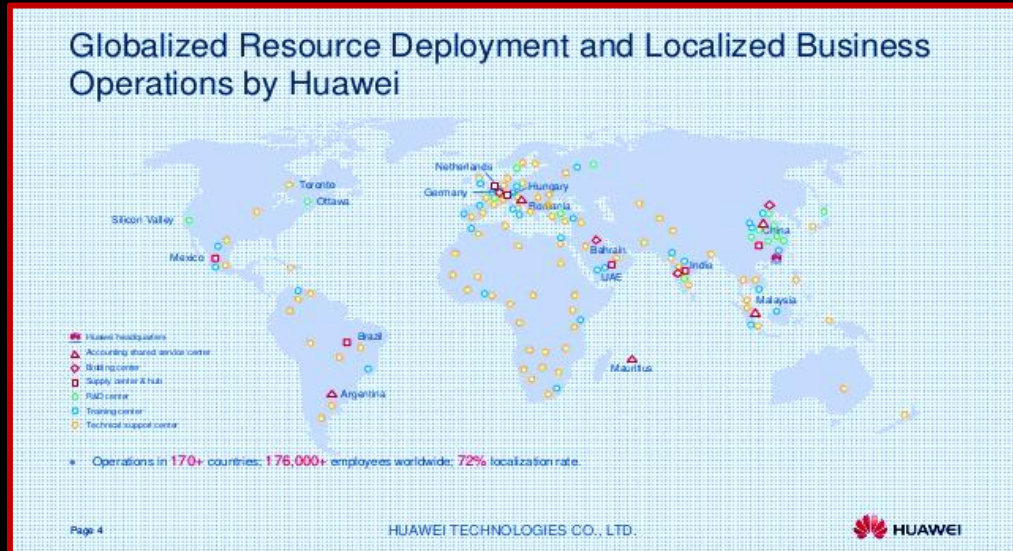
ICT: After overtaking Apple in smartphones, Huawei is aiming for No. 1 by 2020

<https://www.cnbc.com/2018/11/16/huawei-aims-to-overtake-samsung-as-no-1-smartphone-player-by-2020.html>

Huawei logo <https://forum.xda-developers.com/huawei-p8/development/stock-bootanimation-huawei-p8-t3489897>



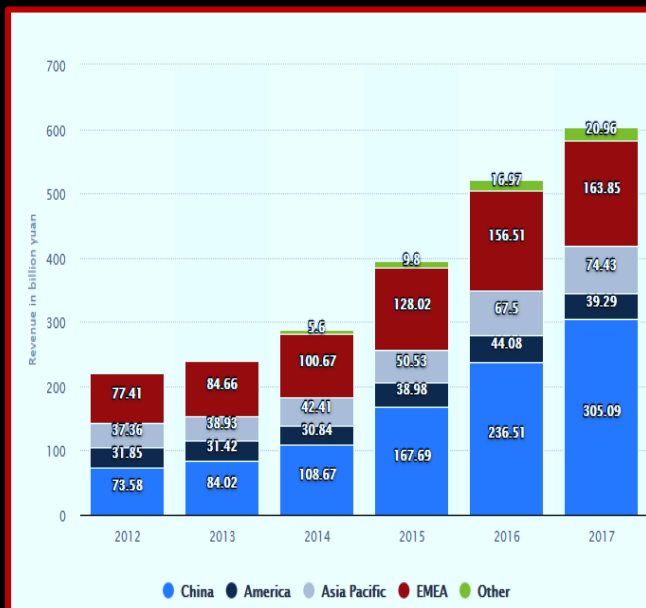
# GLOBAL EXPANSION



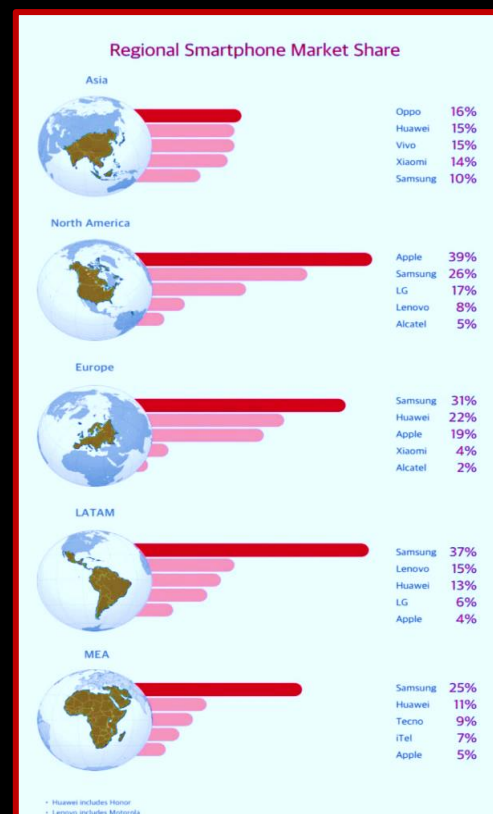
<https://www.slideshare.net/mKrishnaKumar1/kshitij-2017-iit-kharagpur-tech-talk-on-huawei-india>

## SMARTPHONE MARKET SHARE: THIRD QUARTER 2018

Samsung was the only brand to feature in all five regions, with Apple and Huawei following behind. The intensity of competition in Asia is also noteworthy, as the top five are separated by six percent, while the top three brands in the Asia region are only separated by one percent. <https://www.androidauthority.com/top-five-smartphone-brands-region-infographic-933514/>



<https://www.statista.com/statistics/368509/revenue-of-huawei-by-region/>

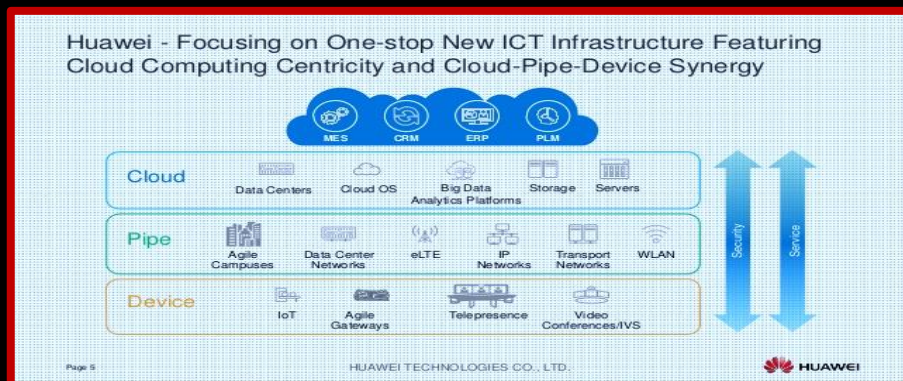


## HUAWEI'S INCREASING REVENUE IN BILLIONS 2012-2017, BY REGION

# STRATEGIES

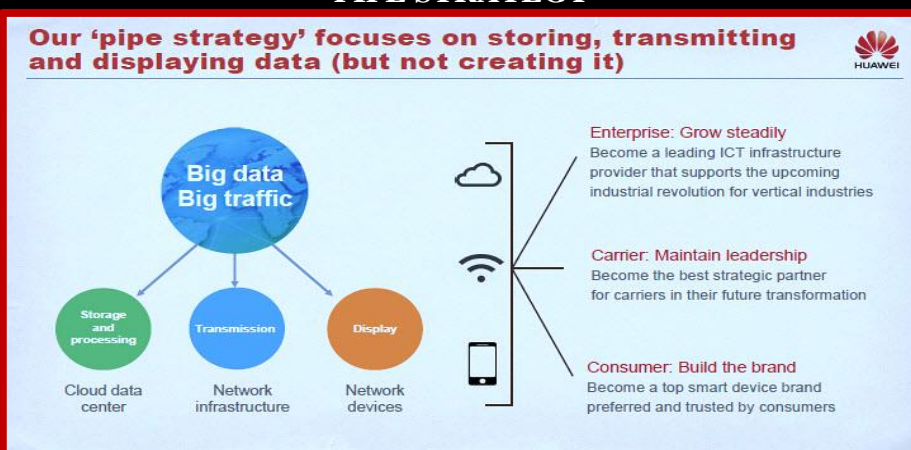
- Firstly Huawei signed contracts with **government entities** to reinforce it was a 'reliable brand'. Then secondly Huawei sold their own brand of handsets directly to customers.
- Huawei operates as a **partner or vendor** for country's telecommunication companies, while studying the market and the culture of the country.
- **Joint venture and investment** with companies such as 3Com USA (2003); Siemens Germany (2005); Motorola USA (2006); and Greater Marine Systems UK (2008).
- Originally marketing was by 'word of mouth'. However, from 2003 advertising was via **global media** as well as providing **sponsorships** (e.g. football and sports organisations-Arsenal Football Club, UK).
- **Consumer-centric brand** strategy dominated – making the connected world a reality for more people.
- Dedicated to bridging the **digital divide**.
- Long term **investment in innovation**. Nearly 15% of revenue in **R&D** in 2017.
- Continuously making **future-oriented investment** to ensure technological advantages: MirrorSys (next generation fully immersive user experience); 5G mobile communications; AI-optical networks (prevent transport bottlenecks); and build a computing platform for big data processing and analyses.
- Changing **image** from low cost brand to a premium brand. e.g. Award winning Ascend series of smartphones.
- Focused on one-stop new ICT infrastructure featuring **cloud, pipe and device**\*.
- Implemented the '**pipe strategy**'\*.

## CLOUD, PIPE AND DEVICE



<https://www.slideshare.net/mKrishnaKumar1/kshitij-2017-iit-kharagpur-tech-talk-on-huawei-india>

## PIPE STRATEGY



<https://www.zdnet.com/article/huawei-talks-innovation-design-customer-success-and-5g-wireless/>



# ACHIEVEMENTS FIRST 30 YEARS



- Huawei is a leading global provider of information and communications technology (ICT) infrastructure and smart devices.
- 2018: Ranked 79 in World's Top **Most Valuable Brands**. Brand value of US\$8.4 billion.
- Received many **awards** such as:
  - 2016-2017: Awarded European Consumer Smartphone for fourth time by European Image and Sound Association (EISA). They won it with the P9 and before that with P8, P7 and P6.
  - 2018: Six awards at International Industrial Design Forum; three awards at Telecom Asia Readers' Choice & Innovation Awards; and 5G Telecom Service Innovation and Internet of Things (IoT) Leadership Awards at TechXLR8 Asia Awards.
- Company achieved **sustainable growth** in the **Carrier, Enterprise** and **Consumer businesses**.
- Huawei is a **household name** in China and becoming increasingly popular in western countries.
- **Explosive rate of growth** since 1987-sales, revenue, innovation, markets.
- In 2018: With 13.3% of **market share**, Huawei beat Apple (11.9%), but lagged behind Samsung (19.3%).
- Largest number of **patents** in China and one of the top 50 patent holders in US.
- Total **R&D** investment US\$24.9 billion in last decade. Over 10% of revenue into R&D which enhances patents and competitiveness.
- Maintained **leadership in core technologies** - mobile broadband, fixed broadband, enterprise business and smartphones via R&D

## Maintain the leadership position in core technologies



### Mobile Broadband

- LTE:
  - Deployed 110 commercial networks in more than 100 capital cities and 9 financial centers
  - 466 key LTE patents
  - No. 1 position globally
- 5G:
  - Set up 5G innovation and research centers in 9 countries
  - Take the lead in researching air interface links for 5G networks in Europe's METIS project
  - Plan to invest US\$600 million over the next 5 years
  - Anticipate commercial deployment of 5G networks in 2020.



### Fixed Broadband

- Launched the 400G core router 1 year ahead of industry peers
  - The only one of its kind deployed on a large scale
  - Deployed by 53 customers as of Dec. 2013
  - World-leading performance and reliability: consumes 1/8 of the power, occupies 1/6 of the area, and weighs 1/12 compared with products with the same capacity in the industry
- The first in the industry to launch the 1T router line card.



### Enterprise business

- Launched the world's first service- and user-experience-centered agile network architecture and the world's first agile switch.



### Smartphones

- Shipped 52 million units in 2013, up 62% YOY
- Ranked No. 3 after Samsung and Apple



# RESEARCH AND DEVELOPMENT FROM IMITATOR TO CREATOR



## IMITATOR

Huawei's technological development has always been controversial. Previously it engaged in 'reverse engineering' by copying Jujitsu and Cisco systems. It then moved to in-house innovation and high investments in R&D. However, they were accused of copying to accelerate product development. Reverse engineering is permitted under Chinese law and not considered intellectual property theft.

\*Reverse engineering is the acquisition of technology by taking apart and studying an existing product.



## CREATOR

Today Huawei is actively showing the world it is not an imitator but a creator of original products, such as: the super thin Ascend smartphones; its crash and waterproof handsets; and seamless mobile broadband connections along super-speed bullet trains and in-flight Wi-Fi service for airline passengers

<http://www.ntc.ntu.edu.sg/ntcc/Documents/Full%20Version/13.%20HUAWEI%20-%20CHINESE%20TELECOMMUNICATIONS%20GIANT%20HUAWEI-%20STRATEGIES%20TO%20SUCCESS.pdf>

Diagram: S. Bliss

## HUAWEI WIRELESS AND 5G TIMELINE

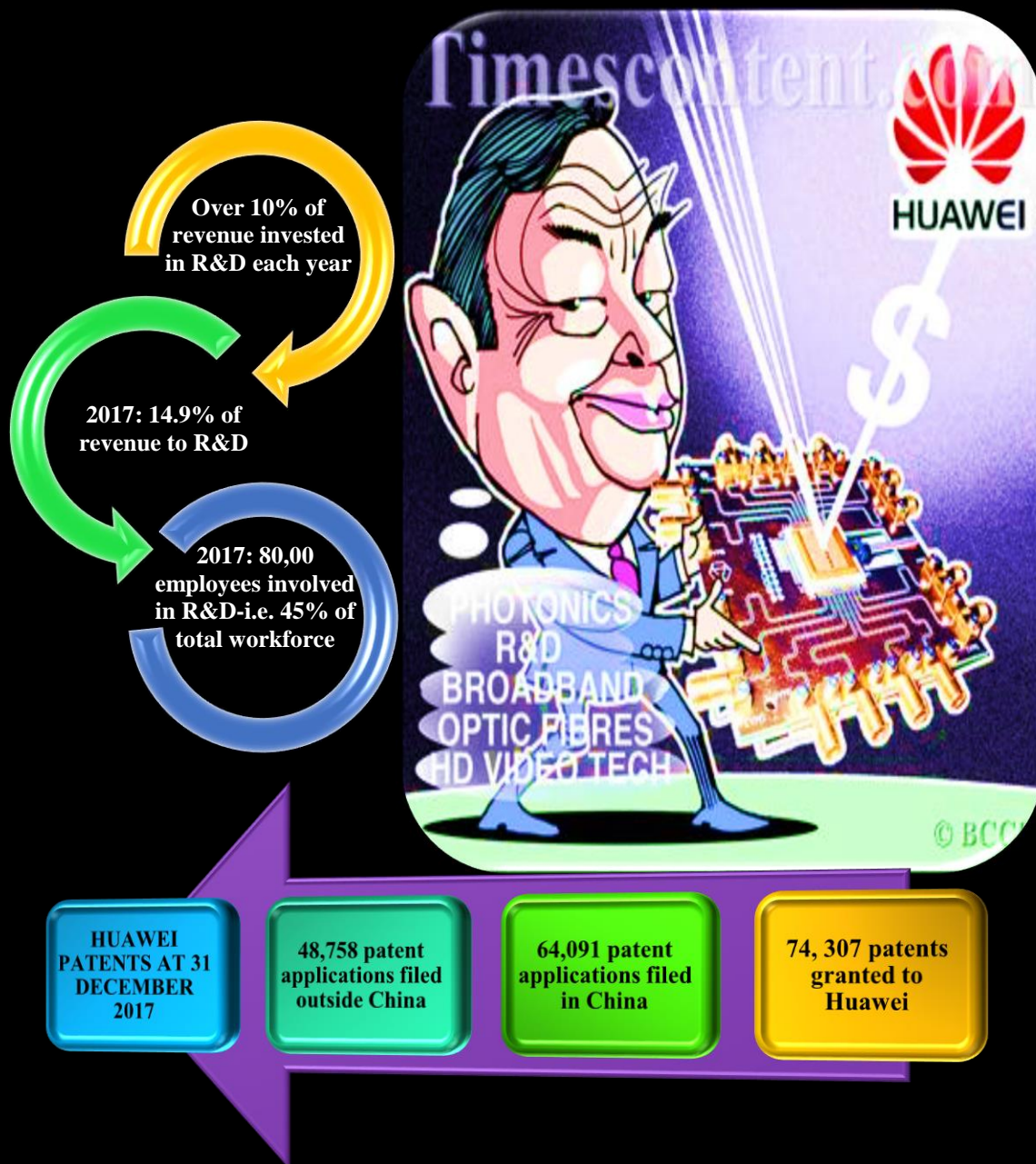
<https://www.zdnet.com/article/huawei-talks-innovation-design-customer-success-and-5g-wireless/>





# RESEARCH AND DEVELOPMENT

Continued investment in R&D innovation, enabled Huawei provide competitive products that dethroned Apple in its smartphone sales in 2018.



Adapted <https://www.huawei.com/en/about-huawei/corporate-information/research-development>

Diagrams: S. Bliss

Cartoon: Huawei invested more than \$4billion in fixed broadband technology R&D 2014-2017

<https://timescontent.com/syndication-photos/reprint/executive-digest/397908/ren-zhengfel-huawei-broadband-inter.html>



# RESEARCH AND DEVELOPMENT 5G

According to estimates, the world will have more than **1.1 billion 5G connections by 2025** (accounting for 15% of total connections).

Together, **4G and 5G wireless standards will make up 67% of all mobile connections worldwide**. <https://teks.co.in/site/blog/5g-is-coming-an-overview-of-the-advantages-challenges/>

## Understanding 5G networks

The design of 5G networks marks a significant departure from 2G, 3G, and 4G networks, which were built primarily around handset-to-handset voice and data communications. As smartphone cameras and screens became better and afforded much higher resolutions, demand for data applications such as video streaming required equipment makers and operators to adjust the performance of 4G networks. However, the underlying network architecture continued to face limitations in terms of density of devices and achieving very high data rates for applications such as streaming high-definition video.

Enter 5G, which is designed from the ground up to handle massive numbers of devices, high-data rates, and applications that require very fast and reliable communications with minimal latency, or lag, such as connected and autonomous vehicles. To deliver these features, 5G networks are divided into three primary network “slices,” each serving a different primary function:

### The 5G innovation stack

#### 5G-enabled applications



5G networks will enable a new breed of digital applications that depend on ultra-fast, low latency, high-throughput communications, including driverless cars, advanced factory automation, and smart cities.

These applications will be the biggest source of long-term economic and political advantage from 5G, and they will be the subject of intense competition between leading US and Chinese companies.

The US has edge in innovative capacity, but China will gain a head start developing new applications and use cases.

#### The 5G network



China's first-mover status in 5G may translate into a geopolitical advantage in countries in Africa, Latin America, and the Middle East, where financing and other incentives available through the Belt and Road Initiative will be difficult for governments to pass up, allowing China to extend its digital influence globally.

A parallel US effort to exclude Chinese networking equipment from Western networks will limit China's 5G footprint in more advanced economies.

#### 5G hardware and software



The US retains significant advantages in semiconductors, enterprise software, and other essential hardware and software components of 5G base stations and other underlying technology.

The US and like-minded allies are pushing back against the use of Chinese hardware in 5G networks over concerns about national security.

## 5G: Foundational technology, political battleground

The rollout of 5G networks will take more than a decade and will be one of the most complex and expensive technology projects ever undertaken. The pace of 5G deployment in a given country will depend on an array of factors. These include carrier preferences, government regulatory policies and strategies, infrastructure and handset equipment maker product timelines, costs and scalability of 5G infrastructure, progress in developing compelling uses and applications of 5G networks, and the ability of various players to capture value in a complex technology ecosystem.

[https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public\(1\).pdf](https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public(1).pdf)

# ADVANTAGES OF 5G TECHNOLOGY

- **Increased responsiveness** (less time lag), **greater reach** (distance) and **improved reliability** (no dropped calls)
- **More bandwidth** means **faster speed**. Almost a thousand times faster than a 4G handset.
- Increased **connectivity** across world. Network connects phones, computers, robots, cars and all sensor equipped consumer products and infrastructure. Connects over 7 trillion devices in the Internet of Things (IoT).
- Offers a boost to **smart cities** in which energy grids, traffic signals, and emergency services are linked to reduce inefficiencies.
- Able to gather all networks on **one platform**.
- **Monitoring will be easier** –governments and organisations can monitor any part of the world. Possible to reduce crime rates and terrorism, and detect natural disasters faster.
- Should resolve the '**last-mile issue**', related to the non-availability of network connectivity in rural/sparsely populated semi-urban areas.
- Improve **quality of government** and **utility services** (water, energy), as well as enhance public safety, health and education.
- **Sustainability**-power consumption anticipated to fall 90% particularly with mobile devices, as well as extend the life of **batteries**.
- **Benefits businesses, education, medicine, information technology, entertainment, automobiles, mining and manufacturing:** increased productivity (work more quickly and efficiently); better connections with rural and remote settlements; smart and automated transport (easier and faster commutes); flexible office spaces (smart buildings); transform the healthcare industry; deliver products faster and more cheaply; processes products more efficiently and thereby reduce costs in smart factories; potential safety benefits in underground mining; as well as revolutionise the retail industry.
- Enables **smart agriculture**, communicating with sensors in the ground, in crops, and on livestock and farm machinery. Along with weather satellites and drones, these technologies will help farmers know when and how much to water, fertilise and apply pesticides in more effective and environmentally friendly ways. <https://www.washingtonpost.com/news/innovations/wp/2018/.../5g-what-is-it-good-for/>



A surgeon could use 5G with a 'VR headset and special glove' to control a robot arm that would perform an operation in another location. The "**internet of skills**" would enable people to transfer their expertise over a long distance in real time.

<https://www.cnet.com/news/5g-not-just-speed-fifth-generation-wireless-tech-lets-you-do-vr-self-driving-cars-drones-remote/>

Background image: <https://indianexpress.com/article/technology/new-hardware-can-help-deliver-internet-speeds-of-10-gbps-for-home-networks-4902433/>



# 5G TECHNOLOGY: SPECIFICATIONS

*Some of the specifications for 5G technology can be defined as follows:*

- *Data Rates: 1 to 10 Giga bits per second (Gbps) to the end mobile users.*
- *Latency: Less than 1 millisecond (< 1ms).*
- *Bandwidth: 1000 times the present bandwidth per unit area.*
- *No. of devices: 10 to 100 times the current number of devices.*
- *Network Coverage: 100%*
- *Signal Availability: 99.999%*
- *Power Consumption: 90% reduction in energy usage.*

<https://www.electronicshub.org/5g-technology/>

## 5G TECHNOLOGY: CHALLENGES

5G networks will support a massive number of connected devices, enable a huge increase of bandwidth, and create a next-generation threat landscape that will inevitably introduce 5G security challenges. <https://www.sdxcentral.com/5g/definitions/top-5g-security-challenges/>

- **Technology is still embryonic in development.**
- Initial subscription plans are likely to be **more expensive**.
- Making 5G operational on a worldwide basis will require a **large number of highly-trained software and data network engineers**.
- Many of the **old IT devices will not be compatible to 5G**. This will be exceptionally expensive.
- Requires developing **new expensive infrastructure**. In UK, over £1 billion is to be allocated for new digital infrastructure by 2020.
- **Annual investments** required for upgrading to 5G is estimated to push towards the \$200 billion mark. A 2016 report suggested that nationwide 5G coverage for US would probably cost more than \$300 billion.
- 5G network cells will offer **lower coverage** than those of 4G (despite the higher bandwidth). This would mean that **more cell towers will be required**.
- **Frequency range is already overcrowded** e.g. used by satellite and many other different signal types.
- **Security and privacy** issues are yet to be solved.
- **Cybercrime and other fraud** may increase with high speed 5G technology. Therefore, **legislation of Cyber law** is imperative.

**However, is 5G the super highway for cybercrime?** Europol said 5G posed challenges for police as crime will be harder to investigate because of the ability of devices to download data simultaneously from multiple sources, such as wifi, network towers and satellites.

<https://www.thetimes.co.uk/article/5g-will-make-crime-harder-to-investigate-35fcs5f5>

<https://teks.co.in/site/blog/5g-is-coming-an-overview-of-the-advantages-challenges/>

Image: <https://www.thetimes.co.uk/article/5g-will-make-crime-harder-to-investigate-35fcs5f5>



# 5G SUPERPOWERS US-CHINA RACE

## BIFURCATED WORLD

*Two separate, politically divided technology spheres of influence will evolve—one led by the **US** and another led by **China**.*

*In a **bifurcated world**, **third countries** wishing to gain access will face difficult choices about whose 5G network technologies and related application systems to adopt. Governments are likely to come under pressure from the US and its allies, to avoid dependence on China for 5G. However, **developing countries** that are more sensitive to cost will find Chinese technology and related enticements (e.g. infrastructure and project financing available through the Belt and Road Initiative), hard to pass up, particularly if China gains an edge in technology.*

[https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public\(1\).pdf](https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public(1).pdf)

*“**China** was far ahead of US in preparing for 5G, which requires more base stations than existing networks. In early 2018, China had almost 2 million cell sites, ten times the number in the US”. “There are 5.3 sites for every 10 square miles in China compared to 0.4 in the US”.*

*“By **2030** 5G in China is on course to generate \$947 billion worth of economic output and 8 million jobs for China.”*

<https://techcrunch.com/2019/01/30/china-continues-5g-push/>

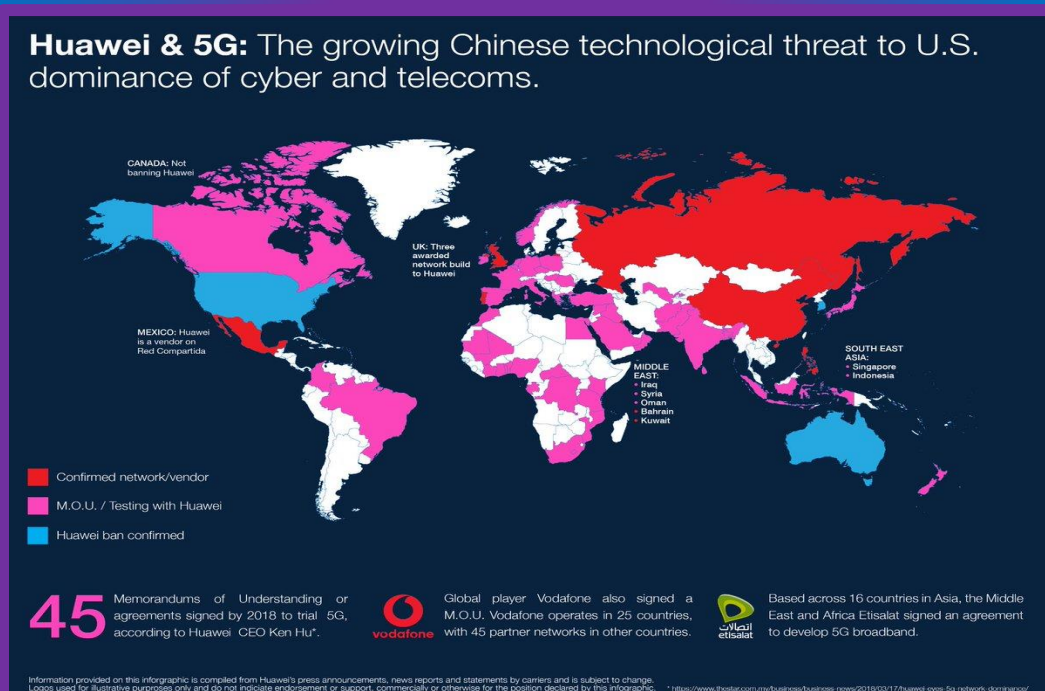
<https://www.webscalenetworking.com/topics/webscalenetworking/articles/440712-as-huawei-faces-western-challenges-china-continues-5g.htm>; <https://www.globalresearch.ca/five-eyes-intelligence-agencies-behind-drive-against-chinese-telecom-giant-huawei/5662933>

## CHINA'S 5G INFRASTRUCTURE ACROSS WORLD

(September 25<sup>th</sup> 2018).

INCUMBENT RETAIL WIRELESS CARRIERS ARE THEIR PRIMARY MEANS OF ENTRY

<https://twitter.com/declanganley/status/1044532260773474304>



### ICT

- China continues 5G push despite economic slowdown and Huawei setbacks <https://techcrunch.com/2019/01/30/china-continues-5g-push/>
- 5G is the real reason the US is afraid of Huawei <https://bgr.com/2018/03/07/5g-release-date-vs-huawei/>

## Yangtze River Delta Initiative highlights Beijing's focus on 5G deployment at scale

China's Yangtze River Delta Initiative (YRDI) is an effort to target 5G development within a critical economic region. China Mobile, China Unicom, and China Telecom, as well as infrastructure firm China Tower Corporation, plan to invest \$30 billion over the next four years to launch a 5G application network across the region by 2021.

The Yangtze River Delta region includes key tech hub cities within the triangle-shaped region spanning Nanjing, Suzhou, and Hangzhou. It is home to large pools of high-skilled labor, high technology, and innovation, as well as the R&D centers of numerous international firms. The YRDI will also support the national ambitions of a fourth city, Shanghai, which is increasingly eager to become a technology player, with a growing focus and investment in AI, autonomous vehicles, and the IoT.

The Yangtze River Delta is central to President Xi Jinping's Belt and Road Initiative as well. Over the past ten years, the transportation network has expanded as rapidly as the high-speed trains it supports. Its railways, highways, and the Yangtze River waterway are considered essential to linking urban areas surrounding it with Shanghai at the nexus. By 2020, China aims to nearly double the region's contribution to national GDP from 12% to 21%.

However, the YRDI has not been left unscathed by the ongoing US-China trade war. The state-owned telecom companies spearheading the country's 5G efforts rely on critical components, such as semiconductors, from US exporters. The US's recent ban on ZTE nearly drove the firm to the brink of bankruptcy and hindered its ability to supply core technology underpinning information infrastructure. Moreover, a growing number of countries, including the US and Australia, have implemented bans on Huawei and ZTE equipment. This and concerns about the proposed merger of China Telecom and China Unicom have affected the share price and future fundraising ability of state-owned telecom infrastructure provider China Tower. Some of the nearly \$7 billion raised during a summer IPO would likely cover part of the budget for the YRDI.



**The Yangtze River Delta, a major economic region centred around Shanghai, is accelerating the pace to embrace ultra-fast 5th generation (5G) mobile networks with an investment of 200 billion yuan (\$30 billion) over four years**

<http://www.ecns.cn/news/cns-wire/2018-07-18/detail-ifywhfmh2712557.shtml>

[https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public\(1\).pdf](https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public(1).pdf)

# 5G GLOBAL TIMELINES AND VENDORS

[https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public\(1\).pdf](https://www.eurasiagroup.net/siteFiles/Media/files/1811-14%205G%20special%20report%20public(1).pdf)

## Current planned deployment timelines by country

Country/ region	Trials	Commercial NSA 5G	Commercial SA 5G	Notes
US	2018	2020	2025	AT&T trialling NSA 5G for end 2018, T-Mobile to launch NSA 5G commercially in limited areas probably late 2019; T-Mobile shooting for nationwide by 2020
EU	2019	2020	2025	EC shooting for large-scale commercial use by 2020 for NSA 5G, SA 5G coverage of main urban areas and transportation routes by 2025
China	2018	2019	2020	China Mobile focused on initial rollout of SA 5G, other carriers will gradually introduce SA 5G
Japan	2018	2020	2025	KDDI, Softbank, NTT Docomo all seeking commercial launch of NSA 5G by 2020
South Korea	2018	2019	2025	KT targeting commercial launch of NSA 5G some time in 2019, SK Telecom planning for second half 2019
Canada	2019	2020	2025	Canada will not be auctioning 5G spectrum until 2020, industry pushing for 2019
Australia	2018	2019	2025	Telstra and Optus have committed to roll out NSA 5G in 2019, with Vodafone to follow in 2020

Note: elements of 5G are likely to be rolled out in stages and markets during the period 2020-2025 in markets other than China.  
Sources: Eurasia Group, media

## 5G Key Global Vendors

Vendor	Country	Technology sectors primary	Technology sectors secondary	Notes
Ericsson	Sweden	Network equipment, integration	Fiber backhaul	Joint work on end-to-end services with Fujitsu
Nokia	Finland	Network equipment, integration	Fiber backhaul, edge devices	
Huawei	China	Network equipment, integration	Fiber backhaul, edge devices	
ZTE	China	Network equipment, integration	Fiber backhaul, edge devices	
Samsung	South Korea	Network equipment, integration	Edge devices	Joint development of base stations with NEC
LG	South Korea	Edge devices		
Qualcomm	US	Mobile chipsets, modems	Infrastructure semiconductors	
Intel	US	Mobile chipsets, modems		
Broadcom	US	Mobile chipsets, other ICs		
Cisco	US	Data center equipment, routers		
InterDigital	US	IoT devices		
NXP	Netherlands	IoT devices		
Alcatel Lucent	France	Fiber connectivity	Fiber backhaul	
Fujitsu	Japan	Edge devices, systems integration		
NEC	Japan	Network equipment		
NTT	Japan	Edge devices		
Panasonic	Japan	Edge devices		

Source: Eurasia Group



## How 5G Can Contribute to Sustainable Development



According to GSMA, 5G could account for as many as 1.4 billion connections by 2025. By that time, 5G networks are likely to cover one-third of the world's population. The impact will be profound. 5G is more than a new generation of technology: It marks a new era in which connectivity will become key to connecting everything.

Huawei X Labs aims to explore opportunities for 5G applications and how technologies like IoT, cloud computing, AI, and big data can provide a platform for connected machines, robots, 3D-printing, virtual reality (VR), augmented reality (AR), automated processes, blockchain technology, guided vehicles, goods, and remote work. We believe these innovations will not only expand our business, but also **vastly improve resource efficiency and environmental protection, making for a more sustainable global economy.** We have selected a few use cases to help illustrate the opportunities that can be introduced by these new digital capabilities. We hope that this can showcase the wide range of exciting possibilities and encourage more people to embrace digital transformation.

- **Connected cars:** Connectivity is developing into an important enabler of safer, more sustainable mobility. Key technology trends include autonomous driving, cooperative mobility, and sensor data crowdsourcing, which will deliver improved environmental and safety performance both at highway speeds and in dense urban environments.
- **Closed-loop manufacturing:** Advanced sorting, robotic disassembly, and digital tracing will allow for much better material recovery and re-use. This will be particularly important for industries that move to "sharing" business models as manufacturers retain ownership of their products (for example cars), thus incentivizing higher levels of circular recycling.
- **3D-printing:** The fabrication of components allows for the production of hardware without large manufacturing operations. This helps to reduce waste while also making it possible to quickly produce replacement parts on an oil rig, for instance, which could improve safety and reduce the chance of contamination incidents.
- **Connected drones:** 5G networks will allow new levels of drone automation that will have a transformative impact on multiple industries. Rather than having a live inspection of potential rotor blade damage on a wind turbine done by a human operator, an autonomous drone fleet will be able to capture and analyze the equipment using video. Similar solutions may help protect high-risk energy infrastructure, or increase productivity in agriculture, for example.
- **Advanced modeling and virtual reality:** Digital replicas of physical assets can be used not only for research and design, but also remote and real-time performance monitoring, making preventive maintenance more effective and helping to keep products in use for much longer.
- **Digital traceability:** Blockchain solutions for traceability and transparency could help prevent illegal or contaminated materials from entering supply chains. For example, improving traceability in the food industry would be an important breakthrough for retailers.
- **Dark factories:** Automated and robotic manufacturing with limited or no human intervention would mean that factories could be operated continuously and without lighting and air-conditioning.

# ISSUES AND CHALLENGES

**With more countries scrutinising the company's activities and rejecting doing business with it, Huawei must fix their problems, and halt the flow of negative headlines, if it is to continue as a wealthy global ICT company.**

## AGGRESSIVE PRICING POLICY ( LOW PRICE APPROACH)

In 1997 Huawei entered the Russian market by undercutting international prices by **12%**. This market success, led to Huawei entering Thailand, Brazil and South African markets, with more aggressive, undercutting of competitors by **30%**. Price cutting caused many ICT companies loss of sales, reduced profits and finally out of business.

## "FIFTH-GENERATION" (5G)

One particular bone of contention has been over super-speedy "**fifth-generation**" (5G) mobile-phone networks. Upgrading to 5G will require telecom firms around the world to **spend billions**, forcing many smaller technology firms out of business.

Huawei, along with rivals such as **Ericsson (Swedish)** and **Nokia (Finnish)**, aim to be one of the principal suppliers.

Many engineers working for telecom firms stated that Huawei's back-end technology used to run computer and mobile-phone networks, is as good or better than Ericsson and Nokia-from which Huawei has gobbled their market share.

<https://www.economist.com/business/2019/01/26/huawei-looks-increasingly-beleaguered-in-the-west>

## GEOPOLITICAL ISSUE

Huawei accused of **violating US sanctions on Iran**.

Is the US administration of President Donald Trump **stifling China's technological rise**, as **trade relations** between the world's two largest economies deteriorate?

Huawei has denied breaking US law.

## INTELLECTUAL PROPERTY THEFT

Huawei accused of **intellectual property theft**.

In 2003 Huawei admitted copying router software code from **Cisco (US)**. They were sued and forced to remove the pilfering property.

In 2010, **Motorola** sued Huawei for stealing its trade secrets. Case was later settled.

## RISK OF ESPIONAGE

Huawei sells mobile devices in US.

However, US has **blocked the company from supplying network infrastructure** due to the **risk of espionage**. Additionally the company has been blocked from **supplying telecommunication products** in Australia.

## FIVE EYES

Huawei has unsuccessfully convinced western countries, especially the **Five Eyes**, that it is a trustworthy ICT firm and solely interested in advancing business growth and gaining a larger market share.

## 'MADE IN CHINA' STIGMA

Originally, Huawei's products were perceived as **low quality** due to their country of origin - '**Made in China**'.

Today, their image has improved. R&D now ensures China produces high quality products and services.

However, negative attitudes to Chinese goods and services still prevails in many minds.

## BRAND NAME

The **brand name-Huawei**, eludes most international consumers, but brand recognition is expanding, especially with global advertising and sponsorships.

Huawei needs to develop greater 'positive' market wareness-globally.

## PLA AND CHINESE GOVERNMENT

Huawei's suspected links to the **People's Liberation Army (PLA)** and **Chinese government**, reinforced the fear of future espionage.

How difficult would it be for a Chinese company to say 'no' to the communist party?

<https://www.economist.com/business/2018/12/07/why-does-5g-have-everyone-worried-about-huawei>

Diagram S. Bliss. Photo image: <https://www.eweek.com/mobile/at-t-to-implement-first-5g-service-in-12-u.s.-cities-by-end-of-2018>

ICT: 5G is the real reason the US is so afraid of Huawei <https://bgr.com/2018/03/07/5g-release-date-vs-huawei/>

# IS IT A CHINESE ISSUE RATHER THAN A HUAWEI ISSUE?

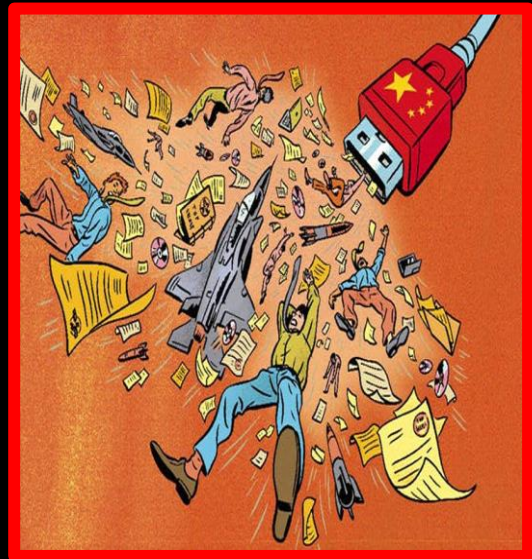
**Telecommunications are vulnerable to espionage.** This problem has accelerated as technological advances, are becoming harder to detect. For too long, governments and many other institutions have been complacent about these risks.  
<https://www.spectator.co.uk/2019/02/after-huawei-can-we-trust-chinese-tech/>

**Huawei is under scrutiny around the globe** over its close ties with the **Chinese government** that could present **national security** threats to US, Europe and allied countries.

- **No Chinese company is fully independent of its government**, which reserves the right to require companies to assist with intelligence gathering. Under **Article 7 of China's 2017 National Intelligence law**, companies like Huawei are legally obliged to help the Chinese intelligence agencies upon request.
- **Huawei is even more closely tied to the government** than many Chinese firms. Its founder, Ren Zhengfei, is a former technologist in the **People's Liberation Army**. As his company grew, so did international concerns about whether Huawei's equipment could be used to spy on companies and governments around the world.

<http://theconversation.com/whats-wrong-with-huawei-and-why-are-countries-banning-the-chinese-telecommunications-firm-109036>

<https://www.theguardian.com/technology/2019/feb/03/huawei-friend-or-foe-global-5g-dominance>



## HUAWEI RISKY BUSINESS

Nigel Inkster, advisor at The International Institute for Strategic Studies and 30 year veteran with British intelligence service MI6, said that "there clearly are risks with using Huawei equipment", even if those risks are hard to define. "There is always a risk that Huawei will in certain circumstances be co-opted by the Chinese state to do things that it does not want to."

<https://www.abc.net.au/news/2018-12-07/why-is-chinese-tech-company-huawei-being-targeted/10593156>

## HUAWEI WOULD NEVER BETRAY CUSTOMERS

Ren Zhengfei, a former officer in the People's Liberation Army, insists **Huawei would never betray its customers**. "When it comes to cybersecurity and privacy protection, we are committed to siding with our customers. We will never harm any nation or any individual."

<https://www.theguardian.com/technology/2019/feb/03/huawei-friend-or-foe-global-5g-dominance>

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Diagram: S. Bliss

**ICT: Huawei's problem of being too 'Chinese'** <https://supchina.com/2019/01/24/huaweis-problem-of-being-too-chinese/>



# HUAWEI FUELS US-CHINA TECHNOLOGY/TRADE WAR

Huawei's Vice-chairperson and CFO **Meng Wanzhou**, daughter of its founder, **Ren Zhengfei** was arrested in Canada on December 1, 2018, at the request of the US government. She was accused of violating US sanctions against Iran. Meng supposedly used a Huawei subsidiary to dodge US sanctions on Iran.

**28 January 2019:** Meng was charged with misleading US banks about Iran dealings.

The **US government** has long discouraged their network operators from using Huawei gear to power their services. **President Trump** turned up the heat on the Chinese tech giant, Huawei, when he took office.

In **2018** heads of major **intelligence bodies**, including the FBI, CIA and NSA, warned that Americans should not purchase Huawei products, citing concerns about their use as **spying devices**. **On 24 January 2019**, Huawei says it will not use US-made components for its next generation of smartphones.

The **US including its allies** such as the UK, New Zealand, Australia and Japan, appear to be shutting out Huawei's networks due to national security concerns. Also, based upon security issues, Japan is considering banning **ZTE** network equipment from government offices and military forces.

<https://www.reuters.com/article/us-usa-china-huawei-tech-eu/u-s-wants-western-tech-to-be-used-instead-of-huawei-kit-idUSKCN1PP24C>

Two major **European** telecom companies — France's Orange (ORAN) and UK's BT recently ruled out using Huawei products in their domestic 5G networks. Germany's Deutsche Telekom (DTG) and Japan's SoftBank (SFTBF) are reviewing their use of Huawei equipment.

<https://edition.cnn.com/2018/12/18/tech/huawei-india-security-concerns/index.html>

**Some believe the US administration's ultimate goal is to push Huawei out of Europe and the US, leaving America to frame the global standards for 5G.**

<https://www.theguardian.com/technology/2019/feb/03/huawei-friend-or-foe-global-5g-dominance>

Cartoon: <https://www.cartoonmovement.com/cartoon/54591>

## Arrest of China exec fuels trade war

12/10/2018  
Graphic News

December 10, 2018 -- The arrest of Huawei's Meng Wanzhou has plunged the world's biggest supplier of telecom equipment and second biggest smartphone seller into the trade war between Washington and Beijing.

Huawei's rise to global dominance has presented the Chinese company with many challenges -- including persuading consumers to pronounce its name "wah-way", not "who-are-we." Now the arrest in Canada of Meng Wanzhou, the company's chief financial officer, is seen by many in China as a personal attack on Ren Zhengfei, the company's founder and Ms Meng's father.

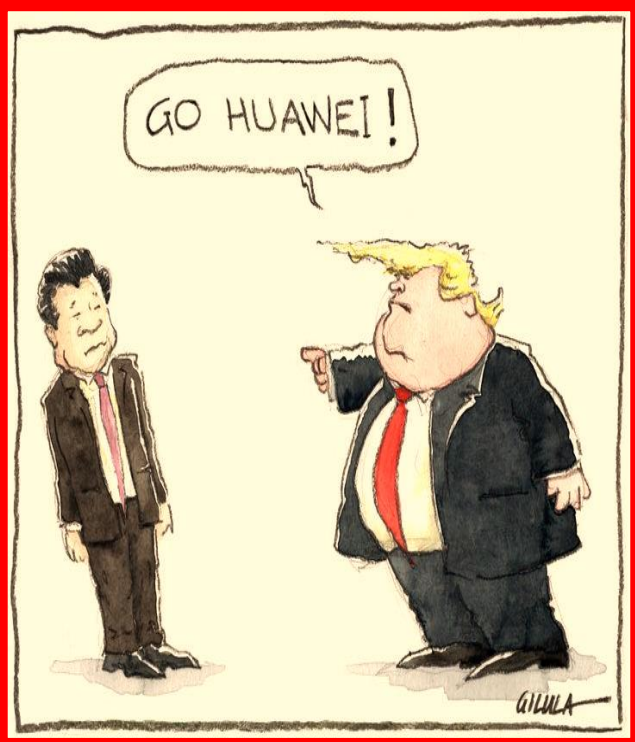
If she is extradited to the United States, the charges Meng faces includes allegations that Huawei used the Tehran office of Skycom Tech Co. Ltd. to provide embargoed mobile network equipment to Iranian telecommunications companies.

U.S. officials allege that Meng misled multinational banks about Huawei's control of Skycom, clearing more than \$100 million worth of transactions through the U.S. between 2010 and 2014.

While the basis for the arrest is national security, it could give the Trump administration an upper hand in trade talks with China. A U.S. ban on Huawei would cut off access to hardware and critical software -- Android from Google and Qualcomm's patents in radio access technology -- needed for next year's rollout of revolutionary 5G.

President Trump could use the threat of a ban to force China to make significant trade concessions.

<https://www.graphicnews.com/en/pages/38605/BUSINESS-Huawei-factbox>



# AUSTRALIA'S RESPONSE

**ABC: Andrew Probyn unpicks the anxiety within the Australian intelligence community.**

<https://www.abc.net.au/news/2018-12-07/why-is-chinese-tech-company-huawei-being-targeted/10593156>



**In 2018, the Australian Government banned Huawei from taking part in the rollout of 5G mobile infrastructure over security concerns.**

<https://en.wikipedia.org/wiki/Huawei>.

[https://news.cgtn.com/news/3d3d514e7859444f79457a6333566d54/share\\_p.html](https://news.cgtn.com/news/3d3d514e7859444f79457a6333566d54/share_p.html)

Huawei was banned in Australia because the company was "fully subject to extrajudicial directions from the Chinese government in contravention of Australian law".

*This decision highlights the increasing tension in balancing Australia's economic, diplomatic, and national security interests against the backdrop of rapid technological and geopolitical shifts. The banning of Huawei will have major ramifications for Australia's technological future* <http://www.anu.edu.au/events/death-of-huaweis-5g-bid-technological-entanglement-and-information-security>

## Rollout of 5G in Australia:

- **Optus** had to 'adjust' 5G service due to Huawei ban. It is to begin 5G rollout in 2019.
- **Telstra** plans to roll out smartphones with 5G capability by the middle of 2019. **Vodafone** is expected in 2020.
- **TPG**, which had planned to build the country's fourth mobile network, scrapped its plans, blaming the Huawei ban.

<https://www.canberratimes.com.au/business/companies/optus-had-to-adjust-nation-first-5g-service-due-to-huawei-ban-20190131-p50us4.html>

<https://www.facebook.com/InsidersABC/posts/to-understand-the-australian-anxiety-about-huawei-you-should-look-at-the-british/1616981768413325/>



# AUSTRALIAN GOVERNMENT WORKS WITH HUAWEI- DESPITE 5G BAN

Australian Strategic Policy Institute and Chinese Communist Party influence researcher

**Alex Joske** said Canberra's stance on Huawei was **contradictory**.

By Nick Bonyhady: February 11, 2019

Adapted: <https://www.smh.com.au/politics/federal/australian-government-works-with-huawei-despite-5g-ban-20190210-p50wt9.htm>

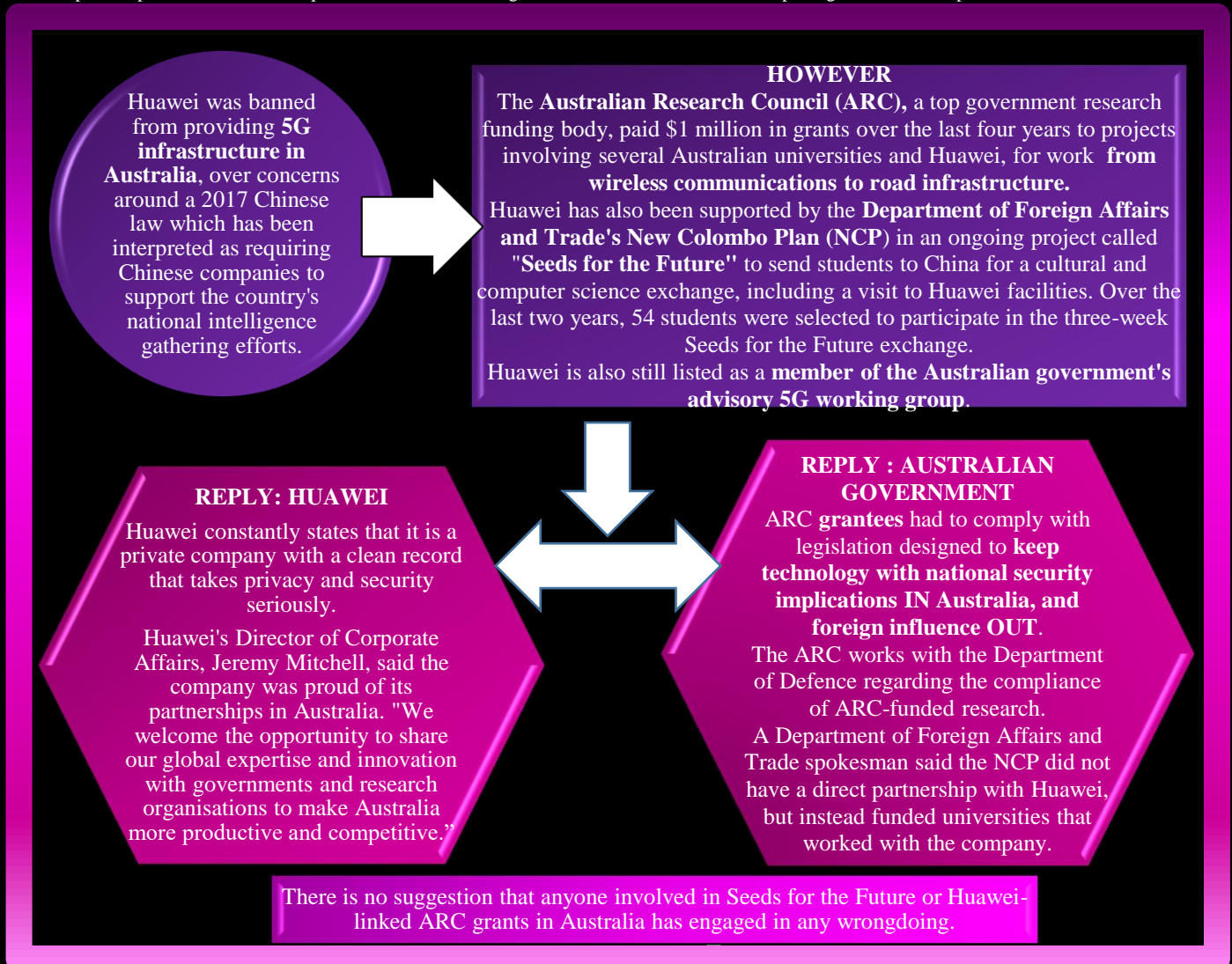


Diagram: S. Bliss

## CONCERNS

- **Meng Wanzhou**, Huawei's Vice-chairperson and daughter of its founder, **Ren Zhengfei**, helped establish Huawei in Australia. She was arrested in Canada in December 2018, after the United States accused her of violating US sanctions against Iran.
- The *Wall Street Journal* reported in late January 2019, that a Huawei official arrested on suspicion of spying had visited the **Polish** military academy through a Polish duplication of **Seeds for the Future**

## WHAT CAN AUSTRALIA DO?

- "There is a lot of room to improve Australia's trade controls legislation," Mr Joske said. A review of the legislation has been completed, but is yet to be made public.
- Tom Uren, who specialises in cyber strategy, said "the changing nature of warfare has made it harder to separate military and civilian technology." "I think government is catching up to the implications."



# UNITED KINGDOM'S RESPONSE

## WHILE UK WOOS CHINA'S TELECOM GIANT FEARS GROW OVER RISKS TO NATIONAL SECURITY

<https://www.theguardian.com/technology/2019/feb/03/huawei-friend-or-foe-global-5g-dominance>  
<https://www.scmp.com/tech/gear/article/2176968/huawei-agrees-uk-security-steps-avoid-5g-ban-report>  
<https://www.theguardian.com/technology/2018/dec/07/huawei-pledges-2bn-in-effort-to-allay-uk-security-concerns>

“The UK, struggles to know whether China is a **threat or opportunity**,” said Robert Hannigan, former director of the British intelligence centre’s GCHQ (Government Communications Headquarters) that works with the Secret Intelligence Service MI6 and MI5. “It’s a difficult balance”. My view is that if we want the benefits of Chinese technology and investment, we should find ways of managing/reducing the risks. He said British intelligence agencies had not “reported back door or malicious intervention” by Huawei, and any official criticism so far were of **“incompetence rather than malice.”**

In the UK, Huawei has gone to great lengths to present itself as **a paragon of corporate accountability**. It **hired notable experts** such as the government’s chief information officer, John Suffolk, as head of cybersecurity and ex-BP boss Lord Browne. In addition it has forged links with **academia**, such as projects with Universities of Cambridge and Oxford.

As the dispute over Huawei’s activities has drawn in the UK’s intelligence-sharing partners (**“Five Eyes”**), Theresa May’s government has been quiet about its position. However, to act against Huawei would risk unravelling years of work that the UK spent assiduously pursuing China. There have been multiple benefits as Huawei employs more than 1,400 people in UK, and is one of Britain’s largest sources of investment from China. Between 2016 and 2017, Chinese investment in the UK doubled to \$20.8bn. Chinese money continues to pour into the UK, with hundreds of Chinese investors receiving golden visas granting them residency. *Nowhere is the burgeoning Anglo-Chinese relationship more tangible than London.*

### ACTIONS: UK

However, growing disquiet about Huawei’s activities resulted in the following actions:

- UK operator **BT** confirmed it was removing Huawei equipment from key areas of its 4G network over concerns about the Chinese firm’s presence in critical telecoms infrastructure.
- **Vodafone** confirmed that it was restricting its involvement with Huawei in the UK.
- **Oxford University** and the **Prince’s Trust**, have broken links with the company

### RESPONSE: HUAWEI

**Between 2018 and 2022, Huawei is to spend \$2bn in an effort to alleviate British security services’ concerns about vulnerabilities in its products.**

Huawei in the UK <https://www.huawei.com/uk/about-huawei/local-states>

Huawei announces £3b UK procurement plan <https://www.zdnet.com/article/huawei-announces-3b-uk-procurement-plan/>. Huawei has committed to £3 billion in procurement over the next five years in the United Kingdom, saying it will assist local companies increase their exports to China.

Huawei agrees to UK security steps to avoid 5G ban: report. Britain’s National Cyber Security Centre says it has ‘concerns around a range of technical issues’ and has set out improvements Huawei must make <https://www.scmp.com/tech/gear/article/2176968/huawei-agrees-uk-security-steps-avoid-5g-ban-report>

# GLOBAL RESPONSES

## What is the current state-of-affairs for Huawei?



### Not looking good:

**USA:** Defense Authorization Act effectively bans Huawei and ZTE from providing any components or services to processes or infrastructure which would be considered 'essential' or 'critical'

**South Korea:** No official ban, but telcos have left Huawei and ZTE off preferred supplier lists in favour of Ericsson, Nokia and Samsung

**Australia:** Government has to approve contracts for communications infrastructure, with any vendor from a country which is suspected of espionage facing a 5G ban. China features on the list

**Taiwan:** Chinese vendors are currently banned from contributing to any government infrastructure. Initial four-year ban about to expire, though expected to be renewed, with the financial industry as an addition

**Japan:** Chinese vendors banned from working with any government or public-sector body, while the telcos have also confirmed they will not be working with Chinese companies for 5G rollout plans

**Finland:** Sensible assumption would be the telcos would work closely with domestic champion, Nokia

**Sweden:** Sensible assumption would be the telcos would work closely with domestic champion, Ericsson

### Nothing official yet:

**Germany:** Politicians are making some dissenting noises though any moves against Chinese firms would certainly dent Deutsche Telekom's 5G ambitions

**New Zealand:** Government recently denied Spark application to include Huawei 5G RAN equipment in its network. No official ban yet, or an explanation as to why the application was denied

**UK:** EE recently announced it was stripping Huawei equipment out of 4G network, while no telcos are working with Chinese vendors for 5G core networks. No official ban from government, while GCHQ continues to monitor all Huawei equipment which is currently in use

**Italy:** TIM recently announced plans to launch SD-WAN product with Huawei, though government has not made any official comments about Chinese China

**European Union:** European Commissioner for Digital Single Market Andrus Ansip publicly said Chinese companies should be feared, though nothing more than off-hand statements

**Canada:** Government has previously suggested it wouldn't ban Chinese vendors though arresting Huawei CFO is complicating matters. Perhaps suggests Canada will be sliding closer to the US

### Looking more positive:

**Portugal:** Recently signed Memorandum of Understanding with Altice Portugal for development and implementation of 5G services. No government intervention suggests China is okay in Portugal

**South Africa:** Huawei Cloud is deeply embedded in government infrastructure and services right now. Public ban would perhaps be too much of a costly U-turn.

**Lebanon:** Working closely with government and local telco, touch, to trial and implement better connectivity infrastructure

**Malta:** Recently signed Memorandum of Understanding with Maltese government for trials of 5G equipment for business and consumer services

**Saudi Arabia:** Domestic telco's STC and Mobily have both signed a Memorandum of Understanding with Huawei focused on the deployment of future 5G networks in the country

<http://telecoms.com/494129/huawei-an-awkward-state-of-affairs-infographic/>

# SWOT ANALYSIS OF HUAWEI

## STRENGTHS

- Low paid labour force
- Low costs (operation and engineering)
- Low cost pricing strategy
- High level of R&D (10% of revenue). R&D led to technical improvements and innovation-new products
- High level of technical automisation
- Stability and support from Chinese government
- Huge Chinese market (1.4 billion people) and emerging middle class
- International expansion- access to many markets
- Leading 5G technology
- Strategic partnerships with global companies (e.g. Google and IBM) and academia (e.g. UK Universities)
- Customer focused with an emphasis on localised service and complete selling networks
- Broad portfolio of products
- Improved financial performance. Revenue and profits high and growing
- Growing faster than other technology companies
- Products are relatively cheaper compared to competitors like Samsung and Apple, and hence, their affordability attracts consumers
- Highly skilled workforce-successful training and learning programs. PhD qualifications.
- Green Action Plan-sustainability e.g. reduce energy consumption and recycling

## WEAKNESSES

- Tarnished reputation from past business practices- intellectual theft
- Adverse media publicity-Trump (US), Five Eyes, and fear lack of cybersecurity.
- Limited presence in many countries
- Competition from other IT companies-Cisco (US); Samsung (S. Korea)
- Products are cheap and are often synonymous with low quality. This image has continued to affect Huawei's penetration in international markets. Huawei, has embarked on developing quality products, which will improve the perception about *Made in China*.
- Low price strategy makes customers suspicious of the reliability of products
- Not good brand recognition in western countries-but improving
- Lack of strong presence in some regions
- Hindered by import regulations in other countries
- Technology/Trade War-US-China
- High employee turnover that puts business continuity at risk
- Banned in some countries (cybersecurity, perceived closeness to Chinese government and People's Liberation Army)
- Rising wages and cost of raw materials-pressure on profitability margin

## OPPORTUNITIES

- Business expansion
- China is relatively labour-intensive. This provides Huawei with an opportunity to cut down on costs, which in turn generates higher profits
- Create high-end devices of superior quality
- Demand is accelerating-new growth in developing countries
- 5G Technology (smart cities, AI)
- Positive outlook for cloud computing
- Increased patents-intellectual property rights mounting
- Make strategic partnerships with skilled experts-companies and people across the globe
- Improve company's image and develop consumer trust in the company
- Provide better localisation of products and services for overseas customers (specialist/tailor made)
- Develop into a sustainable business
- Opportunity to benefit from Chinese government incentives to produce goods for export.
- Expanding global economy, an opportunity to develop new markets
- New customers from online channel

## THREATS

- Global economic scenario e.g. world economic crises
- Geopolitical issues
- US-China Technology/Trade war
- Intense competition and rivalry from other global brands. Xiaomi and ZTE target the same market as Huawei and are competitively priced. Samsung, Apple and Huawei compete globally. Also Cisco (US) competes with Huawei
- Blacklisting Huawei in relation to cybersecurity (Five Eyes)
- Threats of substitutes
- Entry of new big companies-loss of market share
- Lawsuits against company
- Technological changes
- Lower profits
- Western country's fear of Huawei's close links with Chinese government and communist party



# FUTURE

## Few phone makers will survive industry's brutal economics? Who will win the Technology/Trade Race-US or China? What about 6G?

Richard Yu, chief executive of Huawei's consumer business group, said anyone at this stage in the decade-old industry's history that had **less than 10% market share** was losing money. "In the future, only three to four vendors can survive, maybe less than four." He said, **smaller Chinese vendors were consolidating, and most would disappear**, as they did not have enough resources to invest in the same levels of research and development, marketing and branding needed to gain global scale.  
<https://www.reuters.com/article/us-telecoms-mobileworld-huawei-phones/few-phone-makers-will-survive-industrys-brutal-economics-huawei-idUSKCN1GA01X>

Huawei may encounter obstacles to its global ambitions, however, according to Credit Suisse. The tensions created by the US trade war with China could make it **difficult to expand in some markets**. "For developed markets, **Samsung** (South Korea) may have an edge over Huawei as Samsung does not have those political risks to overcome given the current political climate," Credit Suisse said. "But for **emerging markets** as well as **China**, Huawei has the upper hand with its local presence and track record exporting fairly advanced technology at a reasonable price." It is still too early to tell who will emerge triumphant from this latest battle. Credit Suisse believes that both Asian companies want to innovate and both have the capability to win. Now, "it is really up to the execution".  
<https://asia.nikkei.com/Business/Company-in-focus/Samsung-and-Huawei-locked-in-mobile-industry-s-prize-fight>

Analyst Marina Koytcheva, vice president of forecasting at CCS Insight, stated "Size, scale and economic growth give China an obvious head start. But we expect network deployments to be much faster than in the early days of 4G. China will dominate 5G thanks to its political ambition to lead technology development, the inexorable rise of local manufacturer Huawei, and the breakneck speed at which consumers have upgraded to 4G connections in the recent past."  
<https://www.webscalenetworking.com/topics/webscalenetworking/articles/440712-as-huawei-faces-western-challenges-china-continues-5g.htm>

Zhengfei (founder of Huawei) indicated that strategic growth was the key to securing the future. "In the future, the Internet of Things, smart manufacturing, and Big Data will place high requirements on the 'pipe infrastructure'. Our responsibility is to provide connections, and specifically equipment that enables connections. The global market is huge, and we will not be able to achieve success in all countries. It will be good if we can grow in the countries where we can operate (e.g. Huawei is most popular in Germany, Italy, Poland, Spain, Colombia, Egypt and South Africa)."  
<https://www.tharawat-magazine.com/grow/huawei-an-explosive-growth-story/#gs.SAz5bJzn>

### ROAD MAP TO 6G AND BEYOND

**After 5G is 6G**, that proposes to integrate 5G with satellite networks for global coverage.

**6G technology** is considered to be cheap and Fast Internet **Technology**.

<https://www.irjet.net/archives/V4/i9/IRJET-V4I9196.pdf>

Many of the cellular devices connected nowadays are machines (IoT) rather than people. With the rise of Smart Homes, Buildings and Cities, 5G and 6G will need to include increased demands for machine-to-machine communications, including robotic and autonomous drone delivery and transport systems. The Internet-of-Everything (IoE) is a related development.

<https://www.cablefree.net/wireless-technology/4g-lte-beyond-5g-roadmap-6g-beyond/>

# ACTIVITIES

Huawei is the world's largest supplier of telecommunications network equipment and second-biggest maker of smartphones. It derives nearly half of its total revenue outside China and its global reach has come under attack from US, which is trying to prevent US companies from buying Huawei equipment and is pressing allies to do the same.

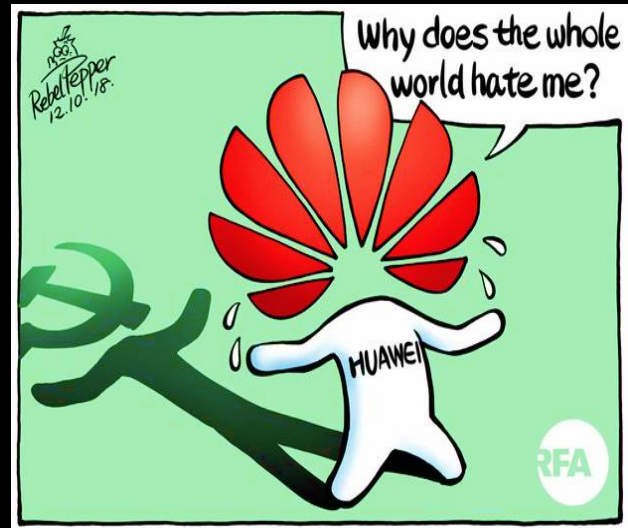
U.S. security experts are worried the gear could be used by China for espionage, a concern Huawei says is unfounded

<https://www.reuters.com/article/us-usa-china-huawei-tech-eu/u-s-wants-western-tech-to-be-used-instead-of-huawei-kit-idUSKCN1PP24C>

Explain the following cartoons and illustrations



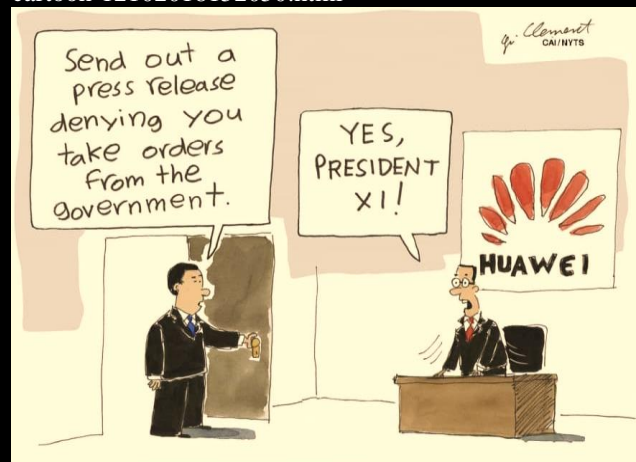
<https://fineartamerica.com/featured/spy-vs-spy-mr-minor.html?product=poster>



<https://www.rfa.org/english/cartoons/Huawei-cartoon-12102018152050.html>



[http://www.china.org.cn/opinion/2012-10/13/content\\_26776504.htm](http://www.china.org.cn/opinion/2012-10/13/content_26776504.htm)



<https://www.japantimes.co.jp/opinionentary/u-s-huawei-cuffs-china-u-s-chains/#.XFqCyrhS-Uk>

### Using ICT answer the following questions:

- Discuss how Five Eyes cooked up a campaign to kill off Huawei  
<https://www.stuff.co.nz/business/opinion-analysis/109348046/how-five-eyes-cooked-up-campaign-to-kill-off-huawei>
- Why does Beijing see itself as ‘hemmed by the West’, particularly the old Anglosphere.  
<https://www.lowyinstitute.org/publications/we-need-five-eyes-spy-network-oversight>
- Huawei and Apple smartphones are both made in China, so what is the difference? Why the fuss over Huawei? <https://www.abc.net.au/news/2019-01-19/apple-or-huawei-which-one-should-we-be-more-worried-about/10720262>

### In pairs explain these quotes



Diagram: S. Bliss

### Economics/Globalisation:

- Discuss how Huawei evolved from a small local business in Shenzhen in 1987 into a global technology company. Describe its global strategies and achievements over the last 30 years.
- Explain how Huawei plans to dominate the global market' for the next generation of wireless communications, called 5G.
- Despite international security concerns and branding issues, describe how Huawei can achieve higher profits, increased growth and greater market share.
- Imagine you were on the Board of Directors of Huawei. Describe how you would respond to global criticism on its pricing, branding, marketing and trustworthiness.

### Business Studies:

- Explain the **main organisational structure** of Huawei Co., Ltd. Include vision, strategies, business divisions, products, services, goals and future trends.
- Discuss how continued investment in **R&D** innovation, enabled Huawei to provide competitive products that dethroned Apple in its smartphone sales in 2018. Include Huawei moving from imitator to creator, poor quality to high quality goods and services, and improving its global brand.

### Civics and Citizenship:

- Huawei is one of the world leaders in 5G wireless communications, but supposed connections to the Chinese Government and communist party, is damaging its business globally. Discuss.
- What is the anglophile “Five Eyes”? What is its purpose? What countries belong? What has been its impact on Huawei?



# COMPARATIVE CASE STUDY HUAWEI (CHINA) AND SAMSUNG (SOUTH KOREA) LOCKED IN MOBILE INDUSTRY'S PRIZE FIGHT

## Curriculum topics:

- The role of business in the economy
- The role of the market and government
- Variations in competition
- The global economy-globalisation
- Contemporary issues-security, intellectual theft and ICT race US/China

**Cross Curriculum Priorities:** Asia, Sustainability

**General Capabilities:** Ethical understanding, Information and communication technology capability, Intercultural understanding, Literacy, Numeracy, Personal and social capability, Critical and creative thinking, Work and enterprise

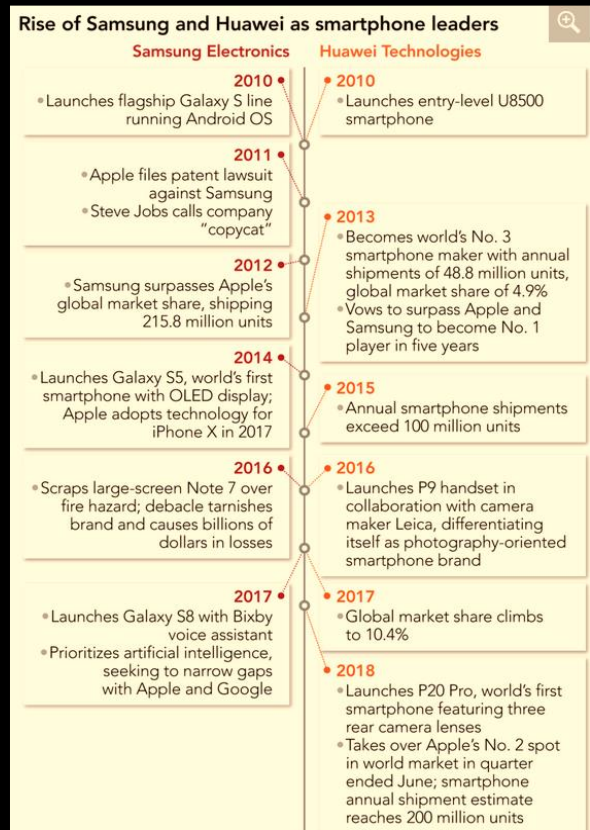
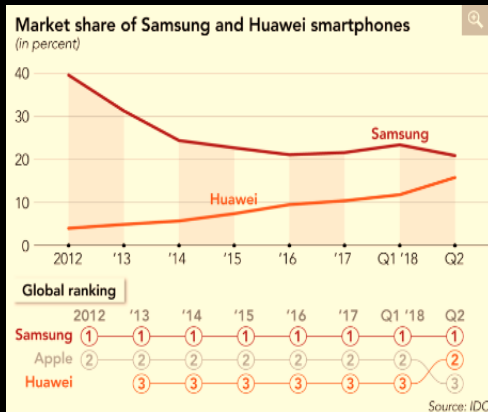


Samsung and Huawei locked in mobile industry's prize fight <https://asia.nikkei.com/Business/Company-in-focus/Samsung-and-Huawei-locked-in-mobile-industry-s-prize-fight>

Huawei and Samsung are going to wage a fierce war in 2019 for smartphone supremacy <https://bgr.com/2018/12/25/samsung-vs-huawei-2019-wa>

Product	Samsung	Huawei
Core processor	In-house	Design by chip unit HiSilicon, produced by TSMC
Chip packaging, testing	Performed in house	ASE Industrial Holding, KYEC
Printed circuit board	Samsung Electro-Mechanics	Unimicron, Career, Compeq Manufacturing
CMOS image sensor	In-house	Sony, OmniVision Technologies
Camera lens	Sekonix, Kolen	Largan Precision
Camera module	Samsung Electro-Mechanics, Patron	Sunny Optical Technology (Group), O-film Tech, Luxshare-ICT
Display	Samsung Display	LG Display, JDI, Sharp, BOE Technology
Casing	Intops	Shenzhen Everwin Precision Technology, BYD
Phone assembly	Performed in house	Foxconn (Hon Hai Precision Industry)
Fingerprint	Dreamtech, Patron	Goodix Technology
Wireless charging	Samsung Electro-Mechanics, Uju Electronics	Luxshare-ICT
Connectors	Uju Electronics	Luxshare-ICT
Battery module	Samsung SDI	Sunwoda Electronic
Voice recognition tech	In-house	iFlytek

Apple iPhone supplier Chinese company



<https://asia.nikkei.com/Business/Company-in-focus/Samsung-and-Huawei-locked-in-mobile-industry-s-prize-fight>

# TECHNOLOGY

## 5G AND US/CHINA TECHNOLOGY WAR

“The fight over trade (US/China) is merely a skirmish in a larger technology war”.

“The quest is to conquer the latest technologies, from 5G telecom to robotics and artificial intelligence.”

<https://seekingalpha.com/article/4226872-united-states-china-technology-war-looking-beyond-trade-wars>

“Apple is at the 'forefront of vulnerability' to the US-China trade war. Apple, is American technology produced in Chinese factories by a Taiwanese company”. Apple draws 20% of its revenue from China.

<https://www.cnbc.com/2018/12/21/apple-is-the-most-sensitive-to-us-china-trade-war-strategist-says.html>

After the arrest of Huawei's CFO, Meng Wanzhou in Canada, “Chinese firms urged employees to boycott Apple in retaliation.” Apple may suffer a dent in their Chinese revenues.

<https://appleinsider.com/articles/18/12/24/apple-boycott-by-chinese-firms-in-support-of-huawei-is-escalating>

Following never leads to greatness



Has the dependence of Huawei and the Chinese high-tech sector on US technology left China in desperate need of a trade deal? Huawei is dependent on chip technology from **Qualcomm** (QCOM) and the Android operating system from Google parent **Alphabet** (GOOGL). "If Huawei cannot license Android from Google, or Qualcomm's patents in 4G and 5G radio access technology, it will not be able to build smartphones or 4G/5G base stations."

<https://www.investors.com/news/economy/dow-jones-apple-rally-huawei-is-china-trade-war-trump-card/>

Diagram: S. Bliss

<https://twitter.com/Huawei/status/989066503726292994>

Two major European telecoms companies — France's Orange (ORAN) and BT in the United Kingdom — recently ruled out using Huawei products in their core domestic 5G networks. Germany's Deutsche Telekom (DETEGY) and Japan's SoftBank (SFTBF) are reviewing their use of Huawei equipment.

### ICT

- 5G -everything you wanted to know <https://www.techradar.com/au/news/what-is-5g-everything-you-need-to-know>
  - What is 5G technology?
  - What will a 5G network need?
  - How fast will 5G be?
  - Will I be able to get 5G networks on my phone?
- What countries are using 5G technology? <https://www.quora.com/Which-country-uses-a-5G-network>
- US/China technology war <https://seekingalpha.com/article/4226872-united-states-china-technology-war-looking-beyond-trade-wars>

In groups complete the following table

What is 5G technology?

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What will a 5G network require?		
How fast will 5G be?		
In the two column table list 4 advantages and 4 disadvantages of 5G	1 2 3 4	1 2 3 4
Compare the current planned deployment timelines of 5G for China, USA, EU and Australia	1 2 3 4	
List the 5 main 5G global vendors	1 2 3 4 5	
What countries are using 5G technology in 2019?		
Explain how 5G contributes to sustainable development		
Outline the US/China technology/trade war <i>Is the real fight over global leadership in advanced technology industries?</i>		
Assignment		
Discuss why control of the next wave of advanced technologies (5G) and related applications such as driverless cars, smart cities, and advanced factory automation, are significant for <b>economic development</b> but also require <b>cybersecurity</b> . Include what is meant by 5G, how it operates, its importance, and its problems.		



# HUAWEI: A CONTEMPORARY CONTROVERSIAL ISSUE

## ISSUE

Three US agencies (CIA, FBI and National Security Agency) warned people against buying Huawei and other Chinese smartphones. US officials have asked counterparts in Germany and several European nations to drop Huawei equipment from 5G networks over security concerns.

## REPLY

China's foreign minister urged countries not to use "fabricated" excuses to block Huawei Technologies. "Using national power to tarnish and take measures against a certain company, without any evidence, is both unfair and immoral." <https://www.straitstimes.com/asia/east-asia/china-blasts-unfair-huawei-equipment-bans-by-other-countries>

A top executive at China's Huawei Technologies slammed the growing accusations that its telecommunications equipment poses a spy threat, and warned that efforts to shut out Huawei from international markets will harm the wider economy.

<https://asia.nikkei.com/Business/China-tech/Huawei-top-executive-says-ban-will-disrupt-global-economy>

The issue is complicated, produces no simple answer, and arouses different values, beliefs and feelings in people, organisations and governments.

**Discuss how the technology company, Huawei, is a global profitable organisation but faces many challenges, requiring analyses from a variety of perspectives.**

**1. Overview of Huawei-organisation, global extent, profitability, success over 30 years, and anticipated trends (AI, cloud computing, chip technology).**  
Huawei is one of the icons of the rise of China's industrial power.

**2. Discuss the challenges facing Huawei-past, present, future.**  
Fall of the 'silicon curtain'. when US and China will no longer trade and provide chips to one another.

**3. Divide class into groups to obtain different/perspectives on the issue e.g. Huawei/US/UK/Australia/developing country.**  
Groups collect facts and figures from a variety of sources to support their view

**5. Present an oral assignment using ICT.**  
Include maps, graphs, statistics, photographs and quotes

**4. Discussion or debate between groups expressing different views.**  
Summarise thoughts

Diagram: S. Bliss

**Social media** such as Twitter, Blogs, Flickr and You tube have changed how people communicate and disseminate information. This modern technology has had a huge impact on determining peoples' perspective on a controversial issue, such as Huawei. Social media allows people to discuss ideas, post news and ask questions. Students should act cautiously and investigate information and data on its source, as it is sometimes based on incorrect facts and is biased.

# CONTROVERSIAL ISSUE: SCAFFOLD

Discuss how the operation of the Chinese technology company, Huawei, has evolved into a global profitable organisation over the last 30 years, but faces many **challenges** for future growth. Analyse these challenges from a variety of **perspectives**.

## STATEMENT OF THE ISSUE

A statement outlining the main organisational functions of Huawei (location of headquarters, executive, vision, strategies, business divisions, products, services, profits, revenue, R&D, global extent/ranking, growth, trends)

## CHALLENGES

5G technology race, national cybersecurity, Five Eyes, US-China technology/trade war, intellectual theft, brand image, new patents, IT industry competition

## PERSPECTIVES

Diverse perspectives: Huawei, China, Five Eyes-USA, UK, Australia, European countries, Asian and developing countries (e.g. India), tech competing companies (e.g. Samsung),

- **ARGUMENTS FOR HUAWEI**

Series of points with explanations-economic, social, environmental, technological and/or political

- **ARGUMENTS AGAINST HUAWEI**

Series of points with explanations-economic, social , environmental, technological and/or political

## CONCLUSION

Future trends and challenges

## YOUTUBE:

- International innovators: The Huawei story <https://www.youtube.com/watch?v=k38gEgepgxE>
- How big is Huawei? <https://www.youtube.com/watch?v=fBsRbb8gt4Q>
- 15 things you didn't know about Huawei <https://www.youtube.com/watch?v=IIYpF4-UMII>
- 5G will change your smartphone, and your life in 2019 [https://www.youtube.com/watch?v=MC\\_Sfkh5-zQ](https://www.youtube.com/watch?v=MC_Sfkh5-zQ)
- Huawei will be 'fine' even despite international pressure: Academic | World Economic Forum <https://www.youtube.com/watch?v=iUgDpLBKBps>
- Why is China's biggest technology company being targeted? Inside Story <https://www.youtube.com/watch?v=Bga1nIstT5Q>
- The real reason USA is banning Chinese phones <https://www.youtube.com/watch?v=a0qNo3qtn6w>

## WEB LINKS:

- Huawei's 2017 Annual Report: Solid performance and lasting value for customers <https://www.huawei.com/en/press-events/news/2018/3/Huawei-2017-Annual-Report>
  - Huawei beats Apple to become second-largest smartphone maker <https://www.theguardian.com/technology/2018/aug/01/huawei-beats-apple-smartphone-manufacturer-samsung-iphone>
  - Huawei moves up on Forbes 'Most Valuable Brands' of 2018 as China's only company to feature in the global ranking. <https://consumer.huawei.com/en/press/news/2018/forbes-most-valuable-brands-2018/>
  - Huawei aims to become top smartphone vendor in 2019. That's even without countries like the US trying to restrict market access over claimed security concerns. <http://fortune.com/2019/01/24/huawei-smartphones-cybersecurity/>
  - Who is afraid of Huawei? <https://www.huawei.com/en/press-events/news/2018/3/Huawei-2017-Annual-Report>
  - What's wrong with Huawei, and why are countries banning the Chinese telecommunications firm? <http://theconversation.com/whats-wrong-with-huawei-and-why-are-countries-banning-the-chinese-telecommunications-firm-109036>; <https://www.sbs.com.au/news/dateline/what-s-wrong-with-huawei-and-why-are-countries-banning-the-chinese-company>
  - Can Huawei survive an onslaught of bans and restrictions abroad? Worries in Western countries about national security might reverse its rise <https://www.economist.com/business/2018/12/15/can-huawei-survive-an-onslaught-of-bans-and-restrictions-abroad>
  - Integrity, the essence of Huawei [https://huawei.eu/sites/default/files/Huawei\\_factsheets\\_2019.pdf](https://huawei.eu/sites/default/files/Huawei_factsheets_2019.pdf)
  - Huawei announces 5G smartphone based on own technology <https://www.thestar.com.my/tech/tech-news/2019/01/24/huawei-announces-5g-smartphone-based-on-own-technology/#Q665RRy7rucmMWGO.99>
  - Prince Charles's Charity to Stop Taking Huawei Donations <https://www.usnews.com/news/technology/articles/2019-01-24/charity-of-britains-prince-charles-to-stop-taking-huawei-donations>
  - Despite US crackdown, Huawei ships a record 200 million smartphones <https://www.dailyherald.com/business/2018/12/29/despite-us-crackdown-huawei-ships-a-record-200m-smartphones>
  - Is Huawei set to become the world's top smartphone maker in 2019? <https://www.thejakartapost.com/life/2019/01/02/is-huawei-set-to-become-the-worlds-top-smartphone-maker-in-2019.html>
  - Apple or Huawei which one should we be more worried about? <https://www.abc.net.au/news/2019-01-19/apple-or-huawei-which-one-should-we-be-more-worried-about/10720262>
  - Inside Huawei <https://www.cnbc.com/2018/11/16/huawei-aims-to-overtake-samsung-as-no-1-smartphone-player-by-2020.html>
  - Huawei Sustainability Report 2017 <https://www.huawei.com/en/press-events/news/2018/7/Huawei-2017-Sustainability-Report>
  - "China's competitiveness myth, reality, and lessons for US and Japan. Case Study: Huawei" (PDF). Centre for Strategic and International Studies. Ahrens, Nathaniel (February 2013). [https://csis-prod.s3.amazonaws.com/s3fs-public/legacy\\_files/files/publication/130215\\_competitiveness\\_Huawei\\_casestudy\\_Web.pdf](https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/130215_competitiveness_Huawei_casestudy_Web.pdf)
  - "Chinese state media says US trying to 'stifle' Huawei with arrest". Bloomberg. Bloomberg Technology. 7 December 2018. <https://www.bloomberg.com/news/articles/2018-12-08/market-shaking-u-s-case-against-huawei-cfo-rolls-into-next-week>
- Background image: <https://www.techradar.com/news/first-standalone-5g-network-standard-approved>