Study on the Development Status of Smart Home: Huawei Smart Home as an Example

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Abstract: With the rapid development of the economy and technology and the application of technologies such as 5G in the Internet of Things, the smart home gradually enters the daily life of consumers through the presentation of different scenes. Multiple factors influence Huawei's late start in the smart home. This passage uses the 4PS marketing strategy and PEST analysis to conduct research from four levels: politics, economy, technology, and society. The study finds that in the development process of the Huawei smart home, political and economic factors play a leading role, while technology and social factors play a mentoring role. Four factors promote its rapid development under the macro environment. Relevant political conditions promote the development of smart home. In contrast, good economic conditions promote the rise of smart home, and developed technical conditions give smart home innovation and optimization power. Finally, social groups directly affect the popularity of smart home.

Keywords: smart home, influencing factor, development trend

1. Introduction

The smart home is based on the residential platform, which uses integrated wiring technology, network communication technology, safety prevention technology, and automatic control technology [1-3]. Audio and video technology will integrate home life-related facilities, the construction of efficient residential facilities, and a family schedule affairs management system to improve home safety, convenience, comfort art, and achieve environmental protection and energy saving the living environment [4-6]. Based on the development status of a smart home which takes Huawei smart home is an example to study its competitive advantage, business model, and future outlook. Specifically, this study applies the PEST (political economic social-cultural technological) analysis method to analyze the market environment of Huawei smart home from the four aspects of politics, economy, technology, and society and uses the 4PS marketing strategy analysis method to analyze the competitive advantages. Also, SWOT (strengths, weaknesses, opportunities, threats) analysis is applied to analyze the strengths and weaknesses of Huawei's smart home development and provide reasonable suggestions. This study broke through the original technical barriers, combined with other factors to analyze the obstacles in the development process, and conducted research breakthroughs one by one to obtain a series of countermeasures and better development direction. Currently, there is no independent analysis of Huawei smart Home.

2.   Literature Review

Many scholars in the academic circle use unique analytical methods to study smart homes in many aspects, such as the Internet of Things, sensor technology, human-computer interaction, smart home application, function, and future development trend. Chen and Wu summarized and analyzed domestic and foreign development factors, existing problems, and future development trends of the smart home industry. They concluded that there is still a long and difficult way for the smart home to realize whole-house intelligence. Only through continuous research and breakthrough on many difficult problems can the smart home better serve the user group and genuinely meet users' needs [7]. Han conducts in-depth research on the Internet of Things technology that smart home relies on from the characteristics of sensor technology, the overall design of the smart home system, the design of gateway node control node, acquisition node, and the analysis of application modules. It is believed that network sensor technology plays a role in promoting the application of smart home applications and can make the application of smart home more perfect based on the original [8]. After collecting, comparing, and calculating a large amount of data in the man-machine interaction of an age-appropriate smart home through an intelligent algorithm and Xu believes that the man-machine interaction reaction speed of age-appropriate smart home in the application system is fast, which can be completed within 2.4s at the fastest Human-computer interaction. Human-computer interaction instruction of high fidelity, up to 0.97, has a good effect and specific application value [9]. Zou studied issues related to personal property and life safety in smart home and argued that in the development process of smart home, special attention should be paid to safety and personal property issues. The solution to related problems can make the development of smart home more perfect [10].

3.   Case Study

With the improvement of residents' living quality, the demand for intelligent living becomes more and more intense. From the very beginning, the use of traditional home gradually begins to pursue the more modern and intelligent smart home. At the same time, traditional household appliance enterprises and other Internet enterprises have flocked to the smart home industry. However, due to the late start, poor technology, and high cost, the user experience brought by smart home has been stagnant. In 2020, the "1+8+N" strategy of Huawei HarmonyOS was launched. In 2021, Huawei again launched the "1+2+N" strategy, perfecting the overall intelligent model and making breakthrough innovations based on the original smart home.

3.1. Business Model

With the development of the Internet, both large and small domestic enterprises put the business model in the first position of company construction or development. As shown in Fig.1, Huawei uses 9 modules of the business canvas to analyze its business model at ends C and B. Customers at the C end are mainly mass consumers. Huawei Smart Home will provide online and offline stores to purchase related products and services and form a unique supply chain by utilizing partners such as content providers. At the B end, traditional household appliance enterprises and other companies are the main consumers, and they form cooperation with Huawei smart home through joining and other ways.
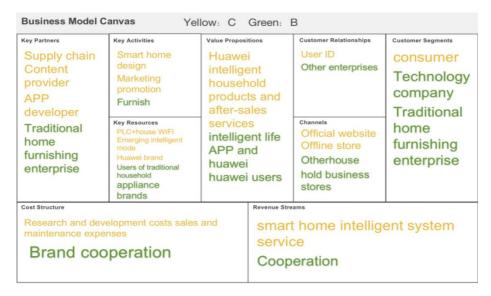
Figure 1: 9 modules of the business model canvas in Huawei.

3.2. Competitive Environment

4PS marketing strategy analysis comprises Product, Price, Promotion, and Place. The strategy and competitive advantage of Huawei in the smart home field are analyzed from product, price, promotion, and channel perspectives. From the perspective of Huawei smart home products, they are characterized by rich variety, high-end positioning, good user experience, and other features. Their design style is simple and elegant, high-end positioning is more complete and intelligent, and they also have advanced technical support in cooperation with many companies. In terms of price, Huawei's premium profit after the formation of its innovative home brand has a reasonable premium ability for upstream suppliers and downstream consumers and the ability to bundle users and the company.

At the press conference on April 8, whole-House Smart Solutions announced two first-mover packages for 3 rooms and 2 rooms (about 100 square meters) and 5 rooms and 2 rooms (about 200 square meters), priced at 99,999 yuan and 149,999 yuan respectively. And the high-cost performance product portfolio price is 5-10 million; At the same time, Huawei smart home has good brand value and corporate image and frequently uses advertising promotion conferences to introduce its products. On March 16, 2022, Beijing time, the "2022 Huawei Whole-House Intelligent and All-Scene New Product Spring Release Conference" was officially held. At the press conference, Huawei launched a new generation of Huawei whole-house intelligent solutions, bringing the heavy upgrade of whole-house intelligent and innovative experience of space interaction, opening a new chapter of the smart life experience; At the same time, Huawei Smart Home is also expanding offline stores from online sales at the very beginning to offline flagship stores. At present, Huawei Smart Home has built stores covering the core cities of all provinces in China. During this year's National Day, Huawei Smart Home has opened 15 offline stores. It covers Shenzhen, Shanghai, Changzhou, Jinan, Yichang, Ordos, Liuzhou, Nanning, Harbin, Nanchang, and other cities. From the analysis of product, price, promotion, and channel, it can be concluded that Huawei smart home has strong market competitiveness (source: Baidu Huawei official website).

The SWOT analysis method analyzes Huawei's smart home's internal and external factors. Table 1 lists the internal and external factors of the Huawei smart home.

Table 1: The internal and external factors of Huawei smart home.

SWOT analysis	Analysis of internal and external factors
Strengths（S）	① cooperated with many traditional companies such as Helmae ② It can effectively arrange users' time and provide convenience. ③ Local system: whole-house storage + whole-house PLC control bus + central control system. 　Cloud system: Wi-Fi 6+ routing + optical cat + central control system, complete technology. ④ Implement remote control, security, security and other control management ⑤ The design of Huawei smart home is high-end and generous, which conforms to the aesthetic taste of consumers
Weaknesses（W）	① Short development time, the technology is not absolutely mature and perfect ② The cost is too high for consumers to bear (3) Huawei has a low reputation in the smart home sector ④ The customization requirements for different users and scenarios are not perfect
Opportunities（O）	① The state issued policy support. ② The domestic economy has developed rapidly and the people's living standards have improved. ③ Promoted by the social environment ④ The technical level is constantly improving
Threats（T）	① Technology update fast, products are easy to incompatible. ② The smart home industry is highly competitive ③) Huawei's smart home products are too expensive. ④ The general recognition of smart home is insufficient

3.2.1. SO Analysis

Most of the public has yet to hear about smart home, but they have a common understanding of the content and services they can provide. Meanwhile, Huawei's smart home started late, and the overall technology application is not perfect and mature. Huawei smart home needs to upgrade the design of new products in terms of technology and innovation and popularize the knowledge of users through various publicity channels in the macro market of smart home, correct users' wrong understanding of smart home, weaken their rejection, make the public gradually understand smart home from curiosity to understanding, and promote the public's wide recognition and acceptance of smart home.

3.2.2. ST Analysis

At present, Huawei smart home has started to update its technology in the face of competition in the overall market. Still, it ignores product cost, product compatibility, and user experience. Huawei smart home should pay more attention to the interaction between products and consumers and the consumers' experience. However, Internet companies and other enterprises nowadays develop dif-

ferent products independently but need to pay attention to the compatibility problem. Only by solving the problem of compatibility between different brands, technical barriers, and new and old products can we standardize and systematize the upgrading of products to reduce the cost of products and encourage more consumers to buy experience.

3.2.3. WO Analysis

The research and breakthrough on the network security and intelligence degree of the smart home discovered before need further improvement in user privacy to compensate for the technical shortcomings and loopholes. There are still many loopholes to be made up for. At the same time, obstacles in development should be removed. Only clear planning and analysis can make it more competitive.

4. Conclusion

This study finds that politics, the economy, technology, and society affect Huawei's smart home due to its late start. In addition to analyzing the four objective factors, the advantages of Huawei's smart home are also reflected. PEST, 4PS, and SWOT analysis tools can jointly prove Huawei's smart home's barriers and improvement strategies. Therefore, it is suggested that Huawei smart home update technology make device iteration and vigorously publicize to break through the original market to improve its competitive advantage and reduce the influence of relevant factors on it. The current research needs to be improved in information collection, data integration, and analysis logic, and future research needs to be carried out in detail in the above three aspects.

References

[1] Stojkoska, R., Trivodaliev, K.:A review of Internet of Things for smart home: Challenges and solutions. Journal of cleaner production 140, 1454-1464(2017).

[2] Robles, J., Kim, H.: Applications, systems and methods in smart home technology: A. Int. Journal of Advanced Science And Technology 15, 37-48(2010).

[3] Yang, A., Zhang, C., Chen, Y., Zhuansun, Y., Liu, H.: Security and privacy of smart home systems based on the Internet of Things and stereo matching algorithms. IEEE Internet of Things Journal 7(4), 2521-2530(2019).

[4] Gram-Hanssen, K., Darby, J.: "Home is where the smart is"? Evaluating smart home research and approaches against the concept of home. Energy Research & Social Science 37, 94-101(2018).

[5] Wilson, C., Hargreaves, T., Hauxwell-Baldwin, R.: Benefits and risks of smart home technologies. Energy Policy 103, 72-83(2017).

[6] Saad al-sumaiti, A., Ahmed, M. H., Salama, M. M.: Smart home activities: A literature review. Electric Power Components and Systems 42(3-4), 294-305(2014).

[7] Jiazhen, C., Wisdom, W.: PEST-SWOT analysis of smart home development in China. Furniture 06, 53-57(2020).

[8] Weiwei, H.: Application of IOT sensor technology in smart home. Electronic Technology 12, 145-147(2022).

[9] Huan, X.: Design of human-computer interaction system for age-appropriate smart home based on intelligent algorithm. Automation and Instrumentation 12, 16-19(2022).

[10] Zou, Z.: Construction of smart home security system in the context of Internet. Science and Technology Innovation and Applications 36, 137-139+144(2022).