

Technology Advancement and Growth: A Case Study of Huawei

Candy Yeo¹, Daisy Mui Hung Kee², Xuen Yee Mo³, Hui En Ang⁴, Su Mei Chua⁵,
Shreyas Agnihotri⁶, Shweta Pandey⁷
Universiti Sains Malaysia, Penang, Malaysia^{1,2,3,4,5}
ABES Engineering College, India^{6,7}
Correspondence Email: daisy@usm.my

ABSTRACT

Today, our lives heavily depend on technology. Technology becomes the central of the lives of people. The fourth Industrial Revolution (IR 4.0) has changed the way how we live, how we work and how we communicate with others. Today, Huawei, a private Chinese firm from China has risen and dominate the world's most important emerging technology. The present paper proposes that technology advancement and growth is one important factor that leads to the success of Huawei. Being a modern and technological enterprise, Huawei has a clear vision of how the company should work towards a more sustainable society. As this paper will show, there is still changes and improvement that can be made, to help Huawei to become even better.

Keywords: Technology, Huawei, AI (artificial intelligence), Electronics market, Innovative devices, Growth

INTRODUCTION

Technology is an absolute necessity to advance human imagination. In an era of advanced technology, where every part of our daily lives is related to science and technology. There's no doubt that technology has been responsible for creating useful information and resources that we need at our fingertips.

When mention "Huawei" and most people would immediately associate the brand with the latest, high-quality technological products. Huawei is a multinational Chinese technology titan that's the world leader in equipment for wireless telecommunication networks and the No. 2 seller of smartphones. Huawei is also the largest telecommunications equipment manager in the world, with mobile devices as one of its core business segments. Founded in 1987 and based in China, its manufacturers smartphones, tablets, and smartwatches under its brand name, but also makes white label products, such as mobile hotspots, modems, and routers for content service providers. The company collaborated with Google on the production of the Nexus 6P Android smartphone. Huawei's vision and mission are to bring digital to every person, home and organization for a fully connected, intelligent world. Within a short 30-year history, Huawei is a global behemoth competing against the likes of Apple and Samsung.

There are some of the reasons behind Huawei's success which are Huawei is an active member of more than 400 standards organizations, industry alliances, and open source communities, where it holds more than 400 key positions. On the industry front, Huawei actively makes contribution to an extensive range of industry organizations to Develop ICT and expand its market potential. On the business front, Huawei company form and engage in open enablement platforms and business alliances that revolve around our

customers' business needs. Moreover, Huawei company also works together with ecosystem partners on open innovation projects to speed up the development of customized solutions, helping our customers consolidate their strengths in digital transformation and succeed in their business pursuits. On the national front, the company also works across public and private sectors in countries around the globe, using new advances in technology like 5G, AI, IoT, and cloud to help galvanize the economy. For example, Huawei's technology is an important part of the next-generation wireless technology — 5G — currently in development, which is one reason it keeps popping up in the news. Huawei company was also the one who took AI features to another level. Huawei manufactures its processors for their devices and created the first 7nm architecture-based processor with tons of AI capabilities.

In this case study, we will focus on the challenges that Huawei faced. Nowadays, the uncertainty is the problem Huawei faced. In addition to that Huawei's suppliers are concerned about business continuity is given their increasing reliance on the Chinese tech giant over the past year. Next, Huawei also has rivals who threaten them which are Apple, Xiaomi, Samsung Electronics, HTC Corporation and so on. Most of them having majority same market as Huawei which is a multinational corporation that designs, manufactures and markets consumer electronics, personal computers, software and so on.

1. BACKGROUND OF HUAWEI

2.1 Product/service

A product is a tangible goods defined by the ability to be touched. While service is an intangible goods which the work is done by a person or a group that can benefit another. One thing to keep in mind is that products and services are closely aligned. Most products carry an element of service with them. Huawei has a lot of products which are phones, laptops, tablets, wearables, accessories, smart homes, mobile broadband, mobile services, and EMUI. For example, HUAWEI Mate 30 or Mate 30 Pro which are the latest Huawei smartphone that launch with the Leica Quad Camera System, Intelligent Touch, HUAWEI Acoustic Display Technology, protected with IP68 water and dust resistance, the Kirin 980, long-lasting 4200mAh battery with intelligent power-saving technology and so on. Besides, Huawei also has service products which are Wireless Network, Fixed Network, Cloud Core Network, Service and Software, IT Infrastructure, and Network Energy. Let us look at the Service and Software which provides global carriers with industry-leading, secure, and reliable end-to-end solutions, covering network planning, construction, optimization, and service operations. Also, the highlights focusing on the theme, "Redefining the Future Together", in-depth discussions on how to accelerate the evolution to 5G and how to implement intelligent operations through AI were held. Huawei is a leading global provider of information and communications technology (ICT) infrastructure and these products and services lead to its growth.

2.2 Market Opportunity Analysis

Market opportunity analysis refers to a tool that can identify and access to the attractiveness of a business opportunity. It is a part of the business planning or strategy processes wherein before undertaking a new product or service, the company must analyze the market for it to determine probable profit and revenue from it. Huawei is a leading player in the smartphone industry and one of the largest technology brands in China. The company has acquired very fast growth in the global markets by focusing

on quality and competitive pricing strategy. The result has been the fast growth of the brand in the global markets. On the other hand, Huawei has seen a lot of growth in recent years, and it is also facing a lot of controversies and problems at an international scale which has been caused due to the allegations of espionage against it. There are other hurdles too in the path of Huawei, several of which have the potential to derail its plans to become an international 5G leader. However, the brand has kept growing stronger over time and soon could acquire much more success given its advantage in 5G which has already become a cause of lots of furious debate in the US. Through the market opportunity analysis, there are some of the opportunities that Huawei company can achieve it. For example, research and development have brought significant opportunities for Huawei. It is a leading player in the smartphone industry and has also gained a significant advantage in 5G technology. 5G and AI both are profitable areas full of opportunities and investing in these might bring Huawei into a leadership position in the global technology industry. While Huawei as a technology firm is strong, its marketing strategy relative to its competitors has remained weaker. Instead of using a consistent branding and marketing strategy, the brand has relied mainly on its product quality and pricing strategy to gain market share and grow its customer base. However, for any leading technology brand, a strong marketing strategy is just as important as its core business strategy. Huawei too should focus upon its marketing strategy to create higher brand awareness and for a stringer image in the global market. Its rival Apple is known for its great marketing strategy and if Huawei can manage to improve its image through marketing, its position in western markets could be even stronger. Globally, the brand mainly uses online channels for sales. Now, Huawei has built a strong position and to further expand its global footprint, it should focus upon building its brand retail chain. Apart from marketing, this could also help to drive sales and customer loyalty higher.

2.3 PEST Analysis

2.3.1 Political environment

Government actions affect the operations of an Organization or business. Government actions may be on the local, regional, national or international levels. Businessmen and managers monitor the political environment to be aware of the actions that can affect the company. one of the main aspects of the Chinese political environment is that the ruling party has a lot of influence on the economic environment of the country, Therefore, Huawei's profitability is heavily impacted by the incidents that influence the politics. For example, suggest that during political promotions and National Congress meetings, the stock prices of most Chinese firms fall (Piotroski, J. D., Wong, T. J., & Zhang, T. , 2015). Globally, the organization's profitability is subject to the political conditions of the respective country. In the case where global markets are not stable, the largest being Europe, Huawei struggles to make sales. According to Ba, Zehou and Qing (2016) Huawei operations may get positively affected by international and local politics. For example, the Chinese government strongly supports the telecommunications sector by ensuring enough training of engineering students, which increases the competitiveness of the domestic labor force and this makes the domestic labor force highly competitive. Secondly, the Chinese government has provisions for loans and incentives to promote local Businesses which gives these local companies an edge over their foreign Enterprises.

2.3.2 Economic Environment

Huawei smartphones are mostly manufactured in China and sold abroad, they are addressed to both national and international markets. Huawei's economic success is justification of both the Chinese economy and the economy of its target market.

While Huawei's financial position is strong, the tech giant has used an aggressive pricing strategy to tackle the economic fluctuations in the international market. It is a leading player in China and the Chinese economy has witnessed a remarkable growth during this decade. This has resulted quite profitable for Huawei which has seen its profits boosting. If Huawei's target markets perform well economically, Huawei is likely to make more sales in that target market. Right now, the European economy is relatively stable, which gives Huawei a consistent amount of business despite of the economic conditions in other areas of the world. The Chinese economic setup affects Huawei in a multitude of ways, beyond the increasing number of smartphone purchases. Notably, labor costs in the nation are rapidly increasing, which is causing Huawei's expenses (in terms of production costs) to rise proportionally. This will eventually force the company to raise the final cost of its products or to withstand the additional costs itself and suffer from reduced net profit. Thankfully, China's economy is also a comparatively liquid area of investment. This means that Huawei shouldn't struggle by any means in the future. Given Huawei's current placing as a premium Smartphone manufacturer, the organization can tap into the growing Chinese middle-class local market that is increasingly concerned with quality.

2.3.3 Social and technology environment

Sociocultural factors have gained crucial in the 21 century and apart from consumers' tastes, regional demand is also influence by social trends and local culture. Therefore, companies are increasingly using sociocultural factors as part of their business and marketing strategies. There is no 'one fits all formula' to win in the international market. Business and marketing strategies in Huawei must be aligned with the local cultures and societies in different district. Huawei's marketers are increasingly conformed cultural factors in their marketing strategies in order to increase to understand their customers and improved to connect with them better. It is also a reason that the demand for local products is generally higher in most district of the world. Moreover, social trends also influence demand for certain products including lifestyle products. The growing use of the internet and social media in most role of the world had also influencing how companies like Huawei market their brand and products.

The technology industry is the fastest growing industry worldwide. Nowhere this industry appears to be more obvious in the area of artificial intelligence (AI). Huawei is a technology brand and places a heavy focus on research and innovation. This is also a reason behind the fast growth of the brand. Its camera phones have been highly popular in several corners of the world. Moreover, Huawei is ahead of most of its competitors in the area of 5G and it actively researching AI to bring new quality products and services for their customers. Its leading position in 5G and the smartphone industry is bound to benefit the brand in the coming years. (Feldstein, 2019)

The demand for technological products has steadily develop in recent years and it has brought higher accessibility, smartphones have become an integral part of people's lifestyle all over the world. Huawei has partnered several firms all over the world to increases its 5G network. However, there are fierce competition and other challenges in the Internet and smartphone industries. Huawei's technical factors are related to many factors.

Firstly, the rates of innovation, time is taken in development, as well as the level of investment in technology are very important factors to consider in Huawei. Secondly, the incentives that are availed to developers of technological products are very important towards the external strategic environment. Similarly, how technology is righteous in a country that deep affected on the growth of an organization.

Technological factors in Huawei are very important for the growth of an organization. The government needs to highly support moves towards technological advancement by investing directly in technology. For example, Huawei is a technological multinational. The growth of multinationals in Huawei has been highly affected by the fast-growing technology in China. The government should strongly support developments in cross networking technologies to lead a better their future. Huawei has taken very serious steps towards transforming the level of technology by investing highly in universities and colleges. This fact offers a very great opportunity for Huawei's growth.

RESULTS AND DISCUSSION

3.1 Collaborating and Open Sourcing

Creating an advance, intelligent world takes a joint effort. The tech giant, Huawei believes in the power of abolishing the boundaries and working together to build an ecosystem that succeeds on shared success. By making advancements in the growth of the digital world – and by extension, an intelligent world – we can bring the benefits of digital life to complete humankind.

On the industry front, Huawei actively makes contribution to a wide range of industry organizations to develop ICT and expand its market potential. On the national front, Huawei is working on both public and private sectors in the international market, using latest advances in technology like 5G, AI, IoT, and cloud to help vitalize the economy. Huawei has collaborated with some companies like Leica & Profoto and launched some great products in the past that got appreciation in the international market. They should come up with some more collaborations to bring some exceptional and unique products to the tech market.

Huawei should launch smartphones by collaborating with google under their Android One program to serve more and better to their customers. Their progress is not just limited to the collaboration, they should start their open-source programs and welcome the people with ideas and innovation to work together for combined growth and development.

These small initiatives can make a large difference by helping in making a better offering to the customer and grow further and transforming Huawei into a Global brand.

3.2 Differentiation

According to marketing research, Huawei consecutively for 5 years in the list of fortune 500 global companies and it has been ranked 129th in fortune 500 global companies list of 2016. Currently, it is the largest equipment manufacturer in the telecom industry after overtaking Ericsson in the year 2012. (Bhasin, 2018)

Huawei has repeatedly impressed consumers with its design as well as the functionality of its phones. Huawei operates with strong penetrative pricing, which is common for all Huawei competitors such as Samsung, Apple's iPhone and Google Pixel which operate on skimming price strategy. (Pawan Kalyani, 2018) There are ripe speculations that Huawei can become a strong global contender to other competitors.

To differentiate Huawei from others, they can develop a free data usage offline message application only for Huawei users. This can make them easier and more convenient to communicate with each other when there are no data or Wi-Fi connection.

If we talk about messaging apps, then WhatsApp is the most trending application which people are using day and night 24 hours. But the app will only work with a good internet connection. When the connections get terminated, messages will not be sent. In short, Huawei can define an offline message app that can work even the connection is disconnected.

Not only that, launching an offline messaging application that can enhance Huawei user experiences and will help people to get huge profits such as save loading time and roaming costs. The most convenient reason for offline messaging apps is to save data at the time when in a bad network area. Some apps demand high costs when access to large data, but with offline apps, it can access without any expenses. Offline mobile apps are not only beneficial for saving money or data, but it also provides speedy loading time when the connection is poor.

Nowadays, the world is growing higher with the use of trending technologies. The mobile application that can work without any internet connection is highly useful and full of features. This can lead Huawei to another level and more different from others. This is the differentiation strategy which means the difference is not in its brand value but the products as it contains different speculations.

3.3 Innovate

Nowadays, the intelligent world is arriving with the fusion of 5G, AI, and other emerging technologies promises the new possibilities, opportunities, and experiences for everyone and everywhere. Huawei's Global Industry Vision 2025 describes 10 exciting trends that are shaping the future and inspiring a new age of social inclusion. Together, Huawei can bring the benefits of digital technologies to every person, home and organization. Therefore, the innovation of Huawei is one of the key success factors for Huawei being a global brand.

Today, Huawei's end-to-end global capabilities are ready to deliver new functions, new opportunities, and unprecedented performance for every individual, company, and industry. 5G's biggest impact will come not so much from technical breakthroughs, but from how it enables industries to advance and consumers to enjoy and share smarter lifestyles. The widespread application of 5G technology will also stimulate the growth of cloud services and the development of new applications on the cloud. For instant, Huawei became the first company worldwide to launch the industry-first 5G commercial chip with the Balong 5G01 and 5G commercial CPE compliant with 3GPP Release 15. At the same time, Huawei is also the only vendor who can provide end-to-end commercial solutions, vigorously promoting the maturity and commercial use of the 5G industry chain. Huawei's ambition is to dominate the market for 5G wireless communications, 8 and it has established cooperation with telecommunications companies in a number of countries in Europe and worldwide. (Kaska, 2019).

Moreover, emerging technologies are driving a new industrial revolution across the entire planet, and artificial intelligence (AI) has undoubtedly become the main force that will release the potential of the fourth industrial revolution. Huawei's AI portfolio covers all deployment scenarios and is full stack. For example, it also includes the Ascend IP and chip series, chip enablement layer CANN, training and inference framework MindSpore, and application enablement platform called ModelArts. Huawei believes that AI will be used in almost every sector of the economy but there are some gaps to close before AI can become a true general-purpose technology. Besides that, Huawei's new AI strategy is designed to bridge these gaps. With the launch of Ascend 910 and MindSpore, Huawei is well on its way to achieving its ambitious AI goals. Last but not least, Huawei's AI strategy is to invest in basic research and talent development, build a full-stack, all-scenario AI portfolio, and foster an open global ecosystem. (Xu Shenglan, 2018) As a result, innovative solutions that help improve Huawei's profit margins, building a fully connected and intelligent world.

4.1 Collaboration and Open Sourcing

New and emerging digital technologies are reshaping user expectations and changing the way businesses are providing solutions to their customers.

By 2020 networks and devices will have evolved to a much greater extent, with the emergence of the super-phone, 5G connectivity, and high-performance video. This brings up a golden opportunity for tech giants to create new products and services within this period of digital transformation over the years.

However, businesses must be mindful to place user-experience at the center of innovation. They will need to be prepared to adopt collaborative 'open' working practices to satisfy increasing demands for real-time, on-demand, all-online and social experiences. Introducing innovation project and direct collaboration with industry and academia, we combine innovation and standardization to serve higher value in major European organizations, such as ETSI. Apart from the cloud, ABB is also collaborating with Huawei on artificial intelligence (AI).

The industry must embrace change. It is no longer the case that companies can work independently to provide a better user experience.

They accompany Internet Protocol microwave, edge computing, and AI, and have put efforts to gradually combine global standards and industry systems via collaboration and openness.

4.2 Differentiation

Developing an offline message application only for Huawei users, which is the idea to convince our customers. This is the differentiation strategy in which Huawei company can apply this idea. To develop a new application or device first at all is the data. (Vitaly, 2018) Huawei company should first understand how the data and people's needs. This also can let Huawei identify the main competitors. All this data might help them in making informed decisions in the future.

Next, defining the functionality implement which Huawei aims to provide a communication platform that free data usage. This is the most powerful motivator for any user. The basic features in creating the application are most likely to other message applications which are authorization, importing contacts, instant messaging, file sharing, tracking location, encryption, cloud synchronization and additional features. The most vital project is Huawei can put the software engineering team in an important position to create, research and development in free data using technology which applies in the message application all over the globe.

Also, launching an offline message application after the testing application accordingly. Therefore, it is necessary to devote much attention to its performance and testimonies. Huawei also should promote its advance which is the free data usage that makes this distinctive product. The new technology can have a strong appeal to the consumer.

However, there must have a risk when applying to this idea. First, the investment cost is one of the important factors that Huawei will consider due to the research and development of new technology. Besides, this new application-specific to Huawei user also becomes a risk in this idea. For the people who not a Huawei user will not familiar with and get across to this new advance. Even if a Huawei user also will think twice about this new technology because there still have people who not using the Huawei device which cannot apply for this advance with them.

4.3 Innovate

Huawei had shared more thoughtful insight into 5G, AI, cloud and other innovative technologies, how Huawei is reshaping the energy industry, and how Huawei built the core of a digital world to speed up the transformation of the energy industry from digitalization to intelligence. Huawei Innovation jointly developed a bright focus

transmission solution. Huawei must to solution integrates front-end reasoning, cloud-based training, cloud-edge synergy and other. Therefore, Huawei will to use Huawei's Ascend AI processors to build a bright focus transmission monitoring system. Next, Huawei Atlas 200 AI acceleration modules with embedded Ascend AI processors are integrated into pole and tower monitoring units. Company Huawei is very emphasized about efficiency of power line inspection is increasing more than five times that of the traditional method, and secure. This is because efficiency of power line inspection increase to fixed power line operation is ensured.

Huawei had their mobile networks and sensors in order to more densely connected this world. But this undeniable truth about attack their ICT system's surface will rose exponentially. AI and big data will enable deep data mining maybe caused the risk of data leaks will also soar. Other than this Cloud will enable the sharing of resources and open closed systems. But that means traditional maybe defendable boundaries will also become vaguely.

Huawei's obvious advantages are not in the least unassailable in an industry that is continuing to develop swiftly. This is because the risk to apply the innovate 5G have those mobile network operators that choose not to work with Huawei, whether out of concern for security and to protect competition, it will have other viable options. This reason caused Huawei to face their competitor Nokia has been catching up with Huawei in deals on the ground. Certainly, Samsung is receiving new contracts for major 5G projects. Qualcomm is continuing to display new inventions in 5G.

Moreover, the risk to apply the innovate 5G has it's hazy how well the company's systems conform with existing 4G infrastructure from other vendors. According to the assessment, the security of Huawei's products has been assessed to be not good enough, and the long-term performance of its 5G networks also relic questionable. Countries that choose this low-cost option for fear that they will fail in the 5G competition. Therefore, it has the potential to create an inconstant and insecure foundation for their future income.

CONCLUSIONS

1. A few months back US government blacklisted Huawei and ordered to stop business with Huawei - In result google suspended their Android license due to which the Huawei devices are not going to get any future Android updates! So, one of the major recommendations would be to work on this and don't do any such activity that could hamper their international business and should resolve the issue with the USA asap!

2. Contributing to a clean, efficient, low-carbon, and the circular economy - Huawei company should be committed to minimizing their environmental impacts during the production and operations and throughout their product and service lifecycles. Huawei should use innovative products and solutions to help industries conserve energy and reduce emissions and contribute to a circular economy. Huawei should also make ongoing efforts to work with all industry partners to build a low-carbon society.

3. Giving the customer what they want (Camilleri, 2018) (B J Pine, D Peppers, M Rogers, 2009)- Huawei should do market research, tracking behavior and surveys as common resources to identify the needs and wants of your ideal customer. The customer is king so offer services to your clients want and thus making sure they come back to Huawei. Every individual customer has their desires, but as companies, Huawei can be experts in a set of needs for customers. Huawei can hone that expertise and delight customers by understanding and anticipating their needs better than they do.

4. Building trustworthy and security - Develop customer trustworthy with high-quality products and resilient networks. Cybersecurity and privacy protection are the top priorities for the customer. As an example, Huawei company can place security and privacy protection at the top of the agenda throughout the product design to deliver secure and reliable products. It can help Huawei company build a resilient network and address growing challenges in the digital age.

5. Improving the use of high-security components - Huawei improves the use of high-security batteries and more doing a test about the product to prevent battery in more hurry to combust and improve safety customers. Huawei company should use a high-quality battery to reduce the combustion product's battery happening. Huawei company should use heat resistant of battery in the product can help the customer has charger the product to reduce the temperature. (Kaska, 2019)

6. Huawei is currently working on making mobile phones and chips but for creating more customers they must launch their Brand accessories like power banks, earphones, etc. which work universally with all devices it will help Huawei for serving more customers and satisfy them. Huawei is making only devices not there accessories people buy Huawei devices but use accessories of other brands it will be a lot better if the Huawei itself offers the accessories too and this will let the customer test Huawei's smaller products first and build some trust over the company to move on to purchase their high-end products.

REFERENCES

- B J Pine, D Peppers, M Rogers. (2009). In *Do you want to keep your customer forever*. Harvard Business Press.
- Bhasin, H. (2018, December 6). *Marketing Mix of Huawei – Huawei Marketing Mix*. Retrieved from Marketing91: <https://www.marketing91.com/marketing-mix-huawei/>
- Camilleri, M. A. (2018). Camilleri, M. A. (2018). Understanding customer needs and wants. In *Travel marketing, tourism economics and the airline product* (. Springer, Cham.
- christopher Balding. (2019, may 8). *Who Owns Huawei*. Retrieved from ssrn: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3372669
- Feldstein, S. (2019, September). *The Global Expansion of AI Surveillance*. Retrieved from Microsoft Word: https://blog.fdik.org/2019-09/WP-Feldstein-AISurveillance_final1.pdf
- Kaska, K. B. (2019). *Huawei, 5G and China as a Security Threat*. Talinn: NATO Cooperative Cyber Defence Centre of Excellence (CCDCOE).
- Pawan Kalyani, M. (2018). A Study of Product Differentiation Strategy in Mobile Devices Specifically In Smartphones about Smartphones Features. *Journal of Management Engineering and Information Technology (JMEIT)* , 1.
- Piotroski, J. D., Wong, T. J., & Zhang, T. . (2015). *Political Incentives to Suppress Negative Information: Evidence from Chinese Listed Firms*. Retrieved from Journal of Accounting Research, 53, 405-459: <http://dx.doi.org/10.1111/1475-679X.12071>
- Vitaly, K. (2018, October 23). *How to Create a Messaging App: Valuable Insights You Need to Know*. Retrieved from Cleveroad: <https://www.cleveroad.com/blog/how-to-make-a-messenger-app-development-process-insights>
- Xu Shenglan, X. H. (2018, December 28). *Sanlian Hope: Powering smart manufacturing with AI*. Retrieved from <https://www.huawei.com/en/about->

huawei/publications/winwin-magazine/32/sanlian-hope-Powering-smart-manufacturing-with-ai

- Kharpal, Arjun (15 March 2019). "Huawei built software for smart phones and laptops in case it can't use Microsoft or Google". *CNBC*. Archived from the original on 22 May 2019. Retrieved 23 May 2019.
- Lakshmanan, Ravie (15 July 2019). "Huawei wants to name its Android OS replacement 'Harmony' in Europe". *The Next Web*. Archived from the original on 16 July 2019. Retrieved 16 July 2019.
- Faulkner, Cameron (14 March 2019). "Huawei developed its own operating systems in case it's banned from using Android and Windows". *The Verge*. Archived from the original on 25 May 2019. Retrieved 23 May 2019
- Amadeo, Ron (20 May 2019). "Google reportedly ends business with Huawei, will cut it off from Play Store [Updated]". *Ars Technica*. Archived from the original on 20 May 2019. Retrieved 21 May 2019
- Steven Feldstein. (2019). The Global Expansion of AI Surveillance.
- Blading, Christopher and Clarke, Donald G., (April 17, 2019). Who Owns Huawei? Available at SSRN: <https://ssrn.com/abstract=372669>