

The Influence of the Innovation on the Performance of the Firm-- Taking Huawei as an Example

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Abstract. Nowadays, the uncertainty becomes more and more dramatic, which significantly negatively impacts on the development of companies. Especially the political risks like sanctions exactly hinder the further development of certain companies in the term of market shares worldwide and COVID-19 does destroy the manufacturing and the life of workers indicating that in many countries and for numerous companies the revenues and benefits gain substantial loss. However, the innovation could overcome this difficulty. It enhances the flexibility and agility as well as increases the competitiveness of companies to ensure problems encountered could be alleviated or even solved. For instance, Huawei, as an ICT company focusing on the innovation, successfully defeats the uncertainty and gains acceptable achievements through the innovation of ideas, technology, organizational structures and business models. Hence, it is apparent that the innovation positively influences on the firm performance. In other words, for corporations, the innovation is a wise choice to overcome multiple problems.

Key words: Huawei, innovation, performance.

1. Introduction

Recently, it is more tough for companies to operate businesses because of the uncertain environment. Protectionism and political risks like sanctions strongly attack several industries. For instance, US government bans the export of chips to China and launches a corresponding sanction. Thus, Chinese smartphone manufacturing industry is deeply influenced. Even though some firms like OPPO determine to do the self R&D of chips but finally they nearly give up. Besides, COVID-19 renders the dramatic decrease of the global economy. For example, numerous factors are shut down and employees are forbidden to work in Vietnam. Therefore, NIKE is affected negatively to get products and meanwhile it is difficult to sell commodities. Consequently, the financial performance gets worse. In order to overcome these problems, companies and governments in the world have considered lots of solutions. Huawei is one of the most typical samples. It gets success to some extent through the innovation. For understanding how Huawei gets great achievements, this thesis does a case study.

2. Literature Review

There are plentiful factors influencing the performance of companies and the innovation is one of the most important factors. For instance, the innovative input and output could stimulate the development of the firm performance under certain environment of leadership [1]. Moreover, the innovation could be illustrated by innovation driven policies, technological innovations, business model innovations and so on.

Innovation driven policies mean that the innovation should be regarded as the first power to motivate and lead the development, which reflect the innovation to some extent and have significantly positive impacts on the performance of firms in general according to the data during 2016 to 2018 [2]. Innovation driven policies contain direct government subsidies and tax incentives, and both these elements positively influence the R&D input and financial performance of firms according to the empirical research on the data from 2014 to 2016 [3]. Furthermore, based on the empirical research

on the data from 2012 to 2014, innovation driven policies enhance inputs of R&D, and consequently R&D stimulates the positive improvement of the performance of the company, in other words, R&D is a full mediator between the relationship of innovation driven policies and financial performance [4]. However, several researchers find that the R&D is not always apparent to increase the financial performance. Only by gaining certain innovative results can the R&D obviously play a positive role in raising the performance [5].

Technological innovations also affect the firm performance. The technological innovation could be divided into inputs and outputs separately, as well as the output significantly increases the performance whereas the relationship between technology inputs and performance is not apparent [6]. Technological innovation especially in the term of outputs enhances the performance of enterprises and has hysteresis effects, which is the conclusion gained by studying the data of equipment manufacturing enterprises listed on China's growth enterprise market from 2012 to 2015 [7]. Besides, several researchers find that the technological innovation vitally positively influences on the performance of firms with non-linear relationship through the data from 442 A-share listed companies in the Shanghai and Shenzhen stock markets from 2015 to 2019 [8].

Business model innovations, which usually function as mediator variables, influence enterprises' performance as well. Business model innovations could be classified to two types that are Innovation in efficient business models and innovation in innovative business models respectively, and meanwhile these two types of innovations could spur the positive development of the performance [9]. Simultaneously, business model innovations could be seen as the mediator variable between the strategic orientation and the performance of firms or self efficacy and performance of start-up technology enterprises, which are with positive relationship [9,10]. Moreover, social relationships or big data capacity of firms have significant positive impacts on the performance of enterprises, with business model innovation playing a mediating role according to several empirical studies [11,12].

Overall, innovations work well in increasing the performance. Current studies have investigated adequate data from perspectives of innovation driven policies, technological innovations and business model innovations. Commonly, these elements have significantly positive relationship with the performance, and business model innovations are also functional as a mediator. However, most of conclusions are from data analysis instead of case study, several mistakes might exist due to the inaccurate model or data. Besides, the suggestions are too general, which might not be suitable to a certain company or detailed. Hence, this thesis will study the effect of innovation on the performance by studying the case of Huawei to ensure the conclusion could be more accurate, specific and useful.

3. Case Description

3.1. The Introduction of Huawei

Huawei is a famous ICT company established in 1987 in Shenzhen, China, which also insists on steady operations, continuous innovations and open cooperations. End-to-end solution advantages have been established in areas of telecom operators, enterprises, terminals, and cloud computing. Competitive ICT solutions, products, and services for various customers and consumers have also been provided. It is committed to achieving a future information society and building a better fully connected world. Key activities are pushing connections, empowering intelligent products, promoting personalizational experiences and establishing digital platforms. By the end of 2022, it has approximately 0.207 million employees. Besides, the reason why this company could survive nowadays is that its core is the innovation. Innovations mean a lot to it.

Simultaneously, Huawei is a private enterprise 100% owned by employees. Huawei implements an employee stock ownership plan through trade unions, with 121269 participants. All participants are company employees, and no government department or institution holds Huawei shares.

3.2. The Innovation in Huawei

Huawei concentrates on the R&D and innovation all the time, and it insists on the path of innovation, which is illustrated by its tight connections with industries and researchers to explore the advanced technology to create a better future.

3.2.1 The Innovation of Ideas

First, Huawei emphasizes innovations from the perspective of ideas and goals all the time, which means innovations are roots or cores of Huawei's survival and development. Corresponding ideas are shown in Huawei's mission and vision. In 2017, a new mission and vision that states result of technological innovations should be beneficial to every person, every family, every organization and even the whole world is proposed. In 2018, the goal stated by its CEO highlights that Huawei should lead innovations to satisfy requirements of clients including persistent R&D inputs, 5G innovation and advanced commercialization and so on. In 2019, Huawei analyzes the whole industry would be accelerated by big data and AI so creation would become more and more important. Hence, ideas of innovation 1.0 involving technological innovations and innovations 2.0 based on the hypothesis of the vision of future intelligent society are proposed during different eras. In 2020, Huawei reiterates their continuous fund support for the R&D to level up the innovation. Meanwhile, using the technological innovation to push the digital economic development is necessary for the future progress of Huawei. In 2021, Huawei states the systematic innovation is essential for the development of the firm to enhance its competitiveness, and persistent innovations are mentioned in the annual report in 2022 as well. Therefore, it is apparently known that the innovation is a concept being deeply rooted in the mind of the whole company in Huawei.

3.2.2 The Innovation of Technology

Second, from the perspective of the technological innovation, Huawei always actively invents or optimizes various advanced technologies and gains the breakthrough of the bottleneck of technologies. Huawei struggles with the transformation from leading technologies to better and more competitive product solutions, aiming at commercial success of customers. For example, in 2017, in the wireless field, Huawei proposes 5G end-to-end solutions and then in 2018 the first full range of 5G end-to-end commercial products and solutions according to the 3GPP standard in the industry have been released, which is based on self-developed chip and antenna technology, with the best 5G series product specifications and performance, taking the lead in completing various tests such as IMT-2020 (5G) and comprehensively leading the way.

Besides, digitalization and intelligent products to connect basically everything and make consumers convenient are also developing. For instance, in 2018, the innovative "Da Vinci" architecture effectively pushes the two-dimensional vector operation of AI computing units into three-dimensional tensor operation to satisfy applications and functions of intelligent earphones, smartphones, intelligent city and so forth. Another example is ARM compatible processor Kunpeng 920, HarmonyOS, the strongest computing power AI chip Ascend 910, and the full scenario AI computing framework MindSpore have been published in 2019. Besides, in 2020, One Stop AI Development Platform ModelArts3.0 has been released to improve the intelligent products. Moreover, in 2021 Huawei Cloud Pangu Series Pre-Training Large Model has been released, and in 2022, Tiancho AI Solver has been published.

Moreover, Huawei decides to research and explore future technological innovation on the extended online platform on the one hand, and on the other hand, layout sudden technological innovation around the entire process of information generation, storage, calculation, transmission, presentation, and consumption. Hence, it collaborates with researchers, students in universities and other experts in the society to prompt the innovation in the view of knowledge. In 2020, top ten mathematical challenges in the ICT field have been released by Huawei to the world, craving for theoretical research breakthroughs, so that world-class difficulties like higher performance, less resource consumption, DNN interpretability, and large-scale network optimization could be mutually and collaboratively solved. What's more, the company has proposed exceeding 300 postdoctoral

research topics. Furthermore, in 2021, 6G has been considered and in 2022 the concept of 5.5G is being defined.

3.2.3 The Innovation of Organizational Structures

Third, organizational structures are innovative as well, which are frequently changed to suit the uncertain environment. During the whole history of Huawei, there are 18 sorts of organizational structures in each important time concretely, which indicates the structures tend to be more complicated, more intelligent and more flexible. Six main organizational structures are illustrated below. First, the simple structure was used in 1987 because at that moment, the company was directly led by the creator of Huawei named Ren Zhengfei who possessed the centralized authority, and employees could only directly report to him. The Figure 1 illustrates the simple structure.

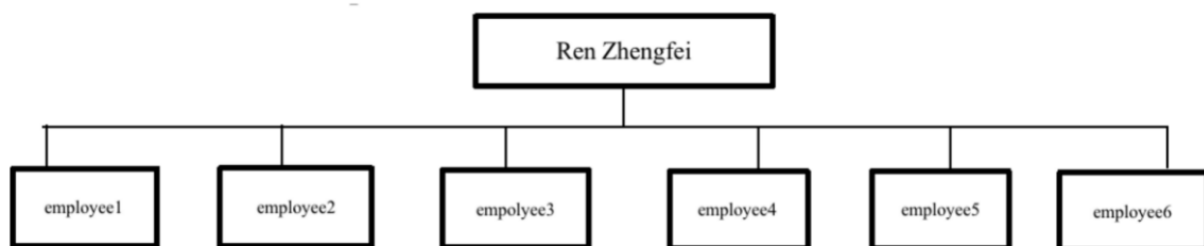


Figure 1. The simple structure

Later, the simple structure was replaced by the functional structure. Groups with akin skills were gathered together in a special department. Departments based on different functions were established to work on specific tasks and each department might have corresponding sub-departments being professional to some parts of the certain function. The Figure 2 demonstrates the functional structure.

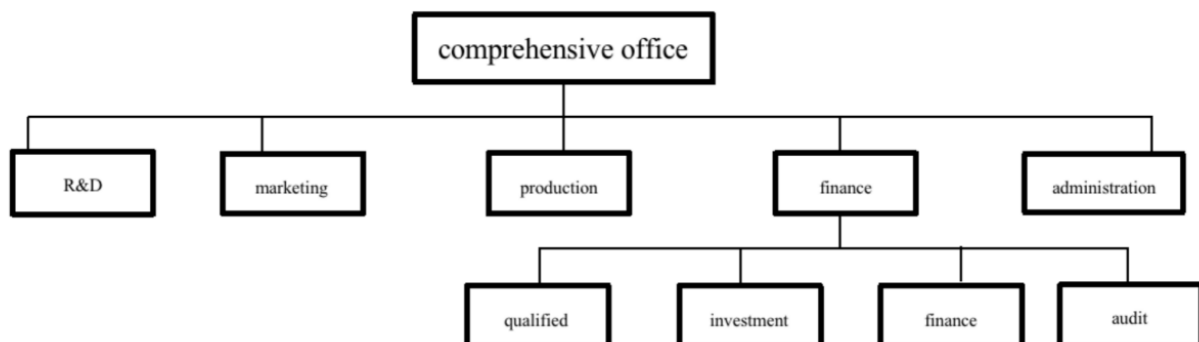


Figure 2. The functional structure.

Then, divisional structure was introduced. Simultaneously, different areas all had the business of Huawei so various business units should collaborate with each area thereby the two-dimensional matrix organizational structure was formulated. This structure made Huawei tend to be formal. The Figure 3 shows the two-dimensional matrix organizational structure.

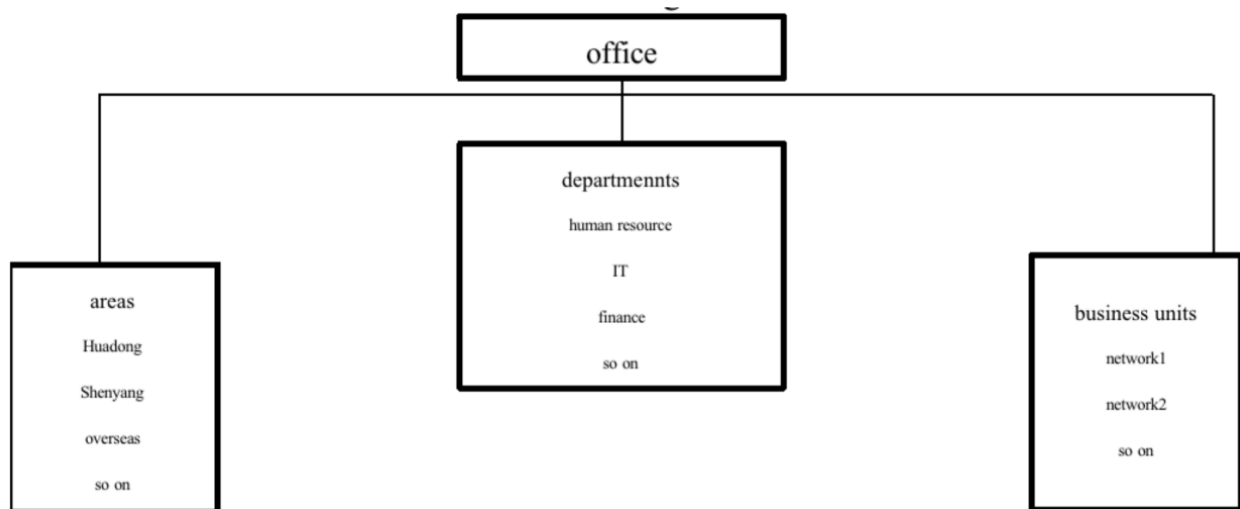


Figure 3. The two-dimensional matrix organizational structure

Consequently, Huawei used matrix structure and “frontline iron triangle” structure. In the matrix structure, board of shareholders charged board of directors and board of supervisors. Meanwhile, operators, enterprises and consumers are three main businesses that should be managed by various boards of shareholders separately. The Figure 4 illustrates the matrix structure.

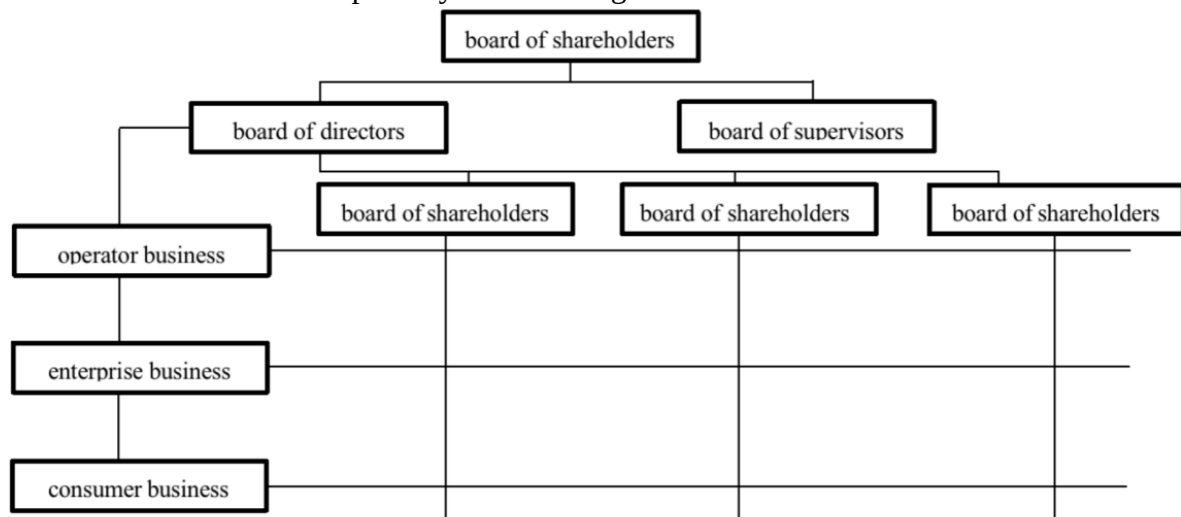


Figure 4. The matrix structure

So called “frontline iron triangle” structure means customer managers, solution specialists and delivery specialists form an iron triangle to mutually face consumers. The Figure 5 demonstrates the “frontline iron triangle” structure.

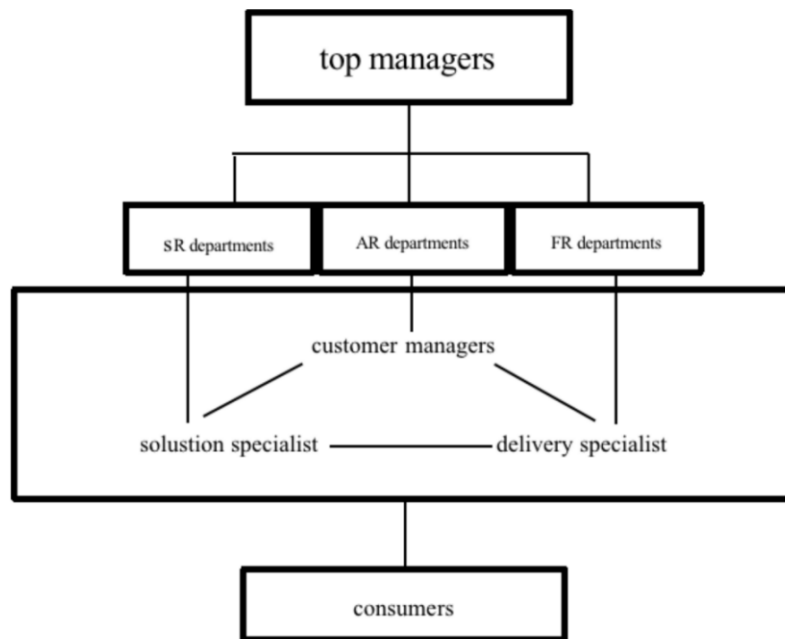


Figure 5. The “frontline iron triangle” structure

Finally, Huawei adopts the platform-based structure. In this structure, the functional platform entailing strategy marketing, Huawei university and so on, the ICT business organization including Cloud&AI production and service and so on as well as the consumer BG with area organization form three main parts. The Figure 6 shows the platform-based structure.

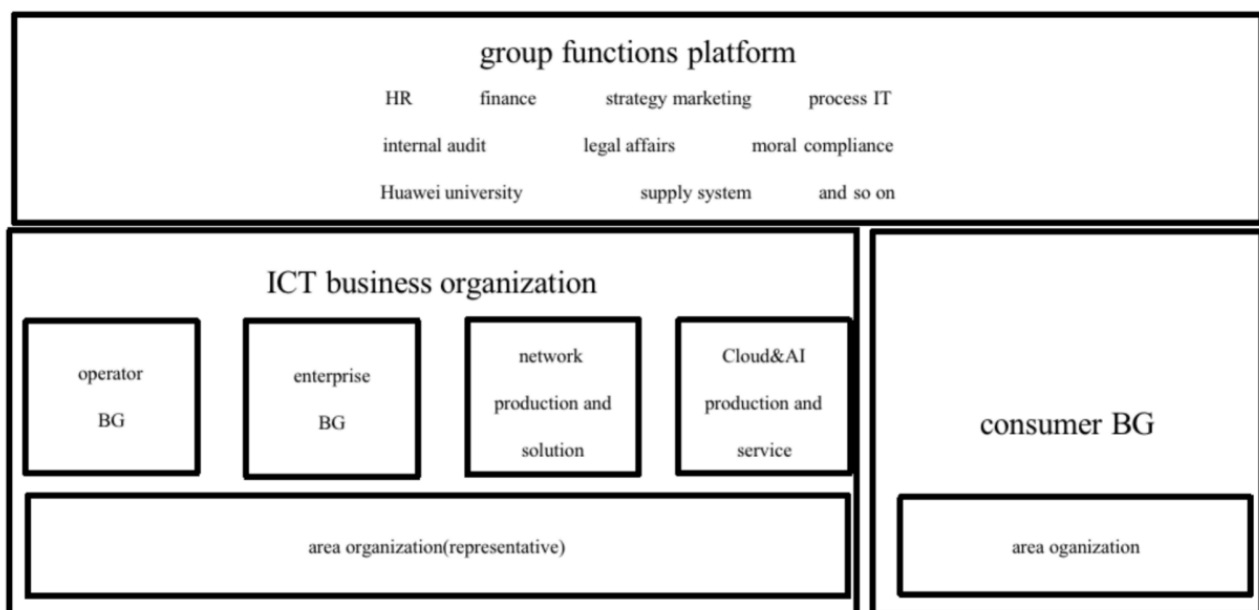


Figure 6. Group functions platform

The first reason why Huawei innovates and adjusts its organizational structures is according to the contingent theory meaning the structure should be adjusted based on the environment, otherwise the negative impacts of environment changes on the business may hinder the development of the company. Initially, there were only six workers in the company. Hence, they could just deliver reports to their boss Ren. However, the internal environment changed. As the development of Huawei, both employees and businesses became more so the simple structure became inefficient, therefore the functional structure was adopted. Gradually, both internal and external environments changed. Numerous workers and more complicated businesses in different areas are determinants to require a structure to solve barriers of communications among different departments with different functions

and various allocations of resources to different functional departments that would hamper the achievements of the goal and the development of the whole company. Hence, the matrix structure was used. This structure is dynamic so it is flexible to deal with problems. The external crisis threatens Huawei so from 2012 on, it changes the organizational structure every year. Such adjustments also help Huawei achieve the agility to solve problems. Moreover, the big data era arrives with advanced technology to attack traditional organizational structures because myriad data can't be only solved by human beings without the assistance of AI. Thus, platform-based structure is employed where Cloud&AI production and service is an important factor.

The second reason is based on the process reengineering theory. Huawei focuses on customers and processes when it runs the business. In order to fit the bigger size and more complex businesses of the company, new process and corresponding structure should be designed. So in 1998, Huawei invited IBM to remold the process of ISC, IPD and CRM. Correspondingly, the structure became the two - dimensional matrix. Besides, after 2004, Huawei reformed its process to increase the speed of decision and make the main process more mature. In other words, decentralization is necessary to ensure that the process could be conducted efficiently. Frontline must have sufficient rights to determine fast so that customers could get resources in time and rivals couldn't get the opportunity. Therefore, "frontline iron triangle" structure was established.

3.2.4 The Innovation of Business Models

Fourth, Huawei innovates its business model as well. During the whole history of Huawei, there are three kinds of business models that are respectively agency model, communication equipment provider model and multilateral market business model [13]. Huawei creates or adopts different business models to cater for its organizational strategies and goals. The transition from communication equipment manufacturers to ICT solution suppliers is to achieve new value propositions through technological innovation [13]. In other words, during this procedure of business model innovations, Huawei initially accumulates certain assets including some intangible assets like the knowledge and skills of technology production and development, thereby then new values to consumers could be realized by new services and products.

3.2.5 Positive Results Because of the Innovation

Thanks to its opinions about innovations, it gains myriad achievements. As for the financial performance, from 2013 to 2020, Huawei's revenues are persistently increasing from about ¥239 billion to ¥891 billion. Besides, its profits are dramatically raising as well from about ¥29 billion in 2013 to ¥121 billion in 2021 whereas the profit in 2020 is slightly decreasing and that in 2021 has a sudden increase. As for the reputation, Huawei is famous the world over. What's more, it is ranked to the first among the top 500 private enterprises in China in 2020 and on August 3, 2022, Fortune released its list of Fortune 500 companies, with Huawei ranking 96th. As for the market, Huawei now has already cooperated with more than 170 countries or regions to provide the service for exceeding 3 billion worldwide. Asia, Europe, Africa and America all have its business activities.

4. Analysis on the Problem

Huawei realizes plentiful amazing achievements, but it also faces several difficulties. The first biggest problem is the sanction from the U.S government rendering it is complicated and difficult for Huawei to purchase chips from professional foreign companies. Due to the lack of suitable chips, some products can not be provided, such as smartphones. Without chips, the function of smartphones can not be implemented and the assembling process can not be executed successfully. Hence, Huawei suffers a lot, which is illustrated by the loss of existing market and the decrease of global ranking.

Huawei solves this problem mainly by the technological innovation. Now that it is expensive or even impossible to buy foreign chips, Huawei commences to do the self R&D of chips. From the knowledge aspect, ¥110 billion is spent to get the new quantum chip technology. From the product view, Qilin 810 chip has been released and commercially used. Even though the chip performance is

not as good as before, it is still feasible and functional. Besides, owing to the persistent innovation ideas, the chip will be more functional in the future. Moreover, it invents other important systems or machines to defeat unreasonable sanctions. For instance, MetaERP invented by Huawei itself has been published. Meanwhile it has completely replaced the original MetaERP system which is made and monopolized by the American company as well as used in Huawei's other 88 subsidiaries globally. Since then, Huawei has expanded its business spectrum, enhanced the irreplaceability of collaboration with other companies and eventually gained the sufficient competitiveness to overcome difficulties of sanctions. Therefore, the financial performance is still acceptable with revenues of ¥642 billion and profits of ¥42 billion in 2022. Even though the performance is not as good as before, it survives under the sanction.

Apart from the sanction, COVID-19 pandemic is also a problem. Due to it, numerous physical stores are closed and logistics are paralyzed. Thus, online sales and offline sales both meet obstacles, which indicates that fewer consumers will purchase commodities and revenues as well as profits definitely will be influenced. Besides, the lockdown will hamper the execution of manufacturing so products are difficultly provided.

In order to solve this problem, Huawei still insists on continuously creating value for customers with innovative ICT technology, assisting in global technological resistance, economic development, social progress, and improving business quality. Huawei positively uses its advanced innovative technology to deal with COVID-19. Huawei, as a part of the ICT industry, has contributed to the process of technological anti epidemic efforts. It uses innovative technology and services to ensure the stable operation of over 1500 networks in over 170 countries and regions worldwide, together with customers. It is also taking the lead in using ICT technology in multiple countries to help local governments fight the epidemic, leveraging the spirit of international collaboration, coordinating actions with local governments, community agencies, international organizations, clients, and partners, and safeguarding the health and safety of local people. In Malaysia and Saudi Arabia, Huawei has installed Zhizhen video conferencing systems to connect multiple departments, allowing doctors to share experiences and quickly issue instructions; In Ecuador and Italy, Huawei helped hospitals deploy the CT-AI COVID-19 auxiliary screening system to help doctors quickly diagnose the disease and reduce the workload of the health system; In Namibia and Argentina, Huawei assisted local institutions in installing infrared thermometers in crowded public places to help prevent and control the local epidemic and reduce the spread of the virus. These behaviors bring the outcome that in 2020, Huawei gains ¥891 billion in the revenue, which is the highest value compared with previous data, as well as ¥72 billion in the profit, which is also relatively high in the history of Huawei. Consequently, on the one hand, this could help Huawei make certain profits and benefits, on the other hand, it can enhance Huawei's reputation worldwide. Hence, Huawei could offset the loss from the sales to some degree, and in long-run more consumers or cooperators could be gained by Huawei, which is beneficial to the development.

5. Conclusion

Huawei always concentrates on the innovation. It innovates advanced technology, organizational structures and business models with ideas of persistent innovation. Since the innovation provides competitiveness to Huawei, it earns rights to defeat uncertainty environment including political sanctions and pandemic crisis, and eventually gains acceptable or even brilliant performances in the aspects of both finance and reputation. So, it is widely known that the innovation plays a significantly positive role in increasing the performance of the company. Therefore, if the company craves for the long-term survival and development, the innovation must be the core of the company no matter what business the firm is conducting.

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