



# **POLITECNICO DI TORINO**

College of Engineering and Management

Master of Science program in ENGINEERING AND MANAGEMENT

Thesis Report

## **Analysis of Huawei Technologies Co., Ltd**

SHENGNAN HOU

S243137

Supervisors: UGHETTO ELISA (DIGEP)

Anno Academics: 2019/2020

# CONTENTS

1 COMPANY BACKGROUND .....	1
1.1 The Introduction of Huawei.....	1
1.2 The development history of Huawei.....	1
1.3 Huawei’s structure and divisions .....	3
1.4 Company’s products and technology .....	6
1.4.1 Carrier business .....	6
1.4.2 Enterprise business .....	8
1.4.3 Consumer business .....	10
1.5 Corporate Culture.....	10
2. Market Analysis .....	11
2.1 Market Trend.....	11
2.2 Growth factor .....	12
2.2.1 Political factor .....	12
2.2.2 Economic factor .....	13
2.2.3 Social and demographic factors .....	14
2.2.4 Technology factor.....	14

2.3 Market share.....	15
3. Financial analysis.....	16
3.1. The Five-Year Financial Highlights .....	16
3.2. Profitability Analysis .....	18
3.3 Liquidity analysis.....	20
3.4 Solvency analysis.....	22
3.5 Activity analysis.....	23
4. Conclusion .....	27

# **1 COMPANY BACKGROUND**

## **1.1 The Introduction of Huawei**

Huawei is a global provider of information and communications technology infrastructure and smart devices founded by REN ZHENGFEI in SHENZHEN, the southern city of China in 1987. Initially, Huawei is as an agency for HONGKONG Company manufacturing Private Branch Exchange (PBX). Since the high-speed development of technology and expansion strategy, Huawei's core business expands to three main business groups including the Carrier Network Business Group, Enterprise Business Group and the Consumer Business Group, and makes great efforts to become the global leader in these business areas. Huawei employs more than 194000 employees, established 36 Joint Innovation Center and 14 research and development organizations in different countries, and operates in more than 170 countries and regions, serving more than tree billion people around the world. By the end of 2019, Huawei's global revenue achieved CNY 858.8 Billion, up 19.1% year-on-year. Net profit reached CNY 62.7 Billion, up 5.6% from 2018. The cash flow from operating activities grew to CNY 91.4 Billion, up 22.4% year-on-year. Huawei insists on investing 10% of annual sales in technological innovation and research. It spent CNY 131.7 Billion on R&D in 2019 and spent over CNY 600 Billion on the past decade. The employees in R&D are more than 96000, accounting for 49% of Huawei's total workforce. The active patents held by Huawei reached more than 85000 in which more than 90 percentage were invention patents as of December 31, 2019.

## **1.2 The development history of Huawei**

The development history of Huawei can be divided into four stages with different themes.

The first stage is entrepreneurial stage from 1987 to 1995 with the theme of survival. REN ZHENGFEI founded Huawei in Shenzhen with CNY 21000 registered capitals in 1987. Initially, Huawei operated as a sales agent for a HONG KONG company, and then began to independently developed and commercialized PBX and digital switching solutions. In the market competition strategy, the continuous development and production of a single product is adopted, and the sales strategy of surrounding the city from the countryside to quickly seize the market through low-cost methods, expand the market share, and expand the company's scale. In 1995, Huawei's revenue reached CNY 1.5 billion, and the number of employees has reached 800. In the first stage, Huawei solved the survival problem.

The second stage can be named as second entrepreneurship from 1996 to 2004 with the theme of out of chaos. By 2000, the revenue had exceeded 20 billion, and in the past few years, they have basically been growing at a rate of 100%. In this stage, Huawei has gradually entered various field including mobile communications, transmission, and became a company that can provide comprehensive communications solutions. Huawei has also completed the reformed of human resources system, management system and process system. During this period, all aspects of Huawei were in a process of standardization. Through the reform, Huawei became a domestic telecommunications giant and began to expand overseas markets and became an international company. In terms of product development strategy, from a single centralized to horizontal integration; from a regional perspective, from focusing on the domestic market to facing both domestic and international markets, and the international market is prioritized for transformation; "City" development strategy, starting from developing countries, choose to start with low-cost strategy, and gradually enter the market of developed countries.

The third stage is the globalization stage from 2004 to 2012 with theme of optimizing, expanding and surpassing. From 2004, Huawei basically still grows at a rate of more than 40% every year. By 2012, its sales had exceeded CNY 200 billion, the number of employees also increased from 30000 in 2004 to 13800 in 2012, and it had surpassed

all competitors such as Ericsson, became the leader of the industry and a large multinational company, its overseas sales accounted for more than 70%. At this stage, Huawei adopted the strategy of vertical integration, diversification and internationalization in product development strategy; in the market competition strategy, it adopted the strategy of win-win with "partners". The company has also transformed from a comprehensive communications solution telecommunications equipment provider to provide end-to-end communications solutions and customers or market-driven telecommunications equipment service providers. From 2004, Huawei readjusted and optimized its organizational structure based on that in 2003. At same time, it carried out the financial and human resources reform projects, comprehensively launched the company's business process reforms, and introduced the best practical practice and build a complete IT framework to support this operation. This has made an important contribution to improving the operational efficiency of the organization, which has enabled Huawei to establish an organization operation system that is acting on international convention.

The fourth stage is the organizational transformation stage from 2013 to now with the theme of booming and crisis. With the development of information technology, the world is gradually entering the era of big data and the era of cloud computing, Huawei began to focus on building a digital and intelligent platform based on 5G, AI and cloud computing. Due to its rapid growing globalization, some western countries are eyeing it, and the way forward has been blocked by certain western countries. Huawei is working hard to break through the blockade, including developing its own systems and ecology. Under harsh external challenges, the revenue still increased 19.1% year-on-year, achieved to CNY 858.8 billion in 2019, and still achieved steady growth.

### **1.3 Huawei's structure and divisions**

A reasonable and relative stability organizational structure based on the industry trend, its own characteristics, and internal and external environment factors determines whether an enterprise can rise victorious or rapidly disappear. Since Huawei was founded more than 30 years, its company strategy is constantly adjusted based on the changes of market trend and environment, and the organizational structure is also optimized following the strategy. From the linear structure at the beginning of startup, it has evolved into a multi-dimensional matrix organization for regions, customers, and products. As shown as the following picture, the newest organizational structure published on Huawei's official website in 2019, from top to bottom are:

- Shareholders 'meeting

It is the company's authoritative body, composed of RENZHENGFEI and the union which is the representative's commission of shareholding employees.

- The board of directors and the board of supervisors

The board of directors is the highest responsible organization for company strategy, management, and customer satisfaction. It guides and supervises the company's overall business operations and makes decisions on major issues in the company's strategy and operations. The main duties of the board of supervisors include checking the company's financial and company operating conditions and supervising the conduct of directors and senior executives in performing their duties and the regulatory operation of the board of directors.

- Independent auditor

Since 2000, Huawei has employed KPMG as an independent auditor. The auditor is responsible for auditing the annual financial statements, assessing whether the financial statements are true and fair according to accounting standards and audit procedures, and issuing audit opinions on the financial statements.

- Four major committees

The four major committees are Human Resources Committee, Finance Committee, Strategic Development Committee and Audit Committee.

- CEO (rotating chairman)

The company implements the rotating CEO system under the leadership of the board of directors. During the rotation, the rotating CEO acts as the highest responsible person for the company's management and crisis management and is responsible for the company's survival and development.

- Group functional platform

The group functional platform is a platform that focuses on business support, service and supervision, provides timely, accurate and effective services to the front, and strengthens supervision while fully authorizing.

- Business Groups

According to the different customer base, Huawei divides the business into six business groups, Carrier BG, Enterprise BG, Network Products and Solution, Cloud and AI BU, Intelligent Automotive Solution BU and Consumer BG. The Carrier BG and Enterprise BG serve the operators and enterprise. The Consumer BG focuses on the end consumers through providing various products including Smartphone, PC, Tablet, Wearable and IOT products. Network Products and Solutions is a department that provides integrated ICT solutions to carriers, enterprise and industry customers. The Cloud & AI BG is responsible for the Huawei's cloud and computing business, and also taking charge of the business's R&D, marketing, ecosystem building, technical sales, consulting, and integrated enablement services. The Intelligent Automotive Solution BU focuses on ICT technology to help the automobile company to make the superior vehicles.

- Regional organization

ICT regional organizations are the company's regional ICT business operations centers, are responsible for developing and effectively leveraging regional resources and capabilities, and for implementing the company's ICT business strategy in their regions. 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.





Figure 1.1

## Business Structure

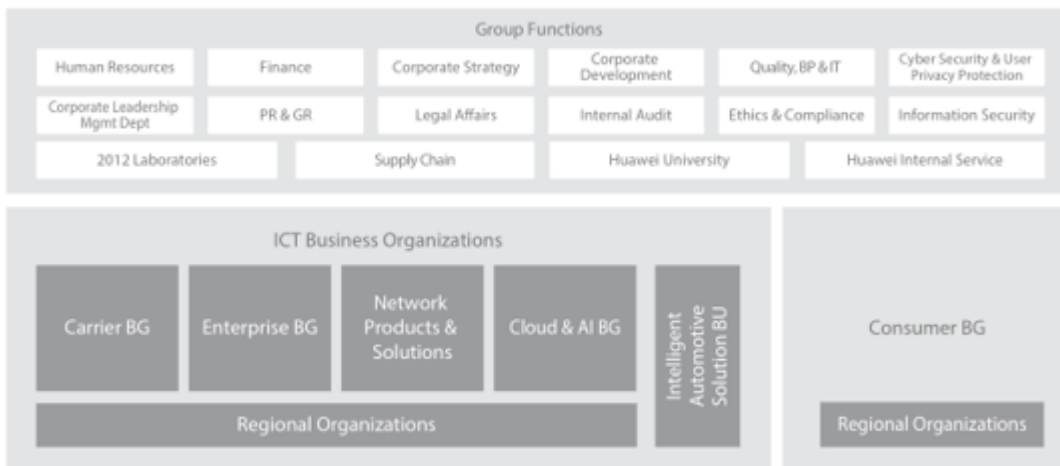


Figure 1.2

## 1.4 Company's products and technology

Huawei mainly serves three types of customers, carriers, government and enterprises, and end users.

### 1.4.1 Carrier business

As the high speed development of 5G in the world, and the digital transformation trends in every industry, for operators, Huawei is committed to creating a minimalist, green, and converged 5G end-to-end network, introducing AI technology into telecommunications networks to improve the network deployment and the operation efficiency, releasing 5G potential, and implementing 5G deployments worldwide based

on the advanced technologies. Huawei mainly provide seven types products and solutions as shown as below:

Products and solutions	Example
Fixed networks	Data communication, transmission network, access network, IMaster NCE automatic driving network, management and control system, network management software
Wireless network	5G Gear UP, All Business Connected@LTE, Digital Indoor System, SingleRAN, MAE,5G Microwave, Site
Cloud Core Network	5G Core, TeclO Cloud, SmartPCC, 5G MEC, VoLTE, Network Slicing, Single Voice Core
IT Infrastructures	Server, Storage, Cloud and Big Data
Service and Software	Network Consulting and System Integration, Network Assurance and Operations, OPEX Optimization, B2C Business Solution
Network Energy	Telecom Energy-5G Power (Site Power, SmartSite Advanced Hybrid Power, Central Office Power) , Data Center Energy(Prefabricated Modular Data Center, UPS, Smart Modular Data Center,

	Smart Cooling)
Autonomous Driving Network (AND)Solutions	Network AI unit iMaster NAIE, Intelligent cross-domain O&M unit iMaster AUTIN, iMaster MAE, iMaster NCE

### 1.4.2 Enterprise business

Huawei Enterprise Network serves government and enterprises in multiple industries including transportation, finance, power, manufacturing, internet, education, medical care, oil and gas, retail, and the construction of smart cities and campuses to provide them various ICT products and solutions to build the digital world. The products and solutions involves the following parts.

Products and solutions	Example
Enterprise Networking	Network Security, Routers, Switches, WLAN, Intent-Drive Network, Campus Network Solution, Data Center Network Solution, EC-IoT Solution
Enterprise Optical Transmission & Access	Optical Transmission, Optical Access, Optical Terminals, Data Center Interconnect Solution, Huawei Campus OptiX Solution, All-Optical Transport Solution, Enterprise Transmission Access Management and Analysis Software

Data Center - Huawei HiDC	Servers - Intelligent Computing, Disaster Recovery Solution, Data Center Network Solution, Cloud Computing & Big Data, Data Center Energy, Storage
Enterprise Collaboration	Huawei Video Conferencing Platform, Huawei Video Conferencing Endpoints, Huawei IdeaHub
Enterprise Wireless	eLTE Safe Mobile Cabin Hospital Solution, eLTE Anti-epidemic Inspection and Control Solution, GSM-R Networking Solution, Enterprise Microwave Solution, Cloud Core Network, eLTE Integrated Access Solution
Intelligent Video Surveillance	Intelligent Video & Data Analytics, Software-Defined Camera, CloudIVS, Smart Campus Video Surveillance Solution, Smart Traffic Video Surveillance Solution
Services	Network Solution Service, Industry Cloud Enablement Service, Industry Operation Support Service, Industry Solutions Service, Training and Certification

### **1.4.3 Consumer business**

The Huawei Consumer Business provides consumers with 1+8+N full-scenario life products, 1 for mobile phone, 8 for tablet, PC, VR devices, wearable devices, smart screens, smart audio, smart speakers, head units, N for IoT devices, also includes terminal chip and operating system development, cloud services, application stores and the establishment of HMS and HiLink ecosystem. In 2019, the representative products include Huawei MATE X that is the first 5G folding mobile phone, MateBook X Pro PC, Watch GT2 watch, FreeBuds headset, smart screen, VR Glass, etc.

## **1.5 Corporate Culture**

Corporate culture mainly refers to the value beliefs, behavior norms and behavior methods formed by a company for a long time and recognized by all employees. The core of corporate culture is values. Huawei admires the wolf very much and believes that the wolf is an example for enterprises to learn the sharp sense of smell, the spirit of perseverance and never-give up, and the consciousness of group struggle and teamwork. Under the guidance of this culture, Huawei created a miracle in the global financial crisis in 2008. In 2008, the Huawei's overseas revenue accounted for 75% of the total revenue, the total revenue achieved CNY 125.2 billion. In 2009, the total revenue achieved CNY 149 billion, increased 19.2% year-on-year. Such achievements are inseparable from the guidance of Huawei's wolf culture.

In terms of enterprise management, we should learn from the wisdom of wolf. However, the wolf culture is a double-edged sword. In this aggressive culture, Huawei is dangerous to competitors. And within Huawei, it also follows the law of the jungle. The heavy labor intensity makes Huawei employees always in a state of high tension. This kind of culture is lack of human care, obliterating the personality of employees.

In the context of globalization, internationalization is the only way for enterprises to grow bigger and stronger. Corporate culture is very important for the international

expansion of companies. Huawei can only abandon the traditional rules and regulations that are too rigid and integrate the world's concept of freedom and development of rights. Huawei can only broaden its horizons and guide enterprises towards internationalization and standardization by abandoning the traditional rules and regulations that are too rigid and integrating the world's concept of freedom and development of rights. Huawei should also pay more attention to the mental needs of employees and help them to relieve their pressure to reduce employee turnover.

## **2. Market Analysis**

### **2.1 Market Trend**

On the basis of the internet and mobile internet in the past two decades, with the upgrading of the network and the breakthrough of computing power, the new generation of ICT technologies represented by cloud computing, big data, and artificial intelligence have become the most important factor to drive the digital transformation and upgrading of the social and economic, reshape the new world pattern and new landscape. The world will step into a full connection and an intelligent world where everything can be connected, the massive connections and real-time all on-line will be realized, and various smart devices will explode.

Specifically, the application of ICT technology can be divided into two categories, one is for life, and the other is for infrastructure construction.

In terms of life, the intelligent life will be the trend in the future. The integrated application of 5G, AI, and cloud computing will be permeating into all aspects of people's clothing, food, housing, transportation, education and medical treatment. It let people experience the convenience that the smart assistants, smart homes, and autonomous driving bring to life, and can help the government improve the level of urban governance.

In terms of infrastructure, the intelligent infrastructure is the foundation for building an intelligent world. The intelligent infrastructure is achieved by transforming traditional ICT infrastructure and deploying new networks using new ICT technologies. It accelerates the transformation and upgrading of traditional industries, further accelerates the mobile internet and industries, and realizes industrialization and technicalization of the industry. It make the intelligent connectivity possible, and make the smart government, smart transportation, smart education, smart energy, smart finance, and smart manufacturing are possible.

## **2.2 Growth factor**

Over the last several decades, ICT industry is booming, and increasingly becomes a key industry for every country in the world. The macro-level environment is an important factor to drive the growth of ICT industry. The PEST analysis is an essential tool to give us an overview of the different macro-environments factors that should be considered including political, economic, socio-cultural and technology.

### **2.2.1 Political factor**

With the process of 30-years reform and opening in China, the domestic political is stable, and the socialist economic system is gradually improved. The companies were given more freedom to run themselves, which allow them to develop rapidly in the free competition environment. In 2001, when China joined the WTO, import and export restrictions became less and less, many companies respond the national strategy of “Bring In, Go Global”, actively learn from advanced foreign experience, introducing the best global perspectives, and actively expanding overseas markets.

From 2006 to 2010, the Chinese government formulated and implemented the Eleventh Five-Year Plan which is the medium and long term national development plan, it

indicated that it is necessary to strengthen the development of the ICT industry and actively carry out the 3G construction and business applications.

In the Twelfth Five-Year Plan from 2011 to 2015, the China Next Generation Internet (CNGI), investing heavily in government informatization and rural education, and the upgrade of comprehensive medical informatization became the main driving forces for the ICT industry.

In the Thirteenth Five-Year Plan from 2016 to 2020, the Chinese government continuously released a series of policy dividends on artificial intelligence, industrial internet and information consumption. It also has actively built a favorable environment for 5G development, organized and promoted special scientific research planning, spectrum planning, international cooperation, and cross-industry cooperation, so that 5G technology research and development experiments are at the forefront of the world.

### **2.2.2 Economic factor**

Since the twenty-first century, China has established the socialist economic system reform goal and gradually improved it. During the whole process, the complete market economic system has gradually established, the allocation of resources was optimized, and the efficiency was improved. These keep the Chinese economy always in a state of rapid development. Even if the economic crisis stuck in late 2008, the Chinese economic was also growing, and survived the crisis steadily. In recent years, China's economic development has been at the forefront of the world, and its GDP has become the second largest country in the world. The country's overall economic scale has expanded rapidly. The savings and disposable income of Chinese citizens has increased. At the same time, the country's tax revenue has also greatly increased, and the government has increased expenditures in education, medical care, and public



services. In the communications industry, with the comprehensive development of 5G, the government also increased the investment in 5G base station construction.

With the global economy integration trend accelerated, the rapid development of communication technology has become an important driving factor for the development of modern economy. Every country has regarded the development of the communication industry as an important industry that drives their own economic growth and improves the competitiveness of enterprises. The large demand for global communication brought by economic globalization has promoted the trend of communication globalization.

### **2.2.3 Social and demographic factors**

In the worldwide, the population continues to increase, the current population is about 7.7 billion people, of which more than 3.2 billion netizens. The number of people is still an important factor affecting the ICT industry. In China, as the economy grows, the income of urban and rural residents is also increasing continuously, people are consuming for a high level of spiritual life on the basis of satisfy the basis needs. In recent years, with the development of China's communication network technology, and the popularity of the Internet and smart phones, the domestic demand for communication has also shifted toward high quality.

### **2.2.4 Technology factor**

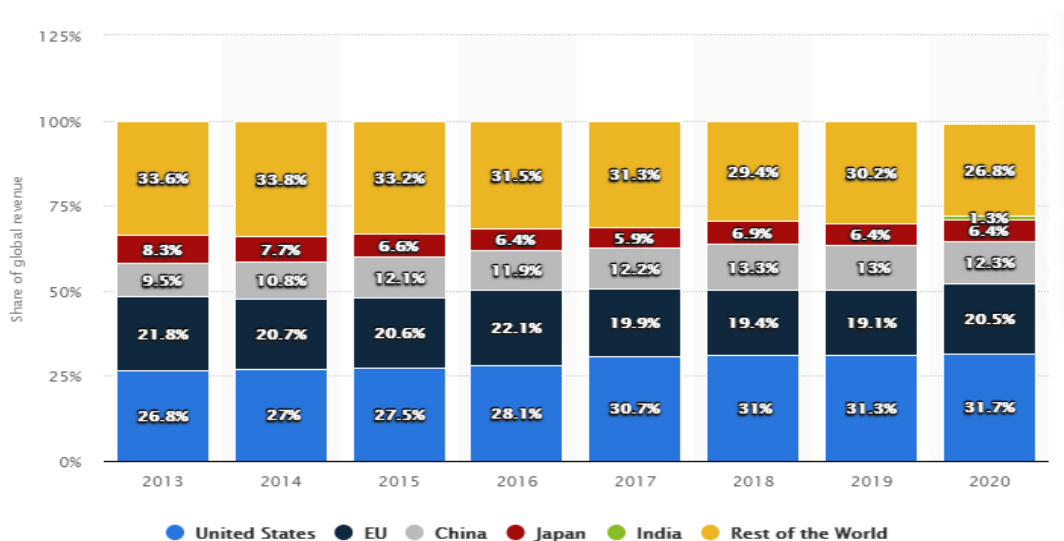
Now is the era of data and information. With the social and economic development, the technology change with each passing day such as internet, cloud computing, big data and AI technology have profoundly changed human thinking, life, production, and learning methods. The information has penetrated every corner of society. ICT industry is in a stage of rapid development and promoting the upgrading and reconstruction of traditional industries and leading the world to a digital transformation. The ICT

industry has become an important force for economic and social informatization and demonstrated the development prospects of the world.

Now is the era of 5G. The increasing maturity of 5G technology integrating the AI technology, big data and other multiple technologies has opened a new era of the internet. 5G becomes an important driver in promoting the transformation of traditional industries such as transportation, medical care, and manufacturing to smart, digital, and wireless. Since the beginning of the 5G network, China has given many preferential policies to the 5G development. The Ministry of industry and information technology takes the lead of technology research and development, the operators and leading enterprise actively invest in product and technologies, the China's 5G development has been greatly promoted.

### 2.3 Market share

According the data from Statista website, the global ICT market share by country is as shown as below. The ICT market share of United States continuously increases in past 8 years, and since 2018, the U.S. region has accounted for above 31% of the global market share, surpassing all countries and become the first one in the world. The market share of Europe and China ranked second and third respectively.



### **3. Financial analysis**

Huawei is a non-listed company that doesn't need to publish the audited consolidated financial statements according with the company law of the People's Republic of China, but Huawei always adheres to the openness and transparency principle, and adopts and follows the standards of listed companies.

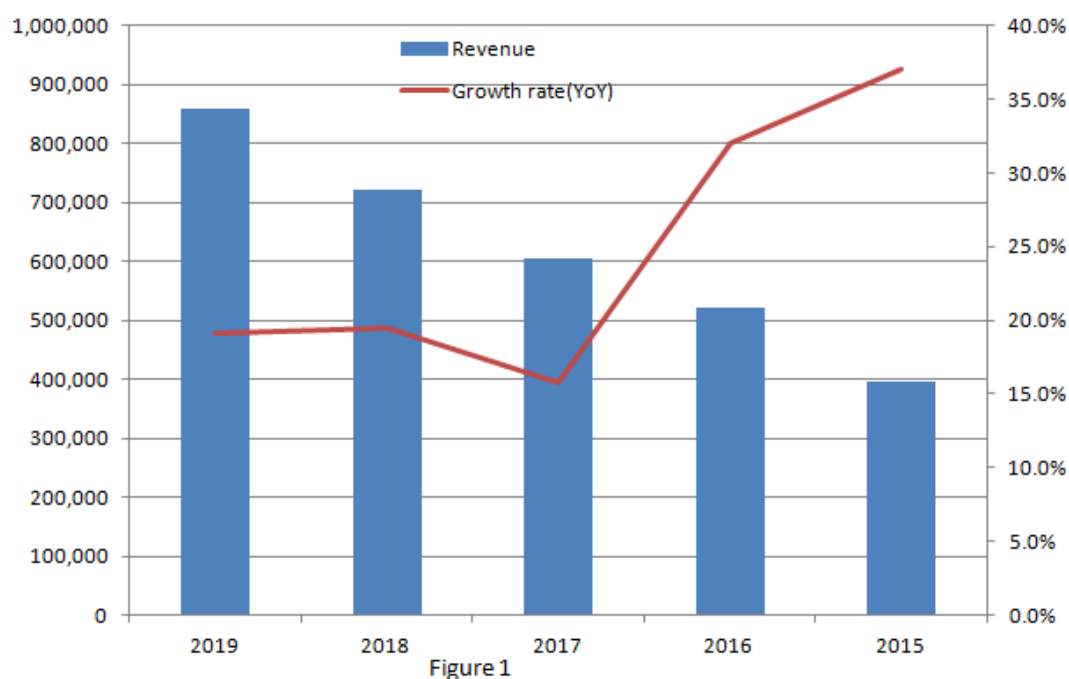
This chapter will analyze Huawei's financial situation based on the consolidated balance sheet, consolidated cash flow statement, consolidated profit and loss statement and the group's five-year financial summary disclosed in Huawei's 2019 annual report.

#### **3.1. The Five-Year Financial Highlights**

From 2015 to 2019, the revenue was growing continuously from CNY 395.009 billion to CNY 858.833 billion, and the compound annual growth rate is 21%. It reflects a better growth trend. The net profit is growing continuously and the compound annual growth rate of 14%. The cash flow from operating activities shows a fluctuating state. As the Fig1 shown, the peaks of revenue growth occur at 2015 and 2016, the growth rates were 37.1% and 32% respectively. At next three years, the growth rate has slowed sharply, and they were 15.7%, 19.5% and 19.1% respectively. Although the revenue in 2019 increased by 19.1% year-on-year, the operating margin was lower than in 2018.

	2019		2018	2017	2016	2015
	(USD 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.



From the view of business's construction, the consumer business is the highlight in 2019, the revenue reached CNY 467.304 billion in 2019, increased by 34% year-on-year, and accounting for 54.4% of the total revenue. In comparison, the carrier

and enterprise business have a relatively low growth rate. The revenue of carrier business reached CNY 296.689 billion, increased 3.8% from 2018, accounting for 34.5% in total. The Enterprise business's revenue was CNY 89.71 billion, increased of 8.6% year-on-year.

(CNY Million)	2019		2018		2017		2016		2015	
%	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion
<b>Carrier Business</b>	296,689	34.5%	285,830	39.6%	297,838	49.3%	290,561	55.7%	232,307	58.8%
<b>Enterprise Business</b>	89,710	10.4%	82,592	11.5%	54,948	9.1%	40,666	7.8%	27,609	7.0%
<b>Consumer Business</b>	467,304	54.4%	348,852	48.4%	237,249	39.3%	179,808	34.5%	129,128	32.7%
<b>Other</b>	5,130	0.6%	3,928	0.5%	13,586	2.3%	10,539	2.0%	5,965	1.5%
<b>Total</b>	858,833	100%	721,202	100%	603,621	100%	521,574	100%	395,009	100%

Figure 2

In terms of regional revenue, the annual revenue in China reached CNY 506.733 billion, increased of 36.2% year-on-year. In overseas business, the revenue in Europe, Middle East and Africa (EMEA) was CNY 206.007 billion, a slight increase of 0.7% from last year. The Asia-Pacific revenue has a decrease of 13.9% to CNY 70.533 billion. The revenue in the Americas increased by 9.6% to CNY 52.5 billion.

(CNY Million)	2019		2018		2017		2016		2015	
%	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion	Revenue	Proportion
<b>China</b>	506,733	59.0%	372,162	51.6%	305,092	50.5%	236,512	45.3%	167,690	42.5%
<b>EMEA</b>	206,007	24.0%	204,536	28.4%	163,854	27.1%	156,509	30.0%	128,016	32.4%
<b>Asia Pacific</b>	70,533	8.2%	81,918	11.4%	74,427	12.3%	67,500	12.9%	50,527	12.8%
<b>Americas</b>	52,478	6.1%	47,885	6.6%	39,285	6.5%	44,082	8.5%	38,976	9.9%
<b>Others</b>	23,082	2.7%	14,701	2.0%	20,963	3.5%	16,971	3.3%	9,800	2.5%
<b>Total</b>	858,833	100%	721,202	100%	603,621	100%	521,574	100%	395,009	100%

Figure 3

### 3.2. Profitability Analysis

The following is a summary of Huawei's financial report. It can be seen that in the case of continuous growth in total revenue, the gross profit margin, operating profit margin and net profit margin in 2019 have declined slightly compared to 2018 and 2017.

The gross profit margin reflects the initial profitability of the company's products. The company cannot afford the company's various expenses such as research and development expenses, management expenses, sales expenses, and financial expenses. Huawei's gross margin in 2019 was 37.6%, the lowest compared to the past five years. As the data shown, Huawei's revenue was continuously increasing, so the decline in its gross profit margin and the rise in cost of sales have become an inevitable link. Comparing with other competitors, Huawei's gross profit margin is higher than XIAOMI, ZTE and Ericson, basically same with Samsung, lower than APPLE.

The operating profit margin is the earning that a business generates from its operating activities, and is the ultimate profitability indicator of company's business. It was 9.1% in 2019, decreased 1.1% year-on-year, and is the lowest value in the past five year, which is result from the higher cost of sales and the research and development expenses.

The net profit margin indicated how much net profit is generated from sales, and measured how successful a company converting sales into profit. It was shown the same trend with the operating profit margin, and they keep a gap of about two percentage points.

Considering the business structure, as the revenue and proportion of consumer business continuously increased, Huawei's operating profit margin and net profit margin have a declined trend. In comparison, ZTE has a similar revenue structure with Huawei, and these two indicators are higher than ZTE. From the perspective of consumer business, APPLE, SAMSUNG and XIAOMI are the Huawei'S competitors. Huawei's operating profit margin and net profit was lower than APPLE and SAMSUNG, but they are closely to SAMSUNG. Comparing with XIAOMI, Huawei has an absolutely advantage whatever the value or the stability.

The return on asset (ROA) reveals how much profit a company earned in comparison to its total asset, is an indicator of how efficiency a company uses its assets to generate

profits. In 2019, the Huawei's ROA is 7.3%, decreased 1.6% from 2018, and it is the lowest value in the past five years.

The return on equity (ROE) measured the ability of a company to generate profits from its shareholders investments in the company during a period. The ROE was shown the declined continuously trend in past five years. Huawei has the highest ROE which is 31% in 2015, and the lowest value is 21.2% in 2019.

Percentage	2019	2018	2017	2016	2015
<b>Gross profit margin</b>	<b>37.6%</b>	<b>38.6%</b>	<b>39.5%</b>	<b>40.3%</b>	<b>41.7%</b>
<b>Operating profit margin</b>	<b>9.1%</b>	<b>10.2%</b>	<b>9.3%</b>	<b>9.1%</b>	<b>11.6%</b>
<b>Net profit margin</b>	<b>7.3%</b>	<b>8.2%</b>	<b>7.9%</b>	<b>7.1%</b>	<b>9.3%</b>
<b>ROA</b>	<b>7.3%</b>	<b>8.9%</b>	<b>9.4%</b>	<b>8.4%</b>	<b>9.9%</b>
<b>ROE</b>	<b>21.2%</b>	<b>25.5%</b>	<b>27.0%</b>	<b>26.4%</b>	<b>31.0%</b>

### 3.3 Liquidity analysis

Liquidity is the ability of the company to repay its short-term debts, and it is mainly expressed through the liquidity of the company's assets and its amount. The higher liquidity of the company's assets and the greater size of amount, the stronger the Liquidity. The current ratio, quick ratio and cash ratio are three important indexes to reflect the liquidity.

The current ratio is the ratio of current assets to current liabilities and used to measure the company's ability to turn the current assets into cash to repay the short term debt before the short term debt expires. In general, the higher the ratio, the stronger the liquidity. However, an excessively high current ratio indicates that the company's asset utilization rate is low, funds are residual, and the company's operations are too conservative. It is generally believed that the current ratio should be above 2:1, which means that current assets are twice the current liabilities. If the current ratio is less than

1, the company is under great pressure to repay for its short-term debt. From the following table, Huawei's current ratio has a little fluctuation between 1.42 and 1.58, which shows Huawei's liquidity is stable and good.

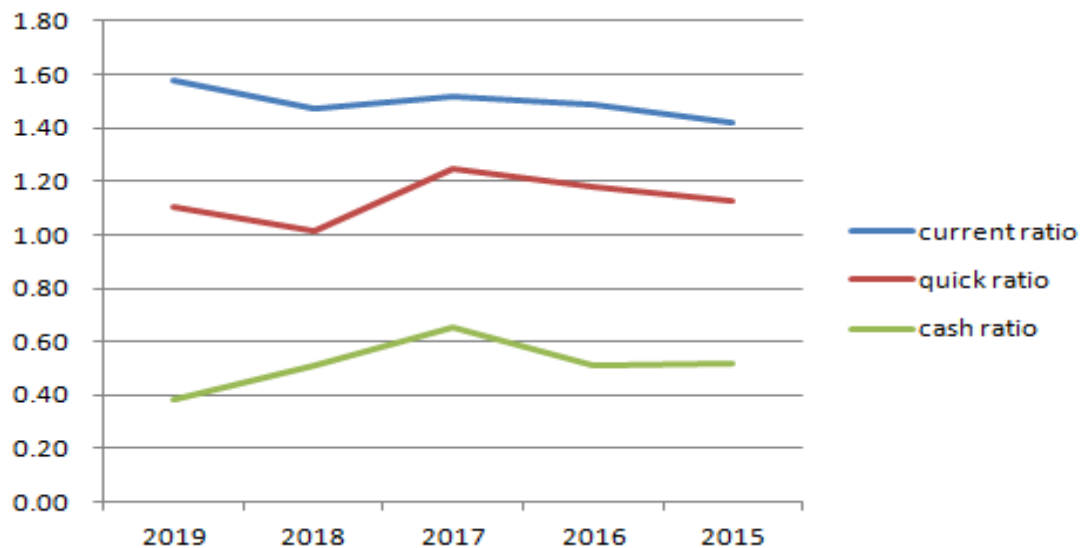
The quick ratio is a ratio that better reflects liquidity than the current ratio, because it removes the effects of inventory that is non-quick assets. Generally, the quick ratio should be bigger than 1. If the quick ratio is lower than 1, the company is generally considered to be facing a great debt repayment risk. According to the following table, Huawei's quick ratios in past five years totally are bigger than 1, which shows that Huawei has a good company's situation and strong liquidity.

Cash ratio measures the ability of repaying the short-term debts through calculating the company's total cash and cash equivalents by its total current liabilities. It is the ratio of the balance of quick assets after deducting accounts receivable to current liabilities, and it can be the best ratio to reflect the ability of the company to directly pay the current liabilities. From the view of creditors, the higher the cash ratio, the higher the liquidity. But for the business operators, too high ratio is not a good performance. The cash and cash equivalent are the assets with the lowest profitability, and the rise of them means the decline in the profitability of the company. Therefore, for company, this ratio should be controlled within a reasonable range, it is necessary to ensure both the liquidity and the profitability. Generally, the cash ratio should be above the 0.2 and lower than 1, and any companies take the 0.5 as a reference. As shown as the following table, the Huawei's cash ratio was violating between 0.38 and 0.66 that is at the reasonable range in the past five years.

In conclusion, Huawei has a good and stable liquidity based on the analysis of the ratios.



liquidity ratios	2019	2018	2017	2016	2015
current ratio	1.58	1.48	1.51	1.49	1.42
quick ratio	1.10	1.02	1.24	1.18	1.13
cash ratio	0.38	0.51	0.66	0.51	0.52



### 3.4 Solvency analysis

Compared with the liquidity, the solvency that is the ability to pay the long term debt reflects the ability of a company to assume debt, and it shows the ability of company's funds to guarantee debt repayment. We usually use the debt-to-asset ratio and debt-to-equity ratio to measure the solvency.

The debt to asset ratio is the percentage of total company's liabilities to total assets, indicating how much of the company's total assets are raised through debt. In fact, the analysis of this ratio depends on the different position. From the view of the creditors, they desire lower ratio that shows the company's debt repayment is guaranteed, and the loan will not have too much risk. Form the shareholder's perspective, when the total capital profit rate is higher than the borrowing interest rate, the greater the ratio, the better, because the shareholder can get more profits. For the company, the higher debt

to asset ratio indicates the worse ability of the company to repay debts, but the ratio is not as low as possible, the company cannot fully use the funds if the ratio is too low. So the ratio should be kept at a reasonable level, which can help company borrow funds and obtain more profit. In general, the 40% to 60% is a suitable range of the debt to asset ratio. According the data in the table below, Huawei's debt to asset ratio is at 65% to 68% over the past five years that indicate Huawei's solvency is obviously weak.

The debt to equity ratio can reflect the repayment ability of the company's own funds for the total liabilities by calculating the percentage of the total liabilities to its shareholder equity, and is an important indicator for evaluating the long term debt repayment ability of the company. Generally, the lower ratio indicates the stronger solvency and the lower risk of financial loss. In the process of financial statement analysis, the normal value of the debt to equity is generally 1. As shown as the following table, the debt to equity ratios in the past five years are totally bigger than 1, and has a little fluctuation around 2. It indicates Huawei has a relatively higher degree of dependence on liability, and solvency is weak.

	2019	2018	2017	2016	2015
Debt/Total assets	65.6%	65.0%	65.2%	68.4%	68.0%
Debt/Equity	1.91	1.86	1.88	2.17	2.13

### 3.5 Activity analysis

The activity ratios refer to the ratios that reflect the efficiency of asset utilization and turnover speed and are important to evaluate the operating performance of the company. We mainly discuss five activity ratios, namely total asset turnover, current asset turnover, inventory turnover, account receivable turnover and account payable turnover.

The total asset turnover is the ratio of revenue to total assets, is used to measure how efficiency the company generated revenue by assets. The higher ratio indicates the higher efficiency of asset utilization. As shown as the table below, from 2015 to 2019, the Huawei's total asset turnover has remained around 1. In the past five years, the highest value is 1.19 in 2017, the value decreased to 1 in 2019, decreased by 8% comparing with that in 2018.

The current asset turnover refers to the ratio of the company's revenue to the total current assets. It is an important indicator for reflecting the turnover speed of the company's current assets and evaluating the company's asset utilization rate. The trend of the current asset turnover is same with the total asset turnover. In general, the higher ratio represents the turnover of the company's current asset is faster and better. Under the faster turnover speed, the current assets will be relatively saved, which is equivalent to the expansion of the investment in current assets, which has enhanced the ability of generation of revenue. In the past five years, the Huawei's current asset ratios are totally bigger than 1. From 2015 to 2017, the current asset ratio was an upward trend, and increased from 1.31 to 1.49. In 2018 and 2019, the current asset ratio decreased by average 13.5% in each year.

Turnover/days	2019	2018	2017	2016	2015
Current Assets Turnover	1.22	1.36	1.49	1.47	1.31
Total Assets Turnover	1.00	1.08	1.19	1.18	1.06

Inventory turnover is a ratio of cost of goods sold to average inventory. It measures the efficiency of a company managing their inventory. Or we can use the inventory turnover days to evaluate the level of the company's inventory management, which is calculating by dividing the number of days in the year by the inventory turnover. The inventory turnover days reflects the average number of days that inventory can be turned over once. Generally, the higher inventory turnover or the lower inventory

turnover days describes the lower inventory occupancy level and the greater liquidity of inventory that means the speed of inventory converting into cash or account receivable is faster, which will enhance the short term debt pay ability and the profitability of the company. However, too high inventory turnover speed can lead the shortage and the loss of sales. Through the analysis of inventory turnover or the inventory turnover days, it is helpful to find out the problems in inventory management and reduce the level of capital occupation as much as possible. From the table below shown, the inventory turnover days increased from 97 days in 2018 to 127 days, achieved the highest in the past five years. In Huawei, 90 days of inventory turnover days is a internal criterion, we can see that in 2018 and 2019, the inventory turnover days exceed its criterion, and higher than that in 2015, 2016 and 2017.

Inventory turnover/days	2019	2018	2017	2016	2015
Inventory turnover	2.84	3.73	5.00	4.60	4.27
Days sales of inventory	126.90	96.58	72.07	78.22	84.36

The accounts receivable turnover is the ratio of the company's revenue to the accounts receivable. Generally, the higher the accounts receivable turnover indicates the company has the faster collection rate, the shorter average collection period, less bad debts losses, fast asset liquidity and strong debt pay ability. Correspondingly, it is better to have a shorter the accounts receivable turnover days. In the past five years, the accounts receivable turnover increased year by year, correspondingly the accounts receivable turnover days show the declined trend. This shows that Huawei's collection efficiency has improved, the probability of bad debts has reduced, and the company's monetization ability has improved.

Turnover/days	2019	2018	2017	2016	2015
Accounts receivable turnover	9.54	7.55	5.49	4.67	4.14
Accounts receivable turnover days	37.75	47.71	65.63	77.12	86.91

The accounts payable turnover refers to the average number of times that a company pays accounts payable within a year. It is used to measure how efficiency the company to manage the repayment of short-term debt to its creditors and suppliers. The higher ratio means that the payment terms are not favorable, and the company is always forced to pay the arrears as soon as possible. In general, the lower accounts payable turnover is better for the company. The accounts payable turnover days are the measure of how long the company needs to pay off the arrears. The longer accounts payable turnover days is favorable for company to use the more of the supplier's payment to supplement working capital. In the same industry, the company with a higher accounts payable turnover day are usually taking the stronger market position and good reputation. As shown as table below, the Huawei's accounts payable turnover was 6.04 in 2019, decreased by 1.4 year-on-year. Correspondingly the accounts payable turnover days is increased to 59.6 days in 2019 from the 48.38 days in 2018.

Turnover/days	2019	2018	2017	2016	2015
Accounts payable turnover	6.04	7.44	8.28	7.33	6.47
Accounts payable turnover days	59.60	48.38	43.46	49.10	55.61

## **4. Conclusion**

In 2019, under the continued suppression from U.S. government, all Huawei employees united and showed an amazing fighting spirit to overcome difficulties which is inseparable from Huawei's corporate culture. In such bad environment, through the analysis of Huawei's financial statement, Huawei has not only ensured the business continuity, but also achieved business growth with good financial indicators and stable operations.

In 2020, Huawei will face more severe challenges, not only to overcome the pressure from the United States, but also to deal with the impact of the epidemic. Under these circumstances, Under such circumstances, Huawei has to keep its core business and cut off edge projects; shrink the front line, save manpower, material resources, and financial resources, and prepare for a protracted war; stabilize the domestic market, increase the research and development of independent systems and chip, and the ecological construction.