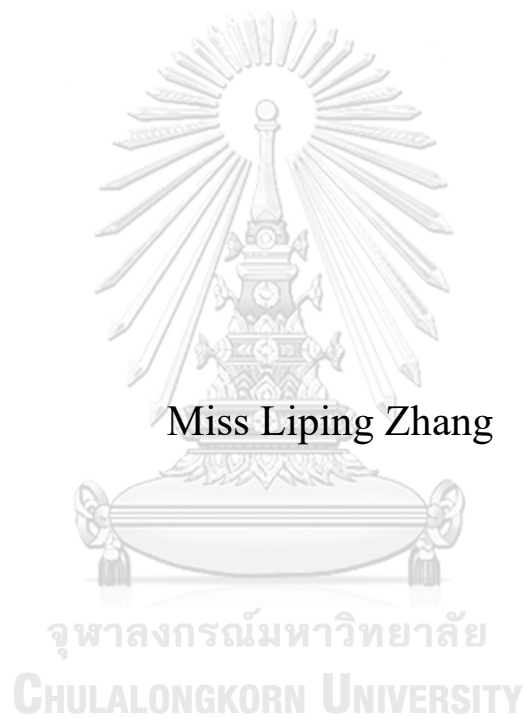


The Effect of the Ongoing China-US Trade War on Huawei,
Evidence from 2021 Financial Report



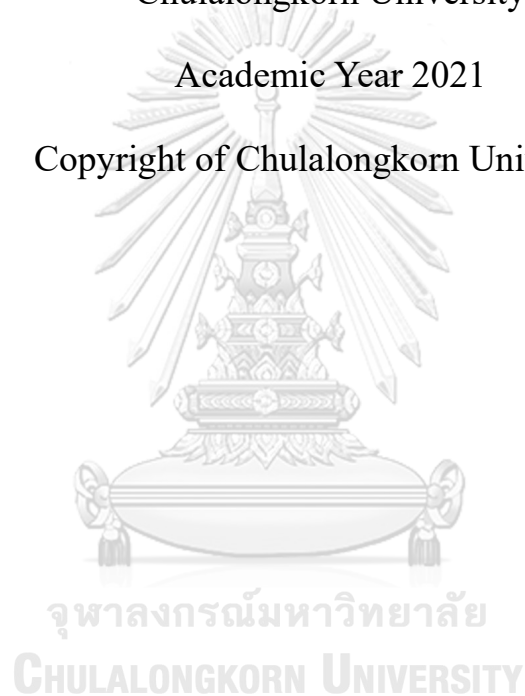
An Independent Study Submitted in Partial Fulfillment of the
Requirements
for the Degree of Master of Arts in Business and Managerial Economics
Field of Study of Business and Managerial Economics

FACULTY OF ECONOMICS

Chulalongkorn University

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ผลกระทบของสงครามการค้าระหว่างจีนกับสหรัฐฯ ที่มีต่อ Huawei

หลักฐานจากรายงานทางการเงินปี 2021



สารนิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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หลิปิง ชาง : ผลกระทบของสงครามการค้าระหว่างจีนกับสหรัฐฯ ที่มีต่อ Huawei
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ในเดือน 2018 สหรัฐอเมริกาเปิดสงครามการค้ากับจีน
 นอกเหนือจากการเพิ่มภาษีศุลกากรในสินค้าจีนในเดือน 2019
 สหรัฐอเมริกายังกระชับข้อจำกัดในการถ่ายทอดเทคโนโลยีของจีนและกิจกรรมทางธุรกิจของหัว
 เ ว้ ย เ รี ย ก ว่า ป้ า น ชิ ป
 หลายบริษัทที่ได้รับการลงโทษจากสหรัฐอเมริกจะเป็นระเบิดที่รุนแรงซึ่งอาจทำลายธุรกิจ
 บทความนี้พยายามที่จะเข้าใจสถานการณ์ปัจจุบันของหัวเว่ยหลังจากสี่ปีลงโทษจากมุมมองทางก
 า ร เ รี ย ก ว่า ป้ า น ชิ ป
 ผู้เขียนหวังว่างานวิจัยนี้จะเป็นประโยชน์ต่อการศึกษาเพิ่มเติมเกี่ยวกับการลงโทษของสหรัฐอเมริ
 กาบริษัทไฮเทคในต่างประเทศ

จุฬาลงกรณ์มหาวิทยาลัย
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สาขาวิชา เศรษฐศาสตร์ธุรกิจและการจัด ฅายมือชื่อนิติต
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Report. Advisor: Asst. Prof. SAN SAMPATTAVANIJA,
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In Jan of 2018, the U.S. had waged a trade war against
China. Besides additional tariffs on Chinese products, in May
of 2019, the USA is also tightening restrictions on the transfer
of technology to China and the business activities of Huawei,
namely the chip ban. For many companies, being sanctioned by
the U.S. would be a devastating blow, a crisis that could
potentially ruin the entire business. This paper has used the data
from Huawei's 10-year annual report and attempted to find out
Huawei's current situation after 4 years sanctions from the
financial point of view. The author expects that this study will
be helpful in conducting further study in the areas of the U.S.
sanctions on high-tech companies outside America.

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Liping Zhang

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Introduction

Founded in Shenzhen China in 1987, Huawei is the world's leading information and communication technology company. Huawei is also the second largest smartphone manufacturer. Huawei employs 197,000 people in more than 170 countries and regions. There are more than 3 billion people around the world that use Huawei's products. Huawei is the highest-ranking Chinese company based on revenue and employees.

Huawei invests heavily with more than 10% of its annual revenue spent in Research and Development. The world Intellectual Property Organization(WIPO)'s annual report ranked Huawei No.1 in the world in the terms of number of patent applications, with 5,464 patent applications published in 2020.

Huawei ranked No.49 on the 2020 Fortune Global 500 list, among which Huawei is the only privately held company. By the end of 2021, over 267 Fortune Global 500 companies worldwide had chosen Huawei as their partner for digital transformation. It is a Chinese company that is primarily employee owned with no foreign capital behind it eliminating its dependence on foreign approval. The 2021 annual report shows that founder Mr. Ren Zhengfei owns 0.84% of Huawei, while the remaining 99.16% is distributed to employees, thus ensuring Mr. Ren's ability to lead the company without being blocked by large shareholders.

Huawei is a classical high-technology and innovative company. Analyzing Huawei is important because the company is a microcosm of China. Both China and Huawei have had major challenges to deal with in recent years. Huawei's largest troubles have been the U.S. sanctions, and getting access to the latest generation of chip technology.

Background

1. China-US Trade War

Beginning in 2018, the U.S. started using tariffs to engage in and ramp up economic competition with China. As a result of this trade war, trade relations between the U.S. and China have been through significant changes, moved from one based on cooperation to one based on competition.

1.1. Stage I: Tit for Tat

At the beginning of 2018, the U.S. waged a trade war against China, who was increasingly viewed as a threat to U.S. leadership. In March 2018, President Trump announced additional tariffs of 25% on steel and 10% on aluminum which started the trade war between China and America. In May 2019, the U.S. announced an increase of 15 percent, from 10% to 25%, in tariffs on the listed \$200 billion goods imported from China. Reciprocally China announced an increase in tariffs of 25%, 20%, 10% and 5% on the listed \$60 billion worth of goods imported from the U.S. starting from June 1st of that year. At the end of 2019, when the U.S. and China reached the first phase of an agreement, the two sides had imposed tariffs on each other over more than a dozen rounds. This quick escalation propelled the situation to the next stage.

1.2. Stage II: Escalations

On October 11, 2019, the two sides reached a preliminary agreement after multiple rounds of negotiations, announcing the suspension of additional tariffs against each other and the reduction of the bilateral trade gap by increasing imports according to the needs of China's domestic market. Both sides suspended further tariff escalation. However, the U.S. did not stop and was intent on keeping up the pressure on China using other tactics like finance, and investment restrictions. For instance, ZTE and Huawei, both high-tech enterprises were listed by the U.S. on their "entity list". Taken to an extreme, the U.S. colluded with Canada, and arrested Meng Wanzhou, daughter of Huawei's founder, the deputy chair of the board and chief financial officer of Huawei, at Vancouver International Airport without any concrete evidence. In addition, The U.S. administration stated some inappropriate and hurtful remarks on sensitive issues like Taiwan, Tibet, Hong Kong and Xinxiang which greatly hurt China and the feeling of Chinese people. Since then, the political and economic environment on both sides has deteriorated.

1.3. Stage III: Alleviating

Under President Biden's administration, the United States continued the previous administration's tariff policy. It did not eliminate nor reduce tariffs but continued to expand the "entity list" which uses sanctions against Chinese companies. In fact, the trade war between the two sides continues. However, due to the U.S. domestic economic policy and global pandemic, there was some economic and social instability in the United States. This led to the U.S. having some negotiations with China. Janet

Yellen, the U.S. Treasury Secretary, was considering reducing the tariffs imposed in the Trump era in a "reciprocal manner". There has been a marked easing of political will on both sides to resolve the trade war issue.

According to the World Bank, before the trade war, the U.S. GDP reached 19.5 trillion dollars in 2017, counting for about 24 percent of the world's GDP, while China's GDP reached 13.2 trillion dollars, counting for about 15 percent of the world's GDP. The third is Japan, with a GDP of \$4.5 trillion. By several metrics, Both U.S. and China are far ahead of the rest of the world. They are the two major economies, also the largest developed country and the largest developing country in the world. They both have an over \$10 trillion GDP, thus a trade confrontation between them would have global ramifications. The tariffs imposed and scale of the trade war kept growing from tariffs being imposed on \$34 billion dollars of goods against Chinese 34 billion dollars goods at the beginning. Then it increased to \$50 billion versus \$50 billion, later shot up to \$60 billion versus \$200 billion. The scale of the trade war is indeed unprecedented with the U.S. even threatening to impose tariffs on \$500 billion of Chinese goods.

The last major trade war took place in 1970s -1980s between the world two largest economies at that time, Japan and the United State. During that period, the U.S. launched about seven rounds of trade wars against Japan, involving textiles, color TV sets, steel, cars, semiconductors and other products. The U.S. also asked for the opening of Japan's market and the appreciation of the yen.

The trade war between China and the U.S. is undoubtedly the largest trade confrontation in economic history, which exerts profound influence on international trade environment and the international relations, and also will have impact on the shaping of a new world pattern.

2. US Sanctions on Huawei

Besides imposing the additional tariffs, the U.S. had also restricted the technology transfer to China and business activities of some Chinese high-tech companies, notably Huawei.

The U.S. crackdown on Huawei began more than a decade ago, when Huawei sought to acquire 3COM in 2008, which was blocked by the U.S. government and failed to pass a review by the Committee on Foreign Investment in the U.S. In the years that

followed, Huawei's equipment sales contracts and acquisition bids with American companies foundered, all because of the U.S. government interference.

Ten years later in January 2018, the U.S. government firmly opposed Huawei's signing of a partnership with AT&T and prohibited Huawei's mobile phones from being sold in American market. In August 2018, the former President Trump signed the National Defense Authorization Act. It prohibits domestic government agencies and contractors from using Huawei's technologies and some other Chinese firms. In November, America and those of Germany, Italy and Japan, asked their telecommunication firms to stop using equipment from Huawei.

On February 24, 2019, Huawei unveiled a 5G foldable phone. This device is at least twice as complete as Samsung's foldable phone, meaning Huawei may already have accumulated more mobile technologies than Samsung. It was also estimated to be the closest and sensational product indicating that Chinese mobile phones officially "lead the future" in the world before 2019.

Since then, the sanctions on Huawei had started and progressively put Huawei in difficult times.

2.1. Round 1

On May 15, 2019, the US Department of Commerce announced that Huawei are added to the "Entity List" for export control.

On May 16, 2019, Flextronics asked all its factories around the world to stop all cooperation with Huawei. Flextronics' contract factory in Changsha not only stopped production and refused to deliver goods, but also refused to return the equipment and materials owned by Huawei.

On May 20, 2019, Google announced that it stopped its business cooperation with Huawei. Thereafter, Huawei's devices would not get updated to Google's Android operating system, only use the open-source public version is available to Huawei, which had a great negative impact on Huawei's overseas consumer.

On May 25, 2019, the Wi-Fi Alliance and SD Society revoked Huawei's membership. (But it slowly loosens Huawei's restrictions later.)

May 23, 2019, the U.K. telecom operator EE announced that its 5G service would be launched soon, but it will not support Huawei 5G phones. ARM, a British chip designer, stopped supplying opponents to Huawei. Microsoft Corp, Toshiba Corp, KDDI and SoftBank, two major Japanese telecom companies, had also suspended business cooperation with Huawei.

On May 29, 2019, IEEE banned Huawei employees from serving as editors and reviewers of its journals and magazines. This means that America's ban on Huawei slowly extends to academics. (this ban was deleted on 3rd June).

...

After the first round of sanctions, although Huawei lost the North American market, it still went super well in the rest of the world. In the second quarter, Huawei sold 55.8 million smartphones, with a market share of 19.6%, which is still greater than Samsung as the top 1 in the world. In addition, Huawei released the first 5G commercial mobile phone with 5G baseband, which was Huawei's first mobile phone officially with 5G broadband and commercially released.

On the other hand, these sanctions forced Huawei start to accelerate the development on its own chips. In the early morning of May 17, 2019, the president of Huawei Haisi sent a letter to his employees, which brought confidence to everyone that all the technology stored by Huawei Haisi would be converted overnight, including the independent solution of various components such as chips.

2.2. Round 2

On May 15, 2020, the United States tightened its sanctions, mainly targeting Huawei's chip business. Manufacturers who use Electronic Design Automation, such as TSMC and SMIC, are also not allowed to make chips for Huawei.

...

This time, the sanction was much serious than the round 1, because chips are so important for ICT industry firms, as little chips are called "the brains of the modern world". The ban covered a crucial Huawei supplier, Taiwan Semiconductor Manufacturing Co., the world's largest contract chipmaker. As Huawei's old partner, TSMC opened its production lines during the 120-day buffer period and coordinated

orders from other manufacturers in order to produce enough chips for Huawei and bid it a good goodbye.

It not only stopped Huawei from purchasing chips from its main suppliers, but it also almost cut Huawei's ability to develop its own chips. As the world's top chip design company, Huawei Haisi took China's chip design industry to the forefront of the world, comparable to Qualcomm, Samsung and so on. Now such changes are devastating for Huawei Haisi.

However, at this time, Huawei still was able to produce chips through third-party commissions, or bought directly from MediaTek or Samsung, which are not regulated by the United States.

2.3. Round 3

Three months later. On August 17, 2020, the U.S. Commerce Department further restricted Huawei's access to American technologies and added other 38 affiliates to the "entity list".

...

It completely blocked Huawei from buying American parts through third parties. The chip ban cut off supplies of key components to Huawei's smartphones. On November 17, 2020, Huawei reluctantly sold its subsidiary, the entire Honor business (important brand smartphone business). After the transaction, Huawei didn't own any share of Honor and did not participate in its management.

2.4. Round 4

In April 2021, the United States restricted Huawei's component suppliers by stopping them supplying any components involved American technology to Huawei 5G equipment.

...

Besides these sanctions, as I mentioned before, on December 1, 2018, Meng Wanzhou was arrested at Airport in Canada. On September 24, 2021, the Justices Department announced that it had reached an agreement with Meng to resolve the case through a deferred prosecution agreement. After 1,028 days, Meng returned home on a chartered Chinese government plane.

Why Study Huawei?

Actually, Huawei is not the first case of a high-tech company sanctioned by the U.S. Government.

1. Precedent: Japan Semiconductor

In the 1970s, Japan decided to support its semiconductor industry. The government organized several domestic enterprises to integrate the semiconductor resources and talents, in order to improve whole technical level of Semiconductor chips. Up to 1980, Japan gained 30% share of the global semiconductor memory market. Five years later in 1985, its market share boomed over 50%, leaving the United States far behind.

In the meantime, the U.S. waged the trade war in 1980s, mainly targeted on limiting the Japanese semiconductor business. In September 1986, both sides signed the US-Japan Semiconductor Agreement, which was aimed to limit Japanese companies' sale of computer chips to America. Japan was required to open its semiconductor market to foreign companies.

Faced with the prospect of Japan overtaking America as the world's preeminent producer of vital technology, Reagan stuck a nationalist pose, "The health and vitality of the US semiconductor industry are essential to future competitiveness, we cannot allow it to be jeopardized by unfair trading practices". In 1987, President Reagan is still not satisfied with the results, and decided to escalate into a wider trade war by imposing 100% tariffs on all semiconductors imported from Japan. While in 1988, American Congress approved a \$500 million policy to subsidize domestic chipmakers.

Since then, Japan's semiconductor chip industry was falling from the top of the wave to the abyss. In 1991, some tariffs were lifted just a year after they were imposed. The rest were discontinued by President George H.W. Bush. Later America did reclaim its place as the World's largest maker of semiconductor chips.

In 1993, Japan owned 6 of the world's top ten semiconductor firms, while AMD's net profit fell by 66% and Intel lost \$173 million and announced it was pulling out of the DRAM business. However, In the late 1990s, Japanese semiconductor companies were gradually defeated sanctions imposed by the U.S. government. By 2016, there was only one Japanese company among the world's top 10 semiconductor companies.

2. Worries on Huawei

We know that Huawei is not the first high-tech company sanctioned by the U.S. Government, it won't be the last one as well. The sanction on Huawei is similar to the semiconductor war between Japan and America. Japanese semiconductor industry had nearly died in the past, Huawei is now suffering. Who will be the next one in future? One must understand, for many companies, being sanctioned by the U.S. would be a devastating blow, a crisis that could potentially ruin the entire business.

With the deepening supply chain globalization, as the United States is the world's largest scientific and technological country, it is impossible for any company to be completely independent of American technology and software. Once a company reaches the same level as Huawei, it will be considered as a threat by the U.S., then this kind of sanction may occur again. High-tech companies outside U.S. are worried about if sanction happens to their firms in the future and how they could survive. They also want to formulate a long-term strategy in advance to avoid it.

Now, governments, individuals, firms, especially high-tech companies, from all over the world are curious about those questions like *Can Huawei survive the U.S. chip ban? The trade war has been going on for 4 years, how is Huawei now*. Several scholars have studied the Huawei affair, however mainly on why the U.S. sanctioned Huawei. Hosain (2019) concluded that, "the Huawei ban in the U.S. will not have a positive impact for either party or for the general consumers of mobile sets." Huawei will eventually become the leader in the telecommunications field; however, accepting this truth depends on if some western nations are able to distinct the ideology and the commercial when talking about China issues, which is not easy (Mascitelli & Chung, 2019). Inkster (2019) said that, because of the U.S. sanctions, China will put more efforts to enhance the capabilities where it has to rely on America or other countries, and keep seeking more progress in some advanced and sophisticated fields such as artificial Intelligence.

It is hard to give a simple answer to those question directly, as we can see, it took more than 20 years to see the Japan case's result... For sure, Huawei will not die immediately, but we can know how it is going, and how much effect the U.S. sanctions have on Huawei. If Huawei breaks through, we can also learn something from it.

This study will try to provide some clues to those questions about Huawei from the perspective of current operation status by analyzing the recently released Huawei 2021 financial report.

Methodology

Financial analysis is based on gathering and sorting the accounting and reporting data, and using a series of analytical techniques and methods, to assess firm's past and present financial performance and stability.

1. Different Ratios

Reading the financial statements is important but a good financial analysis should dig deeper to find what behind the numbers, and assess the company's future direction. Financial ratios can help it. We calculate many different financial ratios with different one examining different aspects of the company's operations. These ratios can be grouped into five categories:

- Liquidity ratios, which provide an idea of Huawei's ability to pay off liabilities that are maturing within a year.
- Efficiency ratios, which provide an idea of how efficiently Huawei is using its assets.
- Leverage ratios, which provide an idea of how Huawei has financed its assets and Huawei's ability to repay its long-term debt.
- Profitability ratios, which provide an idea of how profitably Huawei is operating and utilizing its assets.
- Growth capacity ratios, which provide an idea of how well Huawei had developed in the past to predict how much potential Huawei has in future development.

2. Ratios Analysis Method

Ratio analysis is a method to analyze and evaluate organization's historical financial situation and operating results by comparing the relevant data of different important items, and to understand the development prospects of the firm. It is the most basic tool of financial analysis, often compares ratios in three aspects:

- **Past Performance:** we will calculate the last 10 years ratios and draw the

graphs.

- **Future Performance:** we will predict future 3 years value based on last 10 years values by using the AAA version of the Exponential Smoothing algorithm, which also returns a 95% confidence interval with normal distribution.
- **Comparative Performance:** In this study, we will compare Huawei's performance with the industry average, which is from the *2021 Enterprise Achievement Appraisal Criteria* published by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). It has two reference values, the one is Chinese domestic evaluation value in 2021, the other one is global evaluation value in 2020. Due to the global pandemic recent years, the business environment in 2021 is much different with 2020, thus the global evaluation value in 2020 might be not referential. Therefore, in this study, we only compare Huawei's performance with the Chinese domestic industry average value.

Comparative analysis provides a good way to identify trends. It presents the same information over multiple time periods which make the analysis easily. Analyzing trends is as important as other items because it provides clues as to whether a company's financial status is likely to improve or deteriorate.

3. Data Source

The normal sources of financial analysis are accounting and reporting financial data, usually they are from the Balance Sheet, Income Statement and Statement of Cash Flow. We can get these details from firm's annual report. This study uses Huawei's 10 years annual report from 2012 to 2021 downloaded from Huawei website.

Huawei 2021 Financial Statement Analysis

Financial statements are written reports that contain the firm's business activities. It helps managers identify the firm's strengths and weaknesses and gauge the predicted effects of proposals. Outsiders such as creditors and investors also use it to decide if they should purchase the company's stock or provide funds to the company. We can examine the statements and try to find answers to various questions, such as: How big is this firm? Is it growing? Fast or slow? Generating or losing money?

1. Liquidity Ratios

The liquidity ratios could give us an idea of the question: will this firm be able to pay off its debts that come due and thus to be viable?

1.1. Current Ratio

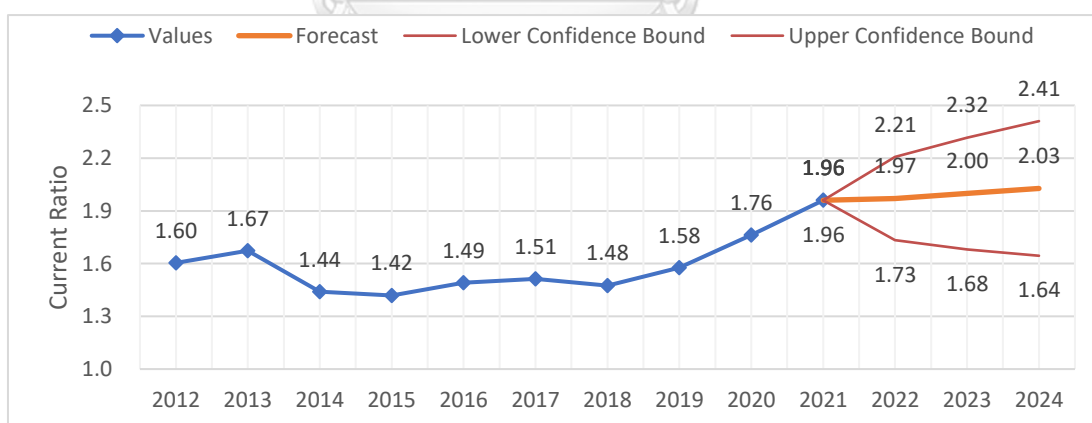
The primary liquidity ratio is the current ratio, which is calculated as below:

$$\begin{aligned} \text{Current Ratio}_{2021} &= \frac{\text{Current assets}}{\text{Current liabilities}} \\ &= \frac{\text{¥ 769,378 million}}{\text{¥ 392,455 million}} \\ &= 1.96 \end{aligned}$$

$$\text{Industry average}_{2021} = 7.8$$

Typically, if a firm has financial difficulty, it starts to pay its accounts payable slowly and borrow more money from its bank that results in the increase of current debts. Huawei's current ratio is 1.96, which is much lower than the industry average of 7.8, indicating that Huawei's liquidity position is relatively weak.

Figure 1.1 Huawei 10-year current ratio and 3-year forecast



From the figure above, before 2018 (the trade war), Huawei's current ratio almost kept at a stable level, about 1.5. After the trade war, Huawei had improved its liquidity status a little bit, which may be mainly due to the YoY increase in assets. In the 3 years short future, the current ratio will keep rising slowly. It is understandable because the chip ban limits Huawei's smartphone business and lowered the sales. Thus, Huawei has to reduce the liquidity risk.

1.2. Quick, or Acid Test, Ratio

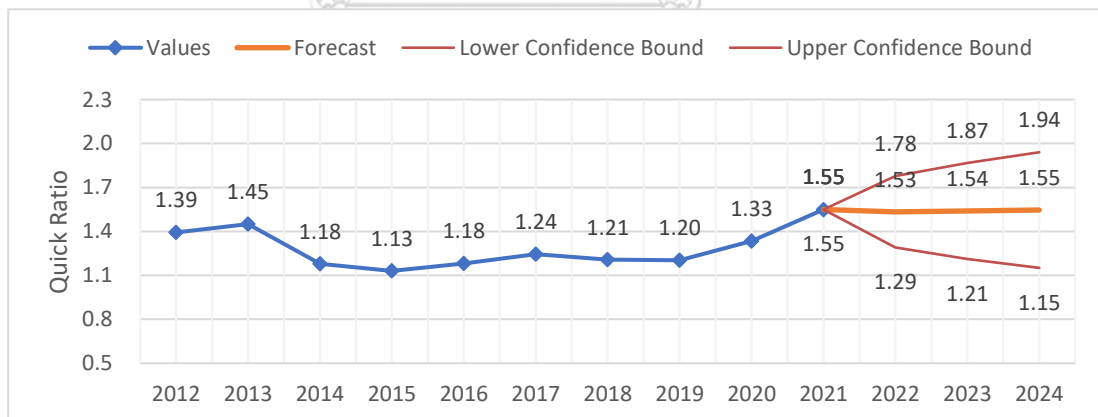
The second liquidity ratio is the quick ratio, which is calculated by minus inventories from current assets then divides current liabilities.

$$\begin{aligned} \text{Quick Ratio}_{2021} &= \frac{\text{Current assets} - \text{inventories}}{\text{Current liabilities}} \\ &= \frac{\text{¥ } 769,378 - 161,306 \text{ million}}{\text{¥ } 392,455 \text{ million}} \\ &= 155\% \end{aligned}$$

$$\text{Industry average}_{2021} = 98.8\%$$

Inventories are usually the least liquid of a company's current assets. When the sales slowdown, inventory can't be turned into cash as quickly as other liquid assets. Thus, it measures Huawei's ability to repay short-term debt without relying on disposing of the inventories. Huawei's quick ratio of 155 is much better than the industry average of 98.8. That gives us the opposite conclusion about Huawei's liquidity performance, also indicates that Huawei had more inventory in stock than industry average.

Figure 1.2 Huawei 10-year Quick ratio and 3-year forecast



From the figure above, over the past 10 years, Huawei's quick ratio is stable, and the ratio shows an increased tendency after the U.S. sanctions on Huawei. Same as the current ratio, it is mainly because Huawei's assets increased those years. On the other hand, facing a lot of uncertainty, Huawei tried to reduce its liquidity risk.

2. Efficiency Ratios

The efficiency ratios could give us an idea of this question: Does the amount of

each type of asset look reasonable in the perspective of current and projected sales? A firm needs to find a balance without neither too high nor too low assets.

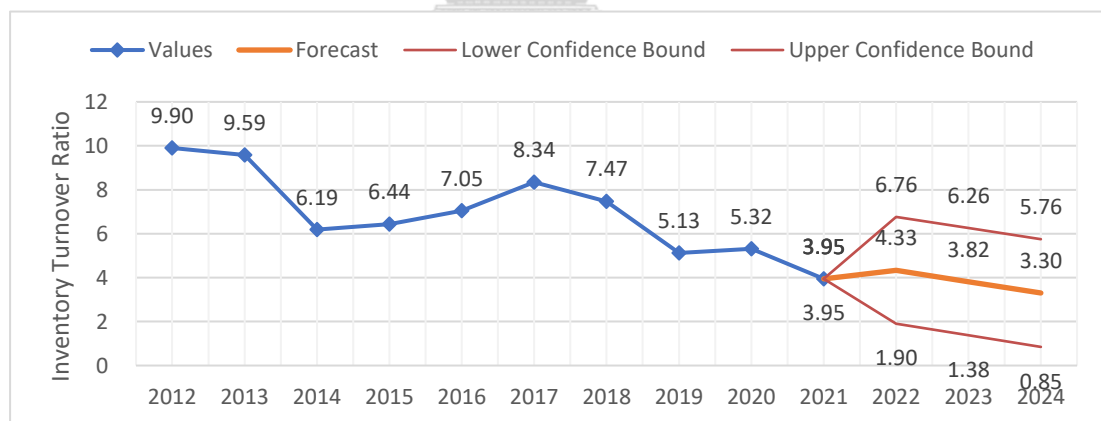
2.1. Inventory Turnover Ratio

Inventory turnover ratio shows how many times the inventory is "turned over" during the year, which reflects the turnover speed of inventory and calculated as below:

$$\begin{aligned}
 \text{Inventory Turnover Ratio}_{2021} &= \frac{\text{Sales}}{\text{Inventories}} \\
 &= \frac{\text{¥ 636,807 million}}{\text{¥ 161,306 million}} \\
 &= 3.95 \\
 \text{Industry average}_{2021} &= 3.5
 \end{aligned}$$

Huawei's inventory turnover ratio of 3.95 is slightly higher than the industry average of 3.5. It illustrates that Huawei is not holding too much inventory in relative term of sales.

Figure 2.1 Huawei 10-year inventory turnover ratio and 3-year forecast



From the figure above, over the past 10 years, Huawei's inventory turnover ratio is decreasing, which means Huawei has more inventories year over year, or we can say that, because the sales increased year over year, Huawei gradually increased its stock to satisfy the delivery term. The decreasing in 2021 might also be because Huawei's sales decreased in 2021.

2.2. Days Sales Outstanding

Days sales outstanding represents the average length of time the firm must wait

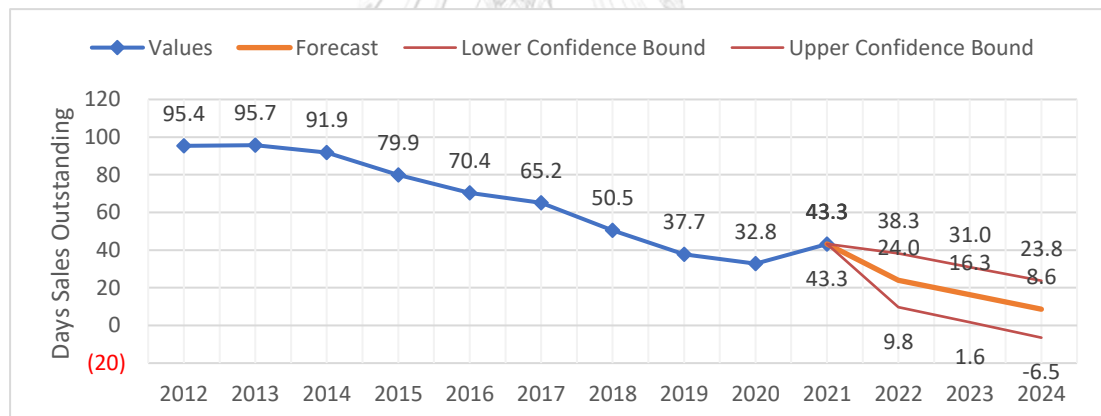
after making a sale before receiving cash, which is calculated as below:

$$\begin{aligned}
 DSO = \text{Days sales outstanding}_{2021} &= \frac{\text{Receivables}}{\text{Average sales per day}} \\
 &= \frac{\text{¥ } (76234 + 74741)/2 \text{ million}}{\text{¥ } 636,807/365 \text{ million}} \\
 &= 43.3
 \end{aligned}$$

$$\text{Industry average}_{2021} = 96.05$$

Huawei's 43.3 days sales outstanding is much shorter than the industry average 96.05-day. We can also compare it with Huawei's own credit term. Huawei's credit policy requires payment within 90 days from suppliers. Therefore, the fact that 43.3 days sales is less than the credit term of 90 days indicates that Huawei's customers are paying their bills ahead of time. It allows Huawei to use these funds to reduce the interest-bearing loans or other type of costly capital.

Figure 2.2 Huawei 10-year days sales outstanding and 3-year forecast



From the figure above, over the past 10 years, Huawei's DSO is decreasing, indicating that it takes less and less days for Huawei to collect its accounts receivable. It also illustrates a great deal about the situation of Huawei's strong cash flow.

2.3. Total Assets Turnover Ratio

The total assets turnover ratio measures the turnover of firm's assets, and it is calculated as below:

$$\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total assets}}$$

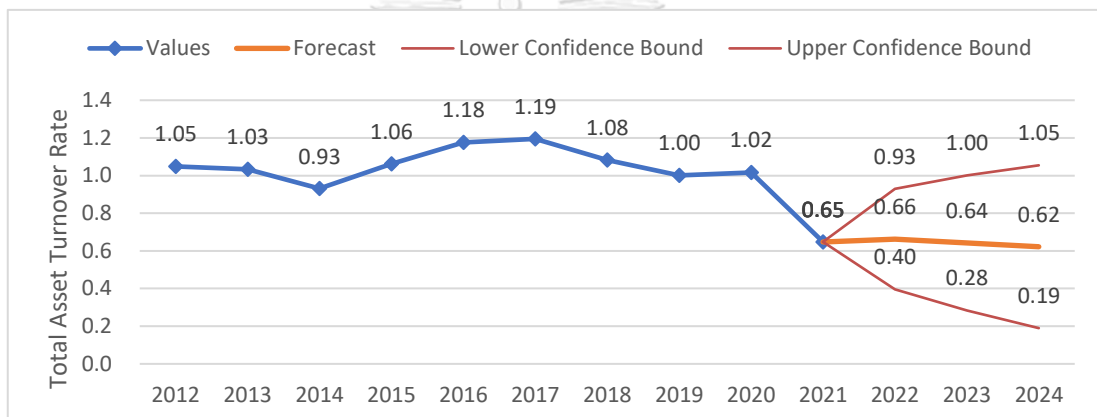
$$\begin{aligned}
 &= \frac{\text{¥ } 636,807 \text{ million}}{\text{¥ } 982,971 \text{ million}} \\
 &= 0.65
 \end{aligned}$$

$$\text{Industry average}_{2021} = 0.7$$

Huawei's total asset turnover ratio is 0.65. It is slightly lower than the industry average of 0.7, indicating that Huawei is not generating relatively enough sales given its total assets.

Figure 2.3 Huawei 10-year total asset turnover ratio and 3-year forecast

From the figure above, Huawei's total asset turnover ratio is stable around 1.05



before 2021, it means that Huawei used to generate sufficient sales given the amount of its total assets. The ratio decreased in 2021 is due to the sudden decrease in sales. If in future years, the sales go up, this ratio will return to its original level.

3. Leverage Ratios

3.1. Total Debt to Total Assets

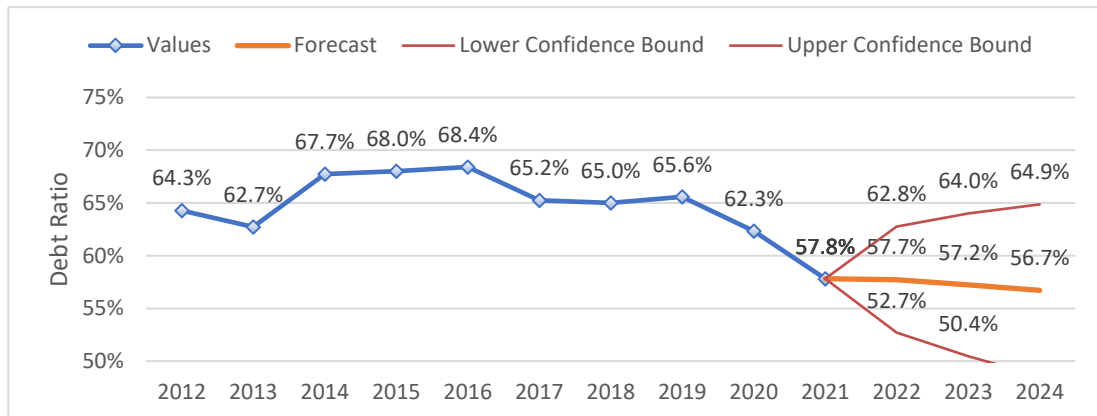
The debt ratio measures the percentage of funds provided by creditors, which is calculated as below:

$$\begin{aligned}
 \text{Debt ratio} &= \frac{\text{Total debts}}{\text{Total assets}} \\
 &= \frac{\text{¥ } 568,319 \text{ million}}{\text{¥ } 982,971 \text{ million}} \\
 &= 57.8\%
 \end{aligned}$$

$$\text{Industry average}_{2021} = 58.3\%$$

Huawei's debt ratio is 57.8%, which means over 50% of the funds are provided by creditors. It is close to the industry average 58.3%, making it less costly for Huawei to borrow additional money without first raising more equity in future.

Figure 3.1 Huawei 10-year debt ratio and 3-year forecast



From the figure above, over the past 10 years, Huawei always had higher debt ratio, indicating that Huawei used to borrow money easily, because creditors believe that it is in a solid financial position and can be expected to pay them back. As we can conclude that, in a short future, Huawei won't face difficulties in borrowing money.

3.2. Time-interest-earned Ratio

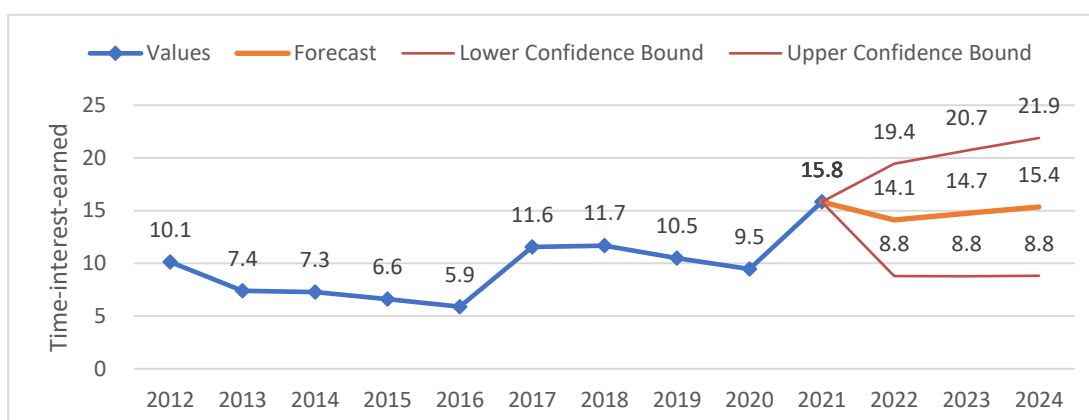
The times-interest-earned ratio measures the firm's ability to meet its annual interest payments, which is determined by dividing EBIT by the interest charges:

$$\begin{aligned} \text{Debt ratio} &= \frac{\text{EBIT}}{\text{Total interest charges}} \\ &= \frac{\text{¥ } 121,412 \text{ million}}{\text{¥ } 7,672 \text{ million}} \\ &= 15.8 \end{aligned}$$

$$\text{Industry average}_{2021} = 2.9$$

Huawei's interest charges are covered 15.8 times. The ICT industry average is 2.9, thus Huawei is covering its interest charges by a larger margin of safety than the industry average. The TIE ratio proved our findings in previous item - debt ratio, that Huawei will not face great difficulty if it wants to borrow more money.

Figure 3.2 Huawei 10-year TIE ratio and 3-year forecast



Over the past 10 years, Huawei always had a higher TIE ratio, the company is better off from the risk standpoint. The higher TIE ratio indicates that Huawei has enough cash to repay its interest payments, and can continue to re-invest these cash into the operations to generate consistent profits.

3.3. Cash Coverage Ratio

The cash coverage ratio measures a business's ability to pay off its liabilities with its existing cash, which is calculated as below.

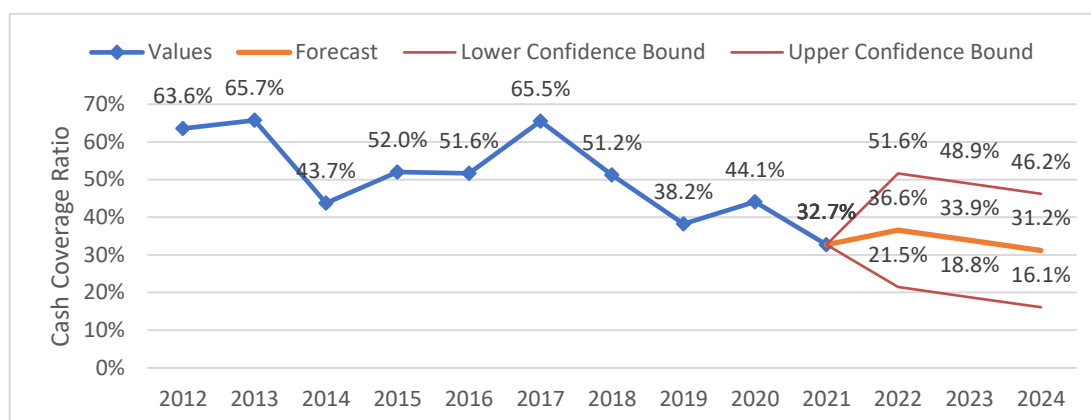
$$\begin{aligned}
 \text{Cash Coverage Ratio}_{2021} &= \frac{\text{Cash \& cash equivalents}}{\text{Current Liabilities}} \\
 &= \frac{\text{¥ 128,395 million}}{\text{¥ 392,455 million}} \\
 &= 32.7
 \end{aligned}$$

$$\text{Industry average}_{2021} = 7.8$$

Huawei's cash coverage ratio is 32.7%, which means Huawei currently don't have the enough cash available to pay off all liabilities. But it is much greater than the industry average of 7.8, indicating that Huawei actually has plenty of cash on hand.

From the figure below: over the past 10 years, Huawei always has a higher cash coverage ratio. If we compare the trend before and after the trade war, the ratio gets lower, which indicates Huawei was trying to increase the liquidity assets and cash flow. Although the ratio has been gradually decreasing year of year, it may only be a matter of time before it falls below the industry average. This means, in the future, it is still safe/riskless for Huawei to increase its debts.

Figure 3.3 Huawei 10-year cash coverage ratio and 3-year forecast



4. Profitability Ratios

The profitability ratios reflect the net result of all of Huawei' financing policies and operating decisions.

4.1. Operating Margin

This ratio measures operating income per RMB/Yuan of sales. It is calculated by dividing earnings before interest and tax by sales.

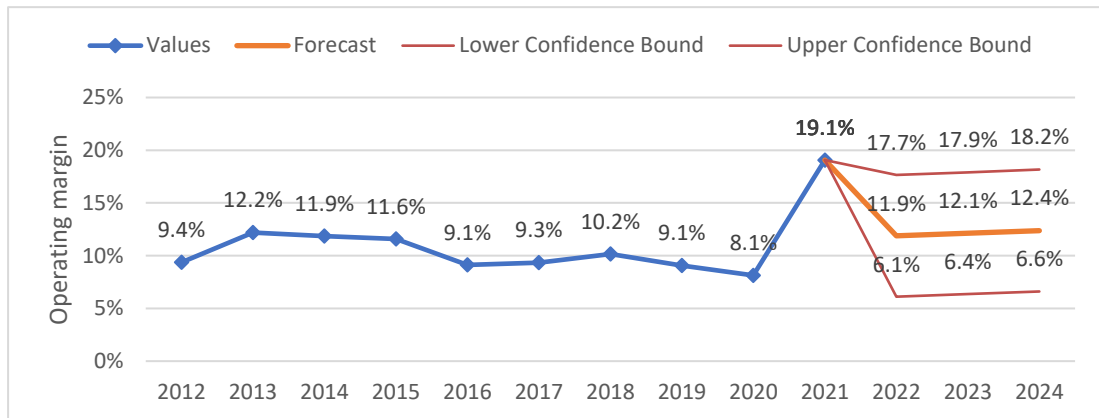
$$\begin{aligned}
 \text{Operating Margin}_{2021} &= \frac{\text{EBIT}}{\text{Sales}} \\
 &= \frac{¥ 121,412 \text{ million}}{¥ 636,807 \text{ million}} \\
 &= 19.1\%
 \end{aligned}$$

$$\text{Industry average}_{2021} = 2.9\%$$

Huawei's 19.1% operating margin is much higher than the ICT industry average of 2.9%, indicating that Huawei's operating cost is very low. This is consistent with the conclusion we got from the high Days sales outstanding.

From the figure below, we can see that Huawei's operating margin was slightly going down before 2021. In 2021, it went up because Huawei sold its 2 subsidiaries, which made EBIT increased a lot while sales decreased.

Figure 4.1 Huawei 10-year Operating margin and 3-year forecast



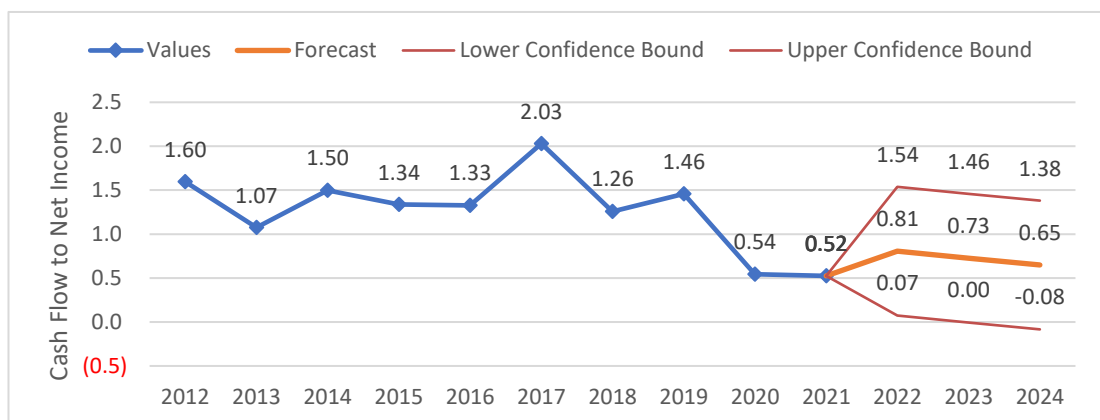
4.2. Cash Flow to Net Income Ratio

The cash flow to net income ratio is calculated as below:

$$\begin{aligned}
 \text{Cash Flow to Net Income Ratio}_{2021} &= \frac{\text{Cash Flow from Operating Activities}}{\text{Net income}} \\
 &= \frac{\text{¥ 59,670 million}}{\text{¥ 113,178 million}} \\
 &= 0.53 \\
 \text{Industry average}_{2021} &= 1.0
 \end{aligned}$$

The calculation shows that Huawei generates 0.53RMB of cash for every 1 generated in net income, which is below the industry average 1.0.

Figure 4.2 Huawei 10-year cash flow to net income and 3-year forecast



From the 10-year trend curve, before the U.S. sanctions on Huawei, its cash flow to net income was stable and greater than 1.0. Generally, it indicates that Huawei takes in less cash and cash equivalents than what it earns in profits. However, after the trade

war, the ratio fell down became smaller than 1, indicating that Huawei takes in more cash and cash equivalents than before.

4.3. Return on Total Assets

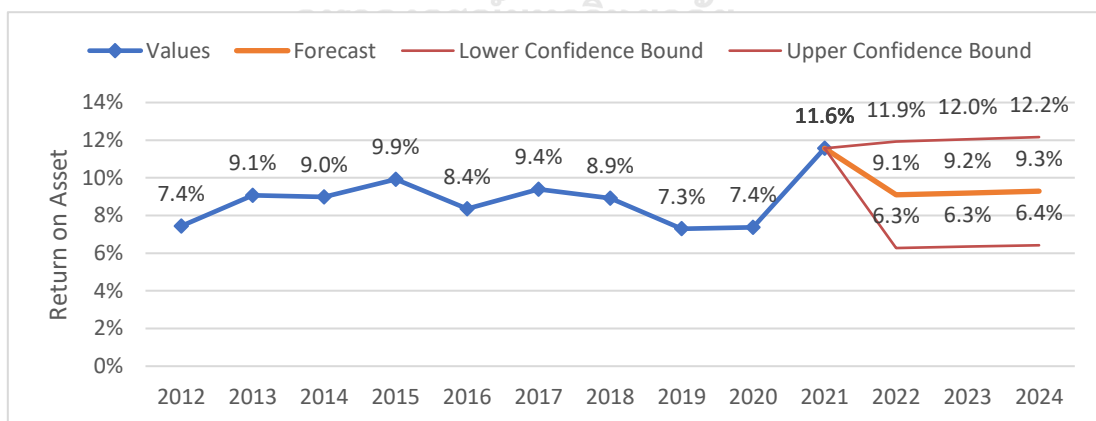
Net income divided by total assets gives us the return on total assets (ROA), which is calculated as below:

$$\begin{aligned}
 \text{Return on total assets (ROA)} &= \frac{\text{Net income}}{\text{Total assets}} \\
 &= \frac{\text{¥ 113,178 million}}{\text{¥ 982,971 million}} \\
 &= 11.57\% \\
 \text{Industry average}_{2021} &= 3.5\%
 \end{aligned}$$

Huawei's 11.57% return is well above the 3.5% industry average, indicating that Huawei made more profit given its total assets than other companies in ICT industry. Obviously, it is better to have a higher than a lower return on assets.

From the 10-year trend curve below, we can see Huawei's ROA was stable before 2021. In 2021, the ratio went suddenly, mainly because the sale of Honor business and another subsidiary, which increased its net income and decreased the total assets.

Figure 4.3 Huawei 10-year return to asset and 3-year forecast



4.4. Return on Equity

The return on equity measures the efficiency of the use of its own capital:

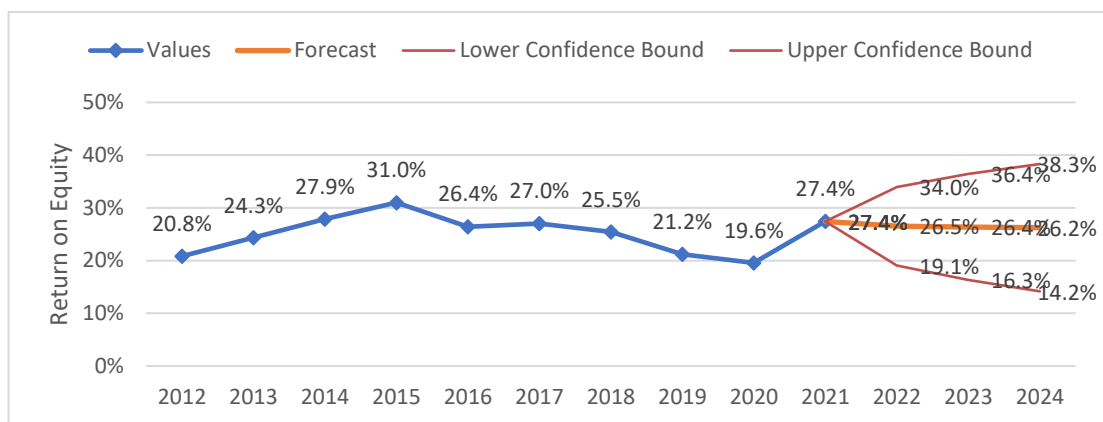
$$\text{Return on equity (ROE)}_{2021} = \frac{\text{Net income}}{\text{Equity}}$$

$$\begin{aligned}
 &= \frac{\text{¥ } 113,178 \text{ million}}{\text{¥ } 414,652 \text{ million}} \\
 &= 27.4\%
 \end{aligned}$$

$$\text{Industry average}_{2021} = 6.1\%$$

Huawei's 27.4% return is much above the 6.1% industry average. It reflects the Huawei's high ability to obtain net income of its own capital.

Figure 4.4 Huawei 10-year return on equity and 3-year forecast



From the trend above, we can say Huawei's ROE was stable and around 25% before sanction. After 2018, it decreased a little. Last year, the ratio increased to 27.4%, the reason is still the sale of business and subsidiaries.

5. Growth Capacity Indicators

5.1. Sales Growth Rate

The sales growth rate measures the rate at which a business is able to increase revenue from sales, which is calculated as below:

$$\begin{aligned}
 \text{Sales Growth Rate}_{2021} &= \frac{\text{Current period Sales} - \text{Prior Period Sales}}{\text{Prior Period Sales}} \\
 &= \frac{\text{¥ } 636,807 - 891,368 \text{ million}}{\text{¥ } 891,368 \text{ million}} \\
 &= -28.6\%
 \end{aligned}$$

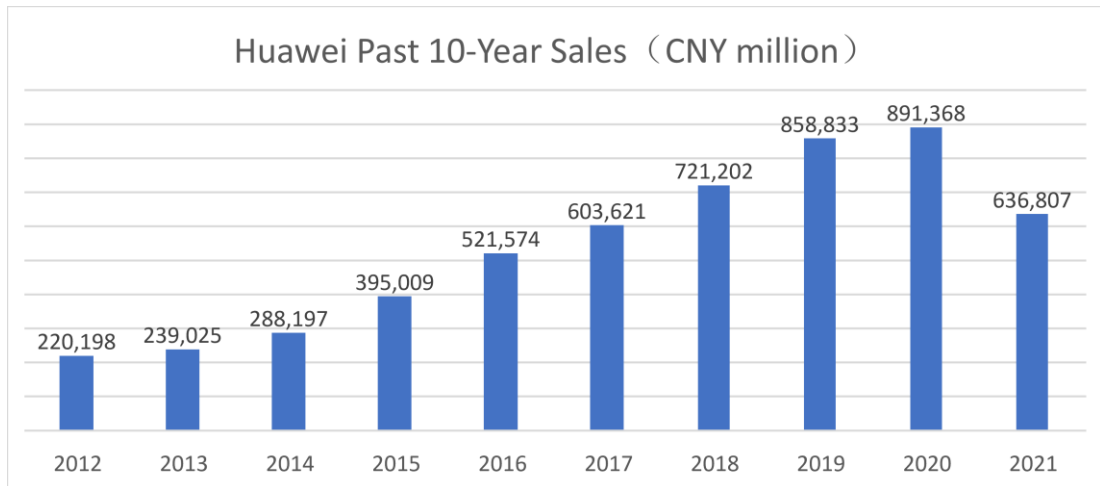
$$\text{Industry average}_{2021} = 0.8\%$$

Huawei's sales decreased dramatically in 2021, leads to the sales growth rate much

lower than the industry average, as the graph shows below. before the trade war, Huawei was expanding quickly. Even after the sanction in 2019, the sales still increased a lot of thanks to the nationwide displayed 5G technology.

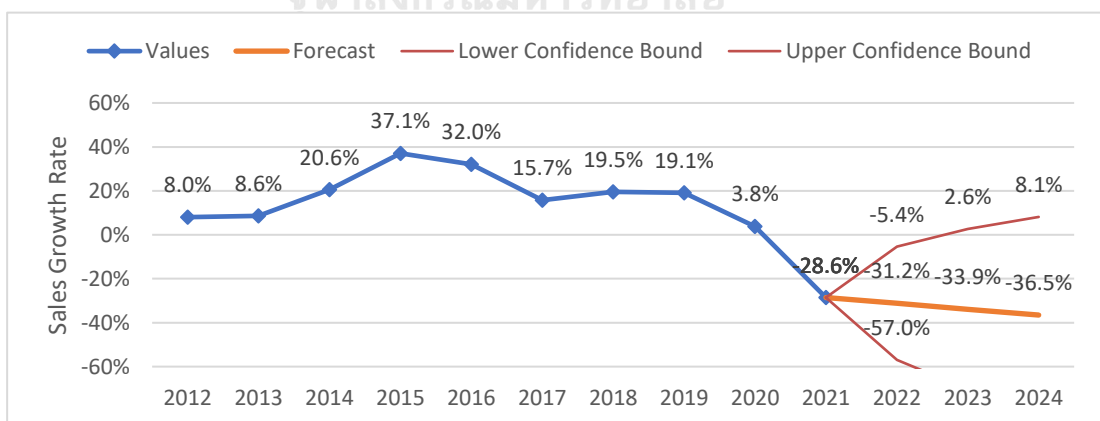
Figure 5.1.1 Huawei 10-year sales

From graphs below, before trade war 2018, Huawei's sales grew rapidly. Even



after the sanctions imposed, in 2020 Huawei's sales still grew 3.8%, mainly because of the invent of 5G technology, making its carrier business boom in those 2 years. And at that time Huawei had adequate chips in stock. In 2021, there was a sudden drop in sales, covid-19 could be one of the reasons, but not the leading cause. Because the other ICT companies' sale increased in 2021. Thus, we go deeper to see what happened there.

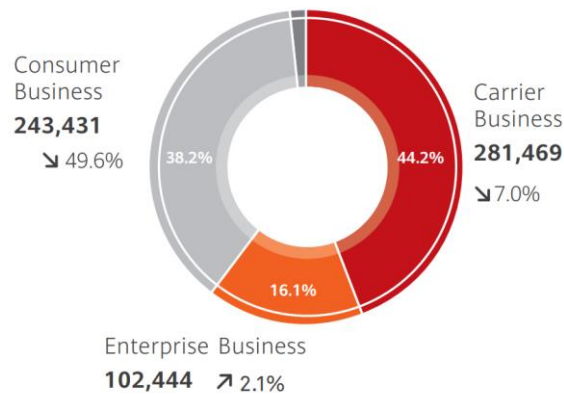
Figure 5.1.2 Huawei 10-year sales growth rate and 3-year forecast



From the below 2021 business distribution, Huawei's consumer business decreased almost 50%. This is the main reason of the drop in the total revenue. Last year, as the chip stock was exhausted. Huawei had to sell the entire Honor business, it used to be one of its important brands and components of Consumer Business. The sanctions imposed by the U.S. government have brought Huawei a lot of with "striving

for survival”.

Figure 5.1.3 Huawei 2021 business overview



5.2. Total Asset Growth Rate

The asset growth rate measures how fast a firm’s asset has been growing, which is calculated as below:

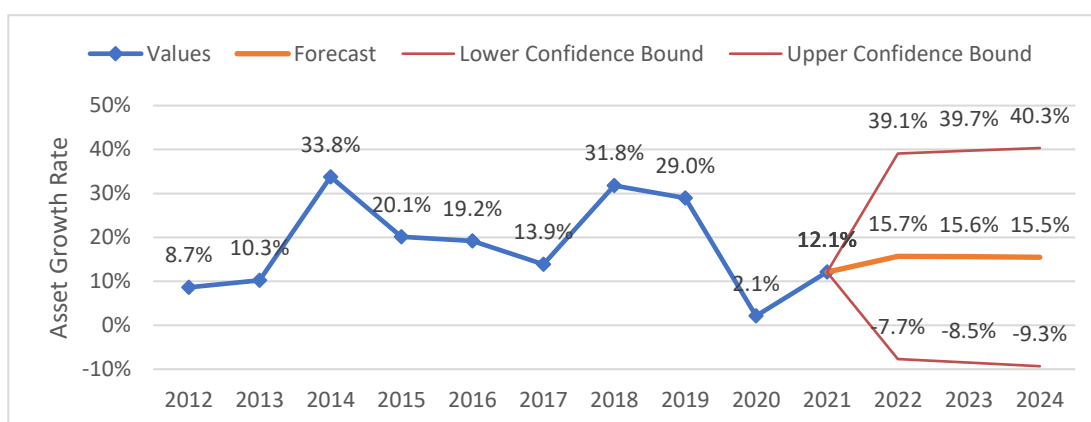
$$\begin{aligned}
 \text{Asset Growth Rate}_{2021} &= \frac{\text{Current period Asset} - \text{Prior Period Asset}}{\text{Prior Period Asset}} \\
 &= \frac{\text{¥ 982,971} - \text{¥ 876,854 million}}{\text{¥ 876,854 million}} \\
 &= 12.1\%
 \end{aligned}$$

$$\text{Industry average}_{2021} = 4.2\%$$

Firms with high development ability can generally maintain stable asset growth. Huawei’s asset growth rate in 2021 is 12.1%, which is about 3 times as the industry average of 4.2%, indicating that Huawei is still expanding.

From the figure below, we can see over the past 10 year, Huawei’ total assets were growing year over year. Before the trade war, Huawei was expanding quickly, after trade war, the expansion has not stop, Huawei is still growing its assets operating scale.

Figure 5.3 Huawei 10-year asset growth rate and 3-year forecast



5.3. R&D to Revenue

The Research & Development Expenditure to Revenue measures the percentage of revenue that is allocated to R&D investment. Usually, high-tech companies are more likely to have higher R&D ratios. The ratio is calculated as below:

$$\begin{aligned}
 R\&D \text{ to Revenue}_{2021} &= \frac{\text{Research and Development Expense}}{\text{Revenue}} \\
 &= \frac{\text{¥ 142,666 million}}{\text{¥ 636,807 million}} \\
 &= 22.4\%
 \end{aligned}$$

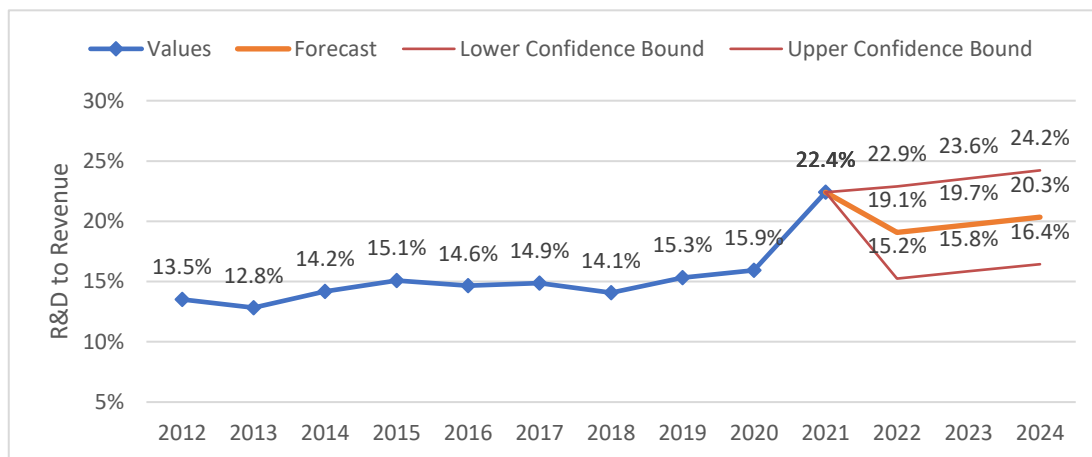
$$\text{Industry average}_{2021} = 5\%$$

Huawei almost doubled its R&D budget to RMB142.7(\$22.1) billion in 2021 with a ratio 22.4% to revenue, comparing with previous years. It is much greater than the industry average 5%. Actually, it is more than any company in the world outside America, nearly double Amazon and Alphabet proportions and more than triple Apple, data compiled by Bloomberg shows. This result can be explained from another view, that is, the sweeping sanctions wiped out nearly a third of revenue in 2021, inflating the ratio spent on research.

Over the past ten years, see figure below, Huawei kept investing in R&D over 10% of its revenue. The R&D expenditures in 2021 doubled from five years earlier. As the CFO of Huawei Ms. Meng said, “The true value of Huawei lies in the R&D capabilities we have accumulated though out constant, long-term investment in research”. As the chairman of Huawei Guo Ping said, “the problems Huawei faces right now can’t be solved by cutting expense, Huawei cannot acquire advanced technologies, we have to

increase investment in technology development.”

Figure 5.3 Huawei 10-year sales growth rate and 3-year forecast



Over the past ten years, Huawei kept investing in R&D over 10% of its revenue. The R&D expenditures in 2021 doubled from five years earlier. As the CFO of Huawei Ms. Meng said, “The true value of Huawei lies in the R&D capabilities we have accumulated though out constant, long-term investment in research”. As the chairman of Huawei Guo Ping said, “the problems Huawei faces right now can’t be solved by cutting expense, Huawei cannot acquire advanced technologies, we have to increase investment in technology development.”

6. Using Financial Ratios to Assess Performance

Table 6.1 gives a summary of the ratios we have discussed. It is useful as a quick reference, and the calculated ratios and accompanying comments give a good sense of Huawei's strengths and weaknesses relative to the average information and communications technology companies. In this table, firstly, we compare Huawei's performance in 2021 with the ICT industry average. If Huawei's value is better than industry average, we make a comment as “good”, vice versa. Secondly, we compare the ratio trend before and after the trade war, the year of 2018. If the trend went different direction, which means the U.S. sanction has affected Huawei's operation, we make a comment as red exclamation mark.

From the overall financial situation, first, we compare Huawei's performance with Industry average. Most of ratios Huawei are higher than industry average, with a few are below the industry average, the current ratio, cash flow to net income and sales growth rate. Next, we compare the ratio trend before and after the trade war. If the trend went to different directions, indicating that the trade war had effects on Huawei. From

this table, we found that the U.S. sanctions did have effect on Huawei' financial status, mainly on the liquidity ratio, leverage ratio and business growth. Huawei was increasing its current asset for lowering the liquidity risk.

Table 6.1 Huawei: summary of financial ratios (millions of RMB)

Item	Ratio name	Huawei 2021	Industry Average	Comme nt	Trend		Co m me nt	
					before	after		
Liqu idity	1.1	Current Ratio	1.96	7.8	Poor	→	↗	!
	1.2	Quick Ratio	155	98.8	Good	→	↗	!
Effic ienc y	2.1	Inventory Turnover Ratio	3.95	3.5	OK	↘	↘	
	2.2	Days Sales Outstanding	43.3	96.05	Excellen t	↘	↘	
	2.3	Total Assets Turnover Ratio	0.65	0.7	Slightly poor	→	↘	!
Leve rage	3.1	Total Debt to Total Assets	57.8	58.3	Low Risk	→	↘	!
	3.2	Time-Interest- Earned Ratio	15.8	2.9	Low Risk	→	→	
	3.3	Cash Coverage Ratio	32.7	7.8	Low Risk	↘	↘	
Profi tabil ity	4.1	Operating Margin	19.1	2.9	Excellen t	→	→	
	4.2	Cash Flow to Net Income	0.53	1.0	Very Poor	↘	↘	
	4.3	ROA	11.35	3.5	Excellen t	→	→	
	4.4	ROE	27.4	6.1	Excellen t	→	→	
Gro wth Indi cator	5.1	Sales Growth Rate	-28.6	0.8	Very Poor	→	↘	!
	5.2	Asset Growth Rate	12.1	4.2	Excellen t	↗	↘	!
	5.3	R&D to Revenue	16	8	Excellen	↗	↗	

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Overall, Huawei's operation was stable in 2021 and was still expanding and making profits, however, the speeds slow down.

Conclusion

In 2021, Huawei's revenue reached to RMB 636.8 billion, decreased 28.6% compared with the revenue in 2020, largely due to the sales drop in its consumer business because of the chip ban. The consumer business used to be Huawei's main source of income, fell 49.6% year on year to 243.4 billion RMB. While its carrier business remained stable, and the enterprise business experienced steady growth.

While the net profit surged incredible 75.9% year-on-year to 113.7 billion yuan, which was mainly because Huawei sold 2 of its business and subsidiaries, Honor business to a state-led conglomerate and xFusion Digital Technologies. Huawei's 2021 annual report revealed that its operating cash flow is as high as 59.67 billion yuan, a year-on-year increase of 70%. On April 2, the company announced a gross internal dividend of 61.4 billion yuan, with each of the company's 130,000 employees pocketing nearly 470,000 yuan. It indicates that Huawei had not scaled back its business and no huge brain-drain happened. Huawei's Chinese firm (headquarter) said it had 195,000 employees in 2021, of which 107,000 – 54.8% - “worked in R&D”. Despite considerable operational challenges over the past few years, Huawei has continued to increase its investment in research and development.

The sanctions imposed by the U.S. government have brought Huawei a lot with “striving for survival” being the company's distinctive voice in recent years. However, it did not stop Huawei from moving forward as the difficulties stimulated its determination to invest in the future. In an effort to find more sources of income and shake off the effects of the U.S. ban, Huawei has kept expanding its business domains and innovation efforts. The company has been shifting focus to systems engineering and driving breakthroughs.

Guo Ping, the rotating chairman of Huawei stated, if it weren't for the U.S. sanctions, Huawei would have not forced itself into this comprehensive turnaround. The greatest opportunity for Huawei is how the Chinese government is transforming into a high-tech economy and global leader in the fourth industrial revolution. This is the application of artificial intelligence and 5G to transform the future of manufacturing, logistics, urban management and transportation. The concept of using AI in 5G to

enhance productivity, improve safety standards and produce more ecological solutions, is something many in the war are just starting to realize.

Huawei is applying these technologies to many industries that are often neglected from the west. For Huawei, there is no limit to AI and 5G technology can do, and the company is applying this tech to transform a variety of industries, including manufacturing, mining, steel, chemical cement, power, grid and healthcare. Even the wall street journal highlighted China's rise in this development, and its march thirteenth article entitled, China leads the way with private 5G networks at industrial facilities. While many in the west believe Huawei's competitive advantage is, in building the actual 5G network towers. You have to go inside China's factories, its coal mines, its shipyards and warehous.es, to see where 5G technology is really taking off. Again, this is the x factor that most analysts in the west are missing.

In the latest news in 2022, Huawei announced its vision to increase bandwidth, bringing a 10 gigabits experience everywhere; break through existing bottlenecks in computing performance, and develop more intelligent devices other than cellphones. Huawei is also planning to develop the smartphone market in north Africa by the brand Hi Nova. This year, Huawei issued a three-year financing bill totaling 4 billion yuan. The proceeds are used to support the development of its business as well as the implementation of the company's important development strategies.

To sum up, Huawei's performance in 2021 is "as it expects", opportunities and challenges coexist.

Recommendation

Although lost part of consumer business due to the chip ban, Huawei still survived because Huawei has other two types of growing business, the carrier business and enterprise business. It Indicates that a larger business scope can reduce a firm's risk. Firms should think about how to establish their own business portfolio.

The trade war on Huawei comes down to "the war of technology". Huawei got sanctioned because of technology, now its survival also owns a good deal to its 5G Technology. For any firm, technology is the core competitive edge.

Another recommendation is that the government subsidies or tax reduction may provide to the chip development firms, and other high-tech areas on which China cannot fly solo to make breakthroughs in core industrial technologies.

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