

國立成功大學  
電信管理研究所  
碩士論文

**AIoT 競合策略之分析：亞馬遜的智慧家庭為例**

**An Analysis of AIoT Co-opetition Strategies:**

**The Case Study of Amazon's Echo**

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本論文業經審查及口試合格特此證明

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## 中文摘要

消費性電子產品和網際網路的整合可提供消費者便利的生活，智慧家庭控制中樞和智慧家庭週邊設備逐漸滲透到家庭內並且延伸物聯網的範疇以及覆蓋率。Amazon 的智慧家庭控制中樞 Echo 讓用戶透過語音助理 Alexa 聲控智慧家庭周邊設備，例如 Philips 智慧燈泡或 Nest 恆溫器。另外，Amazon 的核心事業電子商務的 Prime 會員數超過一億人，對於 Amazon 而言是銷售 Echo 的最佳通路。智慧家庭控制中樞企業: Amazon、Google 與 Samsung 彼此之間互相競爭，不斷升級語音助理的功能性以及建立與其他智慧家庭周邊設備企業連結共同拓展智慧家庭生態系。因此智慧家庭控制中樞在智慧家庭領域中是項重要的產品，不僅將人工智慧帶入智慧家庭，也建立與眾多智慧家庭周邊設備的連結解決以往聯網設備不同品牌無法互相連結的困境，具有非常大的發展潛力。

本文使用個案分析法並採用三種模型分析 Amazon 在智慧家庭產業中的內外部環境，最後藉由深度訪談法驗證分析結果。首先，內部分析的部分透過基礎資源模型探討 Amazon 的企業內部資源、能力以及核心能力進而分析競爭優勢。第二，外部分析採用價值網模型分析 Amazon 與顧客、供應商、競爭者 (Google 和 Samsung) 及補充者 (智慧家庭周邊設備企業) 間的互動關係，最後透過安索夫矩陣分析 Amazon 不同智慧家庭產品在不同市場的發展策略。研究結果發現 Amazon 與 Google 從推出智慧家庭控制中樞以來透過激烈競爭擴大智慧家庭市場並運用各自策略培養消費者使用習慣。Samsung 則將語音助理 Bixby 推廣到手機以及智慧家電上，但 Bixby 的實用性以及市佔率都不佳，因此本研究認為 Amazon 未來能採用 Alexa 與 Samsung 合作以互補的方式共同拓展智慧家庭生態系。

關鍵字：智慧家庭、人工智慧、價值網、安索夫矩陣、競合關係

## Abstract

With the integration of consumer electronics and Internet, smart home hubs and smart home auxiliary devices have been gradually penetrating into household and family life and extending the scope and coverage of Internet of Things. Amazon Echo allows users to voice smart home auxiliary devices such as Philips Hue or Nest thermostats through voice assistant Alexa. In addition, Amazon's e-commerce prime membership has exceeded 100 million and it is the best channel for Amazon to promote Echo.

Smart home hub enterprises such as Amazon, Google, and Samsung compete with each other. They constantly upgrade the capabilities of voice assistants and build the connection with smart home auxiliary device enterprises to expand smart home ecosystem together. Smart home hub is an important product. It not only brings artificial intelligence into smart home field, but also builds the connection with various smart home auxiliary devices to solve the problems that smart devices of different brands couldn't connect to each other before.

This study adopts case study method and three models to analyze the internal and external environment of Amazon in smart home industry, and then uses in-depth interview to enrich the analysis of this study. First of all, internal analysis adopts resource based view model to analyze Amazon's internal resources, capabilities, and core capabilities and then analyzes Amazon's core competences. Secondly, external analysis adopts value net model to analyze Amazon's relationship with customers, suppliers, competitors (Google, Samsung), and complementors (smart home auxiliary device enterprises). Finally, this study uses Ansoff matrix to analyze the development strategies of different products in different markets.

The results show that Amazon and Google have broadened smart home market through intense competition since they released their smart home hub and use their own strategies to cultivate consumer usage habits. Samsung's voice assistant Bixby is not as capable as its competitors with low market share. Therefore, this study suggests that Amazon can propose a cooperation project with Samsung to broaden their smart home ecosystem together in the future.

**Key words:** Smart home, AIoT, Value Net, Ansoff Matrix, Co-opetition

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# Chapter One

## Introduction

This chapter describes research motivation, research questions, research methods, and research process of this study. The first section will explain the background, motivation and the main purpose of this study. The second section is the research purposes and research question. The third section is the research method and the last section is research process.

### 1.1 Background and Motivation

The concept of the Internet of Things originated from Bill Gates "The Road Ahead" in 1995. In The Road Ahead, Bill Gates mentioned the concept of the Internet of Things. Internet was in the development stage at that time, so Internet of Things(IoT) is just an imagination. The Internet of Things was proposed by the International Telecommunication Union (ITU) first in its report "The Internet of Things" published in 2005. In addition to obtaining information between people and people or people and things, things and things can also communicate information through network in the era of internet. Internet of Things has a wide range of applications, and it covers smart transportation, smart cities, smart homes and other fields. It also generates huge business opportunities. With the rapid development of sensors, mobile computing processors, cloud computing services, and 4G/5G mobile communication technologies in recent years. It let the application of Internet of Things to be the key development of global information communications industry.

Gartner predicts that the number of IoT devices will grow from the current 8.4 billion to 20 billion by 2020, in figure 1.1. According to the analysis, more than 80% of the value derived from analysis, statistics, and application services. It can see that the core value of Internet of Things in the future is the development of applications and catch the user needs

and consumer applications will reach 1.5 trillion U.S. dollars in 2020, to see in figure 1.2.

Most of the enterprises actively expand the consumer applications of smart home.

Consumer Electronics Association released a report indicates that smart lights, security, and smart appliances of smart home appliances reached 29 million shipments, and the annual growth rate is 63%. In terms of revenue perspective, smart home appliances reached 3.5 billion U.S. dollars and the annual growth rate is 57%.

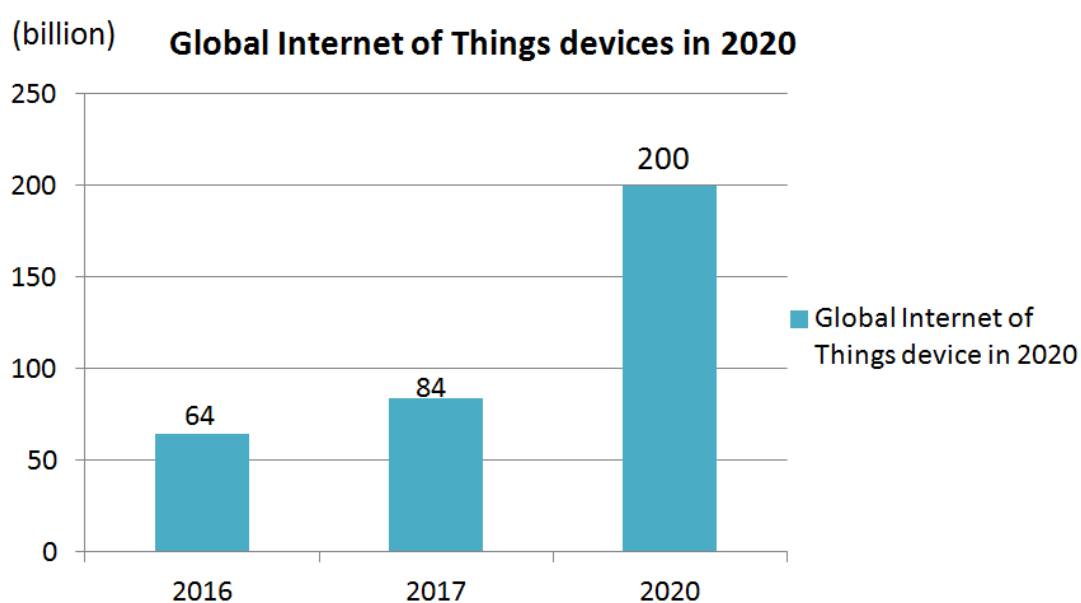


Figure 1.1 Global Internet of Things device in 2020

Source from: (Gartner, 2017)

Category	2016	2017	2018	2020
Consumer	532,515	725,696	985,348	1,494,466
Cross industry	212,069	280,059	372,989	567,659
Vertical industry	634,921	683,817	736,543	863,662
Total (Million)	1,379,505	1,689,572	2,094,881	2,925,787

Figure 1.2 Expenditure of consumer applications

Source from: (Gartner, 2017)

The developments of the smart home faced with the equipment are different brands, different platforms, and different communication protocols that can't be linked together for

long time. International manufacturers and Smart home alliance composed of around the world want to solve this problem. The development of Internet of Things facilitates the technical environment to let third-party or developers integrate a number of services and accelerate related technological applications through open technical resources and cloud developers. With the continuous development and improvement of Internet of Things technology, smart home further expand. The rapid development of smart home increasingly penetrates into everyone's daily life.

Amazon released Smart home hub Echo in June 2015, and Echo's artificial intelligence voice assistant Alexa broke the original concept that people thought Internet of things can only rely on the touch screen or mobile App as the main control interface. Echo can allow users to voice smart home auxiliary such as Philips Hue or Nest thermostats, and play music and news. With the growing growth of Amazon e-commerce, the world has more than 100 million Prime-memberships. Through the e-commerce promotion and cheap price 179 U.S. dollars, it has sold more than 10 million Echo. Many features also enhance the consumer's living standards. In addition, Amazon also invites third-party developers to develop proprietary voice skills, and constantly establishes the link with other smart home auxiliary enterprises to actively expand their eco-systems to further broaden the smart home network effect.

Google released Smart home hub Home in October 2016. Although the launch time is relatively late, but Home's Voice Assistant - Google Assistant combined with the advantages of Google search engine, and coupled with Google calendar, Gmail, and other services. Many feature of the functions same with Amazon, and it also can voice control the smart home auxiliary devices. The price is 139 US dollars, and it is more competitive than Echo. Although as a latecomer, Google actively expand smart home ecosystem and gradually broaden the smart home network effect.

Samsung released the SmartThings hub in April 2015 to take the smart phone control as the core advantage, and enables smart home app monitoring for remote control home environments. Its price is 99 US dollars, and it is the most affordable price in the three Smart home hubs. Samsung also through the open system to provide developers the development tools to reduce the entry barriers and increase the developers to expand smart home network effect.

Table 1.1 The brief comparison of smart home hub

	Amazon	Google	Samsung
Smart home hub	Echo	Home	Smart Phone + SmartThings Hub
Price	179	139	99
Supported system	Close system	Close system	Open system

Source: Data collected by authors

Smart home hub enterprises such as Amazon, Google, and Samsung compete each other and constantly upgrade the capabilities of voice assistants. They also invite third-party developers to develop proprietary voice skills and establish the connection with other smart home auxiliary device enterprises to broaden smart home eco-system.

In addition to the competition, they also have cooperative relationship. Such as Google's smart home auxiliary device enterprise Nest, its products have connection with Amazon's Echo. Smart home hub is the important product to smart home industry. It not only brings artificial intelligence in home but also figures out the disconnection with different brands and has great potential for future development.

## 1.2 Research purpose and question

This study analyzes how Amazon uses its existing advantages and strategies to

promote smart home eco-system after released Echo and also discusses the relationship with smart home auxiliary device enterprises and product development strategy to extend the value of Echo and then broaden network effect. The competitors of value net model choose Google and Samsung to analyze how they use their existing advantages and strategies to broaden smart home eco-system.

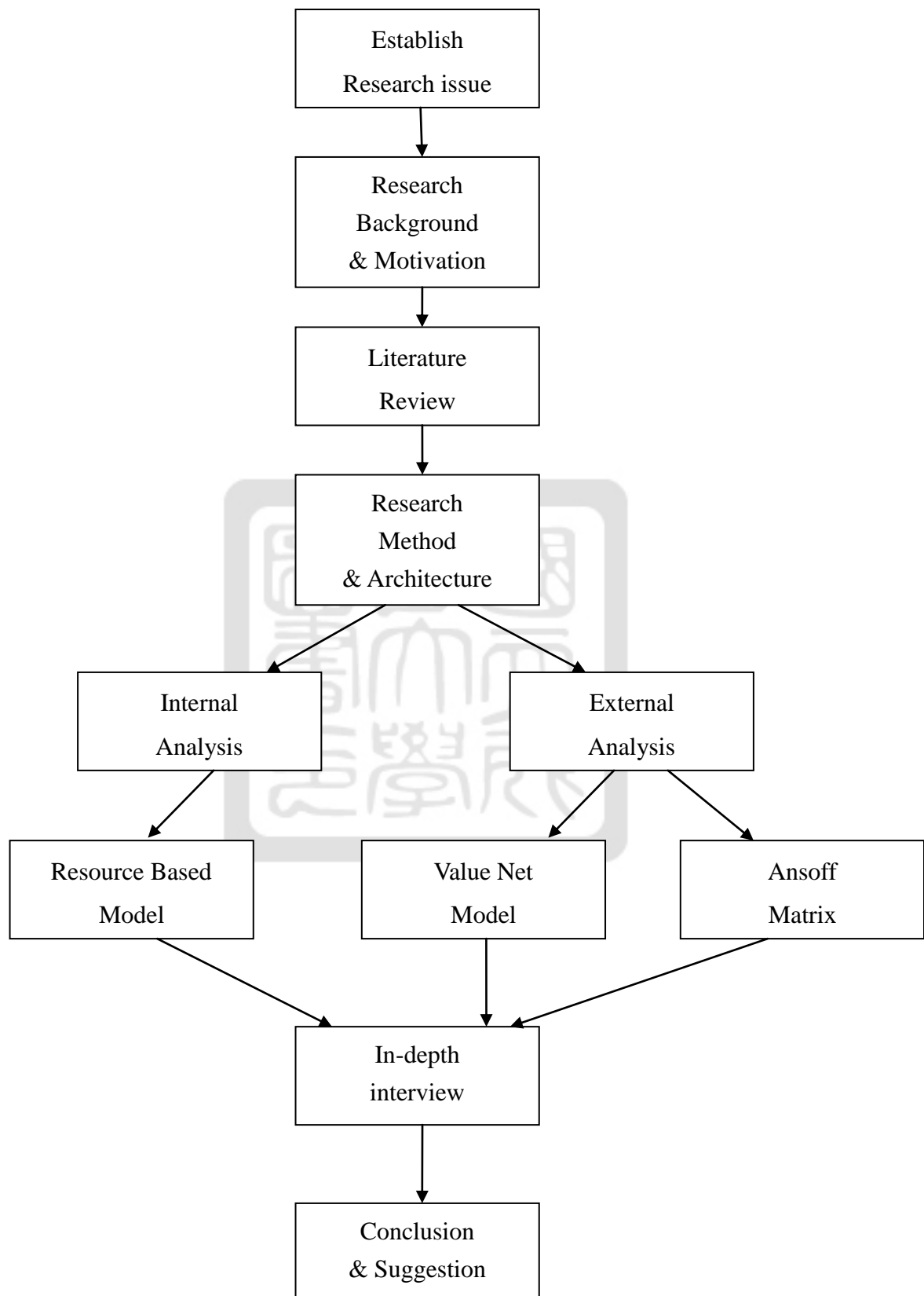
According to the above research purpose, Amazon, Google, and Samsung through competition cultivate each user's usage habit and then broaden smart home eco-system. Is there any possibility about cooperation of them in the future?

### 1.3 Research method

Smart home products expand value proposition. Besides alter original industrial structure, it also extends more value for discussion. This study use case study as the main framework and adopt resource-based model from industry organization to analyze Amazon for internal analysis. This study analyzes Amazon's internal resources, capabilities, and core capabilities and then analyzes Amazon's core competences through resource-based model.

External analysis adopts value net model to figure out Amazon's strategies for Echo in horizontal and vertical competition and then analyze Amazon's relationship with customers, suppliers, competitors (Google, Samsung), and complementors (smart home auxiliary device enterprises). The final part uses Ansoff matrix to analyze the development strategies of different products in different markets. This research mainly discusses how Amazon creates the value of Echo in the relationship with co-opetition, and then through strategic analysis and expert interview results to write the conclusion.

## 1.4 Research process



# Chapter Two

## Literature Review

The study divides literature review into six sections. The first section is introduction of Internet of Things. The second section is introduction of smart home hub enterprises. The third section is Resource Based View model. The fourth section is Value Net model. The fifth section is Ansoff matrix. The final section is In-depth interview.

### 2.1 Introduction of Internet of Things

Internet of Things architecture mainly divided into three levels. The bottom layer is sensor layer which combined by various sensors. The middle layer is network layer which contains wireless and wired network technology and the data which transferred by sensors. The data integrated by network layer and upload to cloud platform. The first layer is application layer which contains applications and management platform. Internet of Things uses sensors to coverage the scope of life and through wireless network to allow sensors have different communication and process capabilities.

<ul style="list-style-type: none"> <li>■ Application</li> <li>■ Management platform</li> </ul>	<b>Application Layer</b>
<ul style="list-style-type: none"> <li>■ Application Gateway</li> <li>■ Wide area Network</li> <li>■ Wireless Edge Appliance</li> </ul>	<b>Network Layer</b>
<ul style="list-style-type: none"> <li>■ Wireless Access Appliance</li> <li>■ Sensor</li> </ul>	<b>Sensor Layer</b>

Figure 2.1 The architecture of Internet of Things

Source: (Institute of Information Industry, 2010)



Internet of Things has stepped out of its infancy and is the next revolutionary technology. As we move from web1 (static pages web) to web2 (social networking web) to web3 (ubiquitous computing web), the need for data getting more important. RFID (Radio Frequency Identification) and wireless network meet the new challenge which equips ubiquitous sensors in the scope of life. Cloud platform provides high scalability and reliability to execute computing and dynamic resources allocation for Internet of Things and it plays the important role (Jayavardhana Gubbi, 2013).

The application of Internet of Things very extensive and the following lists several applications which related to people.

#### (1) Energy management system

Wisdom meters intensively record the electricity information and immediately transmit to power companies, users, and energy service providers. Smart meters help power companies accurately grasp the power demand and increase the forecast of grids. Consumers can grasp the utility changes to adjust the electricity behavior. The complete energy management system can further analyze the consumption of equipment in the house through energy management application platform.

#### (2) Wisdom Medical

The thinking uses patient as the center of 4P (prevention, personalization, prediction, participation) is rising. The future medical will collect rhythm, pulse, exercise through different wearing devices and combined with hospitals, care institutions, home care, and health promotion. Wisdom medical improve the establishment of ubiquitous national medical care services through hospital-wide specialization, big data analysis, and personalized health monitoring program.

#### (3) Smart home

According to (IEK, 2014), the various of smart home application services which are

anti-theft, disaster prevention, smart temperature control, and energy management are most widely known. Global manufacturers actively develop related products and it already penetrated into general family life. Global manufacturers have actively developed four types of application services since 2014. The first is multiple context models which set a variety of different products and services portfolio according to different living conditions of users. The second is home automation management. All of the home devices such as lighting, audio and video devices, and home appliances can be automatically controlled. This part is the vision and goal of smart home development, but the biggest challenge is to solve smart home devices with different brands that cannot be interconnected. The third is home control center which most manufacturers actively design the products or services as home gateway. The last is voice control and interaction. In order to facilitate users to control home devices through voice, manufacturers continuously develop the interaction between devices and users.

## 2.2 Introduction of smart home hub enterprises

### 2.2.1 Amazon

Amazon is multinational e-commerce enterprise which the founder Bezos established in Seattle in 1994. Amazon started with online bookstore and its services gradually expand that includes retail, digital content, and cloud platform.

The founder Bezos always takes the biggest and the most profitable as the mission and his famous saying is: It's all about the long term. Therefore, he adopts long-term development as the main strategy with customer first as the core value of Amazon. The following lists the core business of Amazon.

#### (1) E-commerce

Amazon released prime membership that offers unlimited two-day shipping for 79 U.S. dollars per year in 2005. Amazon's products contain consumer electronic products,

book, furniture, and fresh food, etc. Amazon also holds Prime day and Black Friday discount events every year. In 2014, prime member's annual fee increased from \$ 79 to \$ 99 U.S. dollars, but prime member could enjoy the service is no longer only free shipping. It includes more service like: enjoy movies online, borrow a book from Kindle e-book for free Monthly, priority distribution, and experience Amazon's innovative projects. In the first quarter in 2018, Amazon exceeded 100 prime members (Digital Trends, 2018). According to (Business insider, 2017), Amazon accounted for 43% in total annual sales of all e-commerce websites in United States in 2016. Echo contributed to an estimated 18% of Amazon's total annual sales, the second are home and kitchen category about 15%, and the third are apparel and accessories about 12%. The first and second best sellers were Echo series products in Prime Day and Black Friday in 2017. Therefore, the study indicated the success of e-commerce drive the sales of Echo.

## (2) Amazon Web Service (Cloud platform)

According to (Synergy Research, 2016), Amazon Web Service has become the most successful enterprise in the world and its market share accounted for over 30% and it exceeded total market share of Microsoft, IBM, and Google in 2016, to see in figure 2.2.

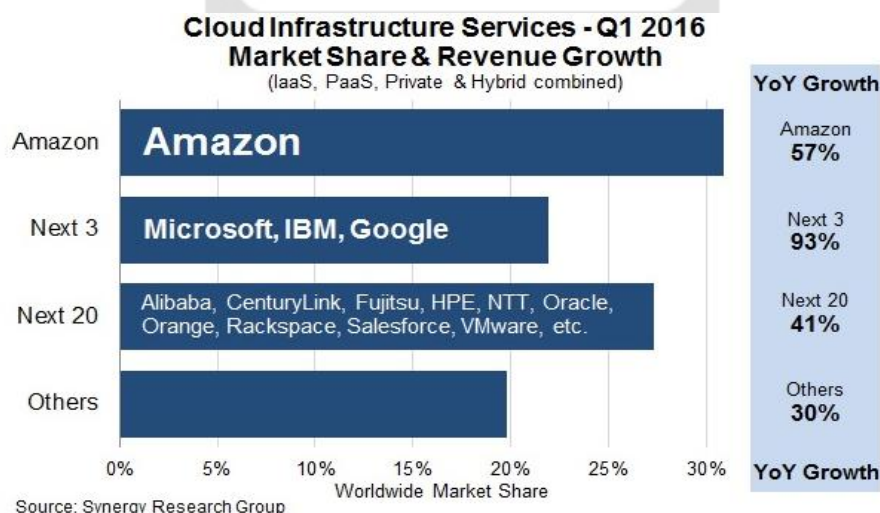


Figure 2.2 The market share of Cloud services

Source: (Synergy Research, 2016)

Cloud platform helps Amazon accurately analyze consumer behavior and through big data analysis to recommend what they really want. Amazon offers customer better shopping experience and personalized services through data analysis. This also increase 10%-30% revenue for Amazon and is one of the reason that Amazon far exceeds competitors on e-commerce.

### 2.2.2 Google

Google is multinational technology enterprise which Larry page and Sergey Brin established in the beginning. Google's business scope contains internet searching, search advertising, and cloud computing and its main profit comes from search advertising (How Google works, 2014).

The rapid growth of Google led a series of product developments, merger, and cooperation since it started. Google offers not only its core business, but also offers abundant online software services, such as G-mail, Google map, and Google plus social network service. In addition, Google also developed smart phone system Android and Google Chrome OS. The following lists the core business of Google.

#### (1) Search engine

Google's search engine which established by Larry page and Sergey Brin and they also called Google guys. Google's search engine can do accurate analysis between websites and it used by most of people in the world. Search engine uses the algorithm which named PageRank to establish index value and through Googlebot to execute it and Googlebot regularly visits websites to renew.

#### (2) G-mail

Google released G-mail which is free e-mail service in 2004. G-mail has 1GB storage space in the beginning and it greatly increased the standard of free e-mail storage at that time. Now, Google has over 15GB storage space and users can through payment to get

more storage space and its user interface is easy to operate and praised by many users.

### (3) Google map

Google map is online map service which released in 2005 and it contains the information of landmarks, satellite photos, and topographic map, etc. Google map service scopes started from United States, England, and Canada and gradually expand to whole world.

### 2.2.3 Samsung

Samsung established in 1938 and it is the biggest enterprise in South Korea. The business scope of Samsung crosses various industries and it contains information technology, financial service, and mechanical. The most famous is Samsung Electronics and it produces smart phones, smart appliances, and television. Samsung constantly innovates and delivers quality products and services for customers to increase their convenience and fulfills smarter life (Harvard Business Review, 2011). The following lists the core business of Samsung Electronics.

#### (1) Smart phones

Samsung focuses on inspiring innovative thinking on smart phones. Samsung releases premium smart phones for high-end market and also releases affordable smart phones to meet consumers need. Therefore, Samsung's market share was the top in the world in 2016. Overall, Samsung's innovative performance is outstanding and its market performance is successful. Samsung experienced the market revolution which led by iPhone and successfully survived in smart phone market. The previous competitors, such as Nokia, Motorola, and Ericsson almost disappeared in smart phone market (Harvard Business Review, 2015).

#### (2) Smart appliances

Samsung constantly releases innovative and consumer oriented products in smart

appliances to offer consumers more convenient life. Samsung's smart appliances contain smart fridges, washing machines, and air conditions, etc and it reached the top of market share of smart appliances in United States in 2016 (Samsung, 2018).

### 2.3 Resource Based View model

Resource Based View model is a theory of Strategic Management which Wernerfelt first proposed in 1984. Wernerfelt thought Resource Based View of enterprise is the combination of tangible and intangible resources instead of looking at enterprise in view of product market activities. The thinking angle of corporate strategy transformed to replace traditional view of products with resources. Resource Based View transforms the basis of strategic development from external analysis of industry to resource based perspective of enterprise.

Barney believed that enterprises can nurture sustained competitive advantages through the accumulation of their capabilities. Barney also thought manufacturers should try to develop incomplete competition to allow enterprises execute strategies in product market to build sustained competitive advantages. The relationship between competitive advantages and resources which proposed by Barney is in figure 2.3.

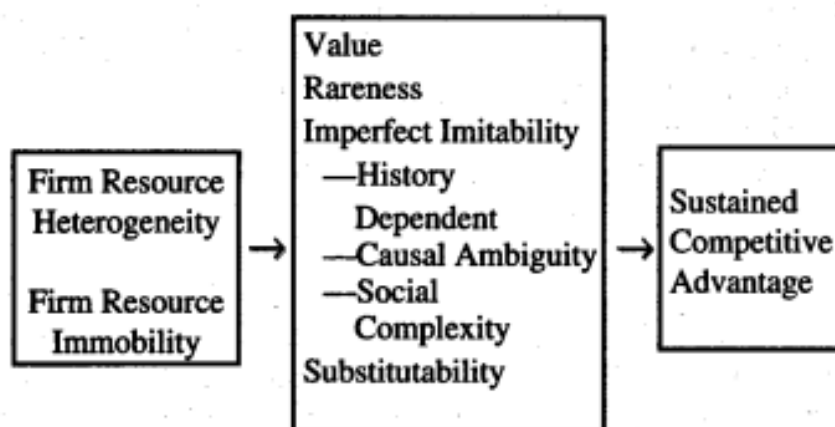


Figure 2.3 Barney's Resource Based View model

Source: (Barney, 1986)

Barney believed that competitive advantages can sustained is mainly because of Firm resource heterogeneity and resource immobility as the foundation. Some resources have value, rareness, imperfect imitability, and substitutability to become capabilities. Enterprises have these capabilities and gradually develop with core capabilities and then become sustained competitive advantages.

Grant thought Resource Based View is the importance of internal review and also considered that enterprise's internal resources and capabilities will guide the direction of business strategy and become the main profit of enterprise (Grant, 1991).

Aaron Baird & Frederick J. Riggins analyzed smart device manufacturers through Resource Based View and found enterprises increase productivity through internal review. They also suggested that Resource Based View should consider the value creation of consumers. Smart device created more value through the actual use of consumers and conducive to manufacturers create diversified smart device for consumers (Aaron Baird & Frederick J. Riggins, 2016).

## 2.4 Value Net Model

Professor Adan M. Brandenburger in Harvard and Professor Barry J Nalebuff in Yale mentioned that the essence of creating value is cooperation, and the essence of earning value is competition (Co-opetition, 1996). To create value, enterprises must combine with customers, suppliers, and employees to develop new market and expand existing market. Brandenburger and Nalebuff proposed Value Net Model in 1996 and it explained the relationship between all business participants, to see in figure 2.4. Traditional enterprise used the materials which provided by suppliers to compete with competitors and then gained customers. But Brandenburger and Nalebuff introduced the new factor which called complementors in business activities. Complementors mainly offer complementary products rather than competitive products and services.

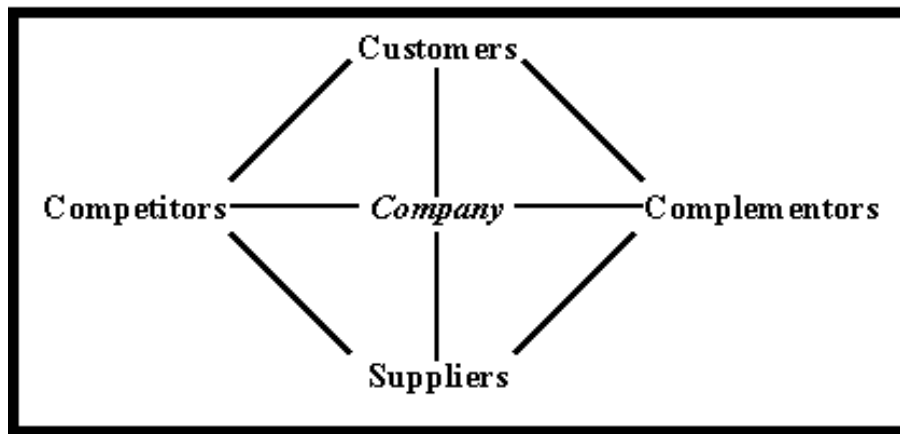


Figure 2.4 Value Net model

Source: (Co-opetition, 1996)

The differences with Value Net model and Porter's five force analysis are the interaction between business participants and the complementor factor which increased in Value Net model. Porter's five force analysis emphasizes segmentation of value and one way interaction between business participants. Value Net Model emphasizes competition and cooperation, and they also called the division of value and the creation of value. Enterprise should work together with complementors, suppliers and customers who create value (win-win process), also compete with competitors, suppliers and customers to gain value (win or lose contest). The relationship combines with competition and cooperation are called co-opetition. The purpose of co-opetition is to create overall value and it is also the core value of Value Net model.

Qiuli & Hao thought customer is the key factor for telecom operators to develop the platform of Internet of Things. The quality of service also affects customer selection and the higher quality of service can increase customer satisfaction. Therefore, telecom operators increase internal innovation to meet customer needs. So telecom operators should use their enormous resources of customers and constantly grasp customer needs to create value in changing market (Qiuli & Hao, 2015).



## 2.5 Ansoff Matrix

Professor Ansoff proposed Ansoff matrix in 1975 and adopts product (exist product and new product) and market (exist market and new market) to be horizontal axis and vertical axis, to see in figure 2.5. Ansoff matrix distinguishes four combinations of product and market to offer the analysis of business growth and strategic development for enterprise.

	Exist Product	New Product
Exist Market	(Market penetration) (Market consolidation)	(Product development)
New Market	(Market Development)	(Diversification)

Figure 2.5 Ansoff matrix

Source: (Ansoff, 1975)

### (1) Market penetration and Market consolidation

Enterprise uses existing product to promote for existing market and focuses on current product market to increase market share. Enterprise uses promotion or enhances service quality to convince consumers to purchase own branded products. Enterprise can based on existing product and existing market to consolidate market share and adopts strategy of product differentiation to strengthen customer loyalty.

### (2) Market development

Enterprise should find customers which have same products requirements in different markets to use existing products to build new market. Enterprise's product position or sales strategy should adjust to suit different markets, but the core technology of products never

change.

### (3) Product development

Enterprise release new product for existing customers to use existing customer relationship to be backing to develop product. Enterprise usually expands the depth and scope of existing product or release new generation product for existing customers.

### (4) Diversification

Enterprise offer new product for new market, but the existing expertise of enterprise may not be useful in it. Therefore, this is the risky strategy for enterprise. Most of successful enterprises get some synergistic effect in sales, channels, or product technology. Otherwise, the failure probability of diversification is high.

Zheng used Ansoff matrix to analyze TFT-LCD manufactures in Taiwan. Zheng thought TFT-LCD manufactures should actively seek for merge of strategic alliance and strengthen the cooperation of China and emerging countries to effectively palm capacity and increase products added value (Zheng, 2012).

Li used Ansoff matrix to analyze IPTV service development of telecom operators in Taiwan. Li thought telecom operators should consolidate the market foundation which established in the beginning and strengthen the comprehensive, immediate, and diverse of video content. Li also thought the price strategy should consider from three dimensions of platform, content, and time to study out flexible price (Li, 2010).

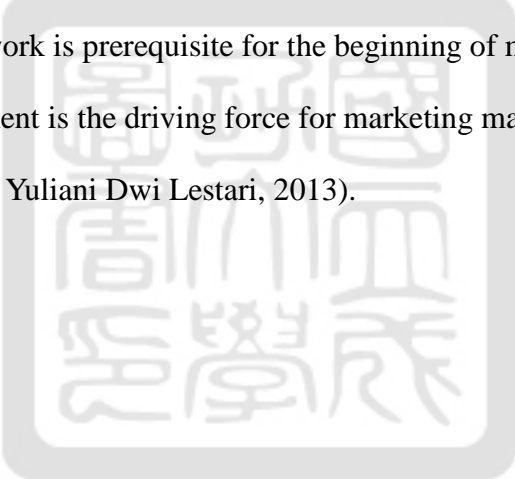
## 2.6 In-depth interview

Interview methods are divided into survey interview and in-depth interview. The survey interview is quantitative studies and its research subject is objective. The survey interview is often used in social science such as market research. In-depth interview is an appropriate method which use in qualitative research to extract more detailed information and deeply understand a subject (Wen, 2000). The purpose of in-depth interview is to

analyze the real insider and find true meaning to solve problems.

Li used in-depth interview to analyze the business model of cross-border e-commerce. Li learned about current situation of the cross-border e-commerce and the strategies adopted by operators and then found out the reasons of constantly operating or exiting market. The research conclusion shows that operators should fully understand target market and also pointed out value proposition, the support of partners, existing customers, and revenue are important factors for cross-border e-commerce to success (Li, 2016).

Wang & Lestari visited 55 companies to explore the success factors of corporate network, new product development, and marketing management. The result shows that only marketing management directly affects the success of entering high-tech industry market. But corporate network is prerequisite for the beginning of marketing management and new product development is the driving force for marketing management to enter market (Kung-Jeng Wang , Yuliani Dwi Lestari, 2013).



## Chapter Three

### Research method and architecture

The purpose of this study is to analyze Amazon, Google, and Samsung through competition cultivate each user's usage habit and then broaden smart home eco-system. Are there any possibilities about cooperation of them in the future? This study adopt Case study method first to analyze Amazon creates the value of Echo in the relationship with co-opetition and then use in-depth interview to make up for the lack of analysis of secondary data from the perspective of experts to answer the research question more perfect.

#### 3.1 Research method

This study adopt resource-based model from industry organization to analyze Amazon for internal analysis. This study analyzes Amazon's internal resources, capabilities, and core capabilities and then analyzes Amazon's core competences through resource-based model. External analysis adopt value net model and Ansoff matrix. Using value net model to figure out Amazon's strategies for Echo in horizontal and vertical competition and then analyze Amazon's relationship with customers, suppliers, competitors (Google, Samsung), and complementors (smart home auxiliary device enterprises). The final part uses Ansoff matrix to analyze the development strategies of different products in different markets.

##### 3.1.1 Case study

The nature of the case study or the main tendency in all case study types is that it tries to clarify one or a group of decisions about why they are adopted, how they are implemented, and what results they have(Schramm, 1971).

Case study is an empirical research method that is mainly used to investigate the current phenomenon in real life. When these phenomenons are not so clear, there are many

aspects of evidence in case study to prove (Yin, 1994).

The general definition of case study is the current phenomenon in the natural environment and it is more suitable for the problem that in the exploratory stage (Zhang, 1998).

According to the different numbers of case study, it can be divided into two types: single case study and multiple case study. Single case study refers to the research process that the researcher is mainly responsible for collecting data related to the research that is an analysis unit. If researchers are responsible for two or more cases and that are multiple case studies (Pan, 2003).

(Cooper, 1995) pointed out that exploratory research is suitable for when there is a lack of clear ideas about certain issues. For new or vague areas, researchers must use exploratory research to have a basic understanding of the problem. If the study that has unknown or not well-defined definition, and it must through exploratory studies to first establish hypotheses.

#### (1) Case study's advantages

- Depth:

Case study is focus on events and situations that are complex phenomenon. It focuses on the events and situations that are closer to the facts and then analyze it and it is more holistic and in-depth.

- Dynamicity:

Comparing with statistical research, case study is more helpful for grasping the complex dynamic changes and causality in facts.

#### (2) Case study's disadvantages

Case study's data are not quantitative data, so it is subjective ideas of researcher. Therefore, it is difficult to do complete objective and rigorous analysis. It is difficult for

case study to convince others about the applicability of the theory without the support of statistical theory, so the stringency is relatively low.

### 3.1.2 Research objects selection

This study mainly analyzes Amazon and aim for smart home market of America to collect the data. Amazon's Echo is the first adopt artificial intelligence voice assistant in smart home hub in smart home market. Alexa broke the original that people thought that Internet of things can only rely on the touch screen or mobile App as the main control interface. Through the promotion of e-commerce and physical store, Amazon sold more than 5 million Echo in a short period of one and a half years. In addition, Amazon also invited third-party developers to develop proprietary voice skills, and constantly establish the link with other smart home auxiliary enterprises to actively expand their eco-systems to further broaden the smart home network effect. The competitors of value net model choose Google's home and Samsung's smartThings to analyze. The reason that chooses Google is that it adopts its advantages of search engine and artificial intelligence to release Google home and it is the main competitor to Amazon. Samsung is the first that release smart home hub to take the smart phone control and open system as the core advantages. These three enterprises have different advantages and strategies on their products, and the market share that Amazon is the first, Google is the second, and Samsung is the third. Therefore these three enterprises is the main competitor in smart home market, so this study chooses Google and Samsung as competitors in value net model.

### 3.1.3 Secondary data collection

This study data includes domestic and foreign relevant journal articles, foreign well-known technological media website, and relevant information about smart home in internet, so this study data belongs to secondary data. Secondary data analysis is to further analyze the research purpose of the original data or apply the original data to explore

another new research issue. Secondary data is very important to social scientists and it has considerable value for researcher. Researcher more relies on secondary data than original data when researcher started to discuss the issue. Finding the direction and emphasis of research from large secondary data and use secondary data to save the time cost, it also can make up the lack of research data (David, 1993).

### 3.2 In-depth interview

In-depth interview is a research method that often uses to collect data in qualitative research. It is the structure that through the conversation between interviewer and respondent to exchange opinions. Through the collective data prepared by interviewer to understand how respondent analyze the questions. In-depth interview is different from general interview that the purpose of the in-depth interview is to analyze the real insider, real meaning, impact, future development and solutions of the interview. In general, in-depth interview should take more time than general interview, but the result gained from it could be the basis for further analysis (Wan, 2004).

Interview can generally be divided into three types: structured interview, non-structured interview, and semi-structured interview. Structured interview are also called standardized interview. It is a kind of interview process that highly controlled, including questions, the order of questions, and record are fully unified. It mostly used for questionnaire. Non-structured interview refers to the standard procedure without questions. Interviewer and respondent exchange opinions according to the topics. The characteristics of semi-structured interview are that interviewer formulates interview outlines or interview points prior to the interview. However, the questions can be formed at any time during the interview, and the manner and order of questions are presented at any time according to the respondent's answer (Yuan, 2002).

This study adopts semi-structured interview. Collecting secondary data through the model presented by case study to analyze it to figure out own contention. According to the analyzed result, this study formulates interview's outline and main point before interview and exchange opinions with respondent to improve overall's outcome.

### 3.2.1 Interview design and object selection

In this study, respondents have expert knowledge of smart home market. The first respondent Jason Lin is the manager of Home Segment Consumer BU in FARESTONE. He also establishes Smarthomehub website and Facebook group. It has more than 10 thousand people in the Facebook group and most of them are author of technological author, startup company owner, and people who have insight in smart home discuss together in the Facebook group. Jason Lin has a good understanding of Amazon, Google, and Samsung enterprise's ecosystem. The second respondent Hsiao-Mei Chang is an associate researcher of policy research division in National Applied Research Laboratories. Through iKnow website to see Hsiao-Mei Chang's article about the competition between Amazon and Google of their smart home hub and she has deep research about it. Therefore this study chooses these two experts as the respondents. The content of the interview analyzes Amazon's co-opetition with other business activity participants in value net model. The final part is that ask the respondent the research question: Amazon, Google, and Samsung through competition cultivate each user's usage habit and then broaden smart home eco-system. Is there any possibility about cooperation of them in the future?



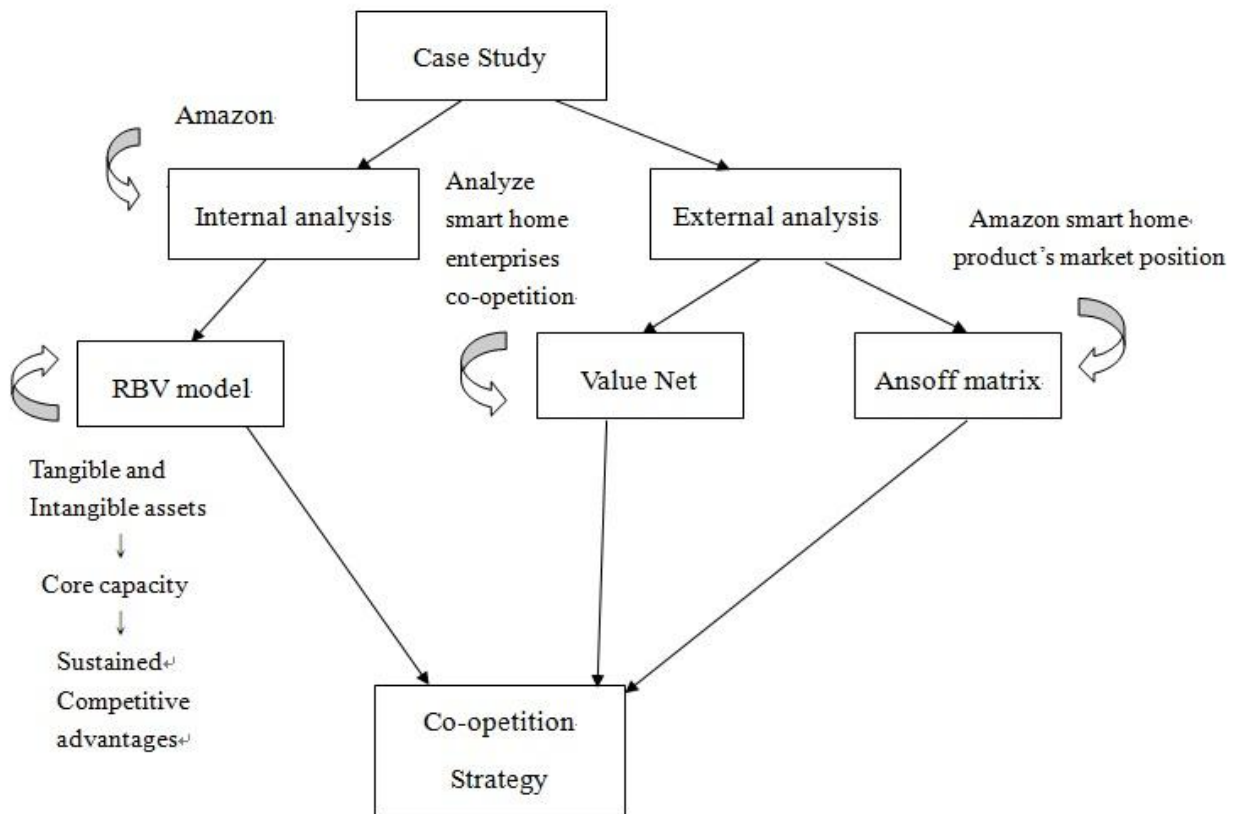
Table 3.1 Respondents

	Section	Respondents	Serial number
1	Home Segment Consumer BU in FARESTONE	Jason Lin manager	A1
2	National Applied Research Laboratories	Hsiao-Mei Chang associate researcher	A2

Source: Data collected by authors



### 3.3 Research architecture



## Chapter Four

### Case Study

This study analyzes Amazon's co-opetition with other business activity participants. According to (eMarketer, 2017) analysis report, it indicates that about 13.6 million Americans use smart home hub every month. Among them, Amazon accounts for 70% market share, Google has 24%, and others have 6%. Most of them in others are Samsung's smartThings. In addition, these three enterprises have large resources and it can integrate into their smart home hub. For example, Amazon owns e-commerce, logistics, and cloud platform to integrate with Echo. Google owns search engine, existing software, and Nest. Samsung owns smartphone and home appliance. These three enterprises are better than other enterprises to have market influence in resource integration. Therefore this study chooses these enterprises to study their co-opetition. The functionality of artificial intelligence voice assistant affects user's perceived value. The number of smart home auxiliary devices and third-party applications are related to the diversity of user choices. These points will affect the enterprise itself to expand the eco-system and the purpose of marketing is to make the demand market wider. This chapter will conduct comprehensive data collection through technological media website and this research perspective. This chapter divided into six parts: artificial intelligence, the cooperation of smart home auxiliary devices, Third-party Applications, eco-system, product line, and marketing to the different of Echo, Home, and SmartThings.

#### 4.1 Amazon Echo

Amazon's Echo launched in June 2015 and offers amazing capabilities. Its artificial intelligence voice assistant Alexa is a breakthrough invention and enables people not only to search information, play music, read daily news, but also to control smart home

auxiliary devices through the connection with Zigbee and Bluetooth by their voice. With the growing growth of Amazon e-commerce, the world has more than 100 million Prime-memberships. Through the e-commerce promotion and cheap price 179 U.S. dollars, it has sold more than 10 million Echo. The following lists the features of Echo.

#### (1) Artificial intelligence voice assistant

Alexa is a voice activated artificial intelligence search engine, combined with Microsoft's Bing search technology to support Alexa. The search results through Echo back to Amazon's AWS cloud service system and then Alexa as an interface to transit the information to users. Alexa biggest feature unlike to other voice assistant is that it always been the state of listening through sound control to start, and the following lists what Alexa can do.

- Playing stream music

Ask Alexa to play a song, artist, album, or playlist, and she'll stream it from the Amazon Prime Music Library. She'll also work with other services such as Pandora and Spotify to offer users multiple choices.

- Read the news headlines

Aside from reading headlines of the news, Alexa can make abbreviated brief if user is interested in the news.

- Check traffic and weather

Through Alexa to get the information about traffic and weather, users don't have to use mobile phone to search as long as they have Echo.

- Set timers and alarms

User can tell Alexa to wake you up every weekday morning at 7 a.m. or tell her to set a timer in kitchen.

- Control smart home auxiliary devices

User can voice control the smart home auxiliary devices that cooperation with Echo

through Alexa and order the devices switch on and off or ask for some customized requirements.

- Answer question

Alexa can face simple questions in life, and even help you deal with math problems.

Alexa also good at using the humor of movie to interact with user.

- Customized voice command skills

Alexa allows users to configure your skills through smart home skill API process, and allows Alexa to understand user's idioms and commands. After setting up customizable voice commands, Echo passes smart home skills translation instructions and returns them to Amazon's cloud AWS. Lambda on AWS through machine learning to let Alexa learn about voice command skills.

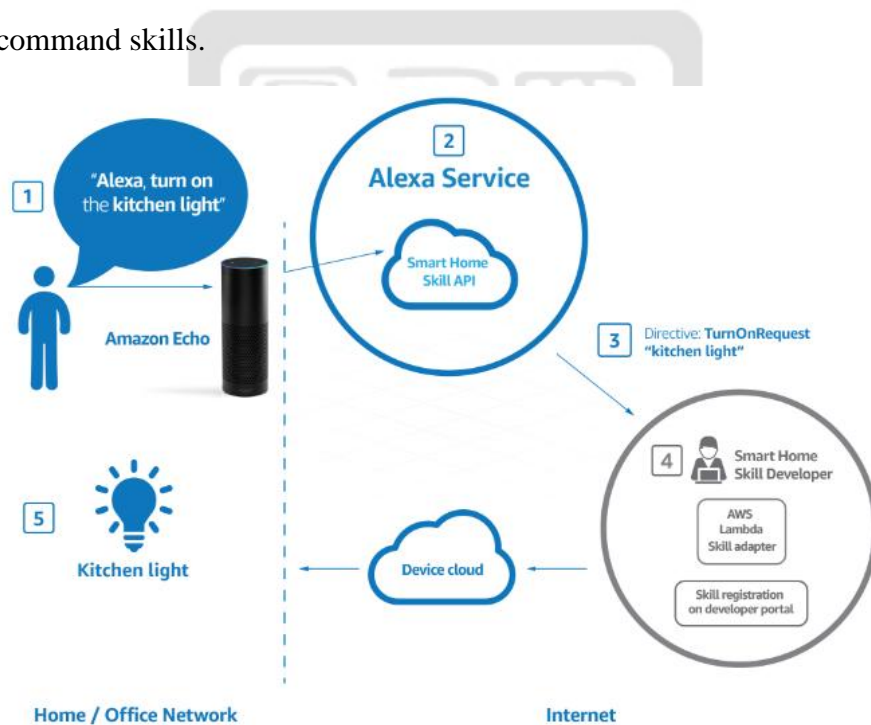


Figure 4.1 Smart home skill

Source: Amazon's website

- Shopping function

When users ask Alexa what is worth to buy today? Alexa will answer user something

on sale in the Amazon, but the premise is that user must have Amazon prime-membership to use this feature. This study agrees that it is a win-win strategy for Amazon, because Amazon is successful in e-commerce, with more than 100 million prime-members. In addition to the success of e-commerce to market Echo, through Echo to let user shopping is a successful development that belongs to Echo's profit model.

## (2) The cooperation of smart home auxiliary devices

The successful development of Echo attracts various smart home auxiliary devices enterprises to cooperate with it to create valuable ecosystem and then broaden smart home market.

- Philips hue

Through Alexa, users can voice control to switch the lights, and also can select the built-in scene mode in accordance with the mood to choose a different color. Through IFTTT can set a variety of light and shadow notification, and the most special feature is to download many third-party applications to make the bulb change. Such as Hue Party this program, with the music flash, show candlelight, fast flashing, random color change, so that you can open a live concert with Philips hue.

- Nest thermostat

Users can voice control Nest thermostat to control the indoor temperature through Alexa. It has circular appearance of an LCD display and external control ring outside the device. Users can through thermostat to understand the indoor temperature and humidity, and the sensor contained in the device. Nest also uses machine learning algorithm to build a programmable schedule containing temperature and time through Linux software, allowing the thermostat to record the user's preferences to set the schedule. Another feature is that if the sensor detects the house for nobody in two hours, and it will start the automatic idle mode and automatically reduce the temperature to avoid the waste of

electricity.

- August

Users can voice control to unlock August smart lock through Alexa and also change the habit to carry the key to go out. User may have some security concerns about the smart lock, but August need to unlock with the password. Also August claims that as long as user regular update, the security issues will never have to worry about.

- Fitbit

Users can voice control to check the information about Fitbit's smart watch through Alexa. Fibit is a smart watch with stylish appearance. Its functions mainly include counting calorie, counting step, distance calculation, tracking sleep quality. The extra function is that link the mobile phone to display the incoming call on it.

- LG smartfrige

LG smartfrige has a 29-inch front touchscreen with something called Instaview, which is a door that can turn translucent to show you the contents of your fridge. User only needs to set the expiration date of the food in system to start tracking through smartfrige. Through Alexa voice to find recipes and play music on the touchscreen.

### (3) Third-party Applications

Amazon opens up Alexa Skills Kit, which is a third-party partner to welcome developers, hardware vendors, and internet operators that based on this platform to build a variety of services to connect Alexa. At present, Echo has more than 10,000 third-party applications.

- Uber

Uber can be used based on the home address through Alexa to call the car service. The choices of the car is same as using app, the different is the control interface change to Echo.

- Domino

With Echo, you can order Domino's pizza. When you place your order, you can track your order anytime and Domino will tell you which service process is now about your order.

- Ted

Echo can explore TED's database to listen well-known speakers or leaders of their inspiring lectures and even through the subject search or speaker name to search the content of the speech.

- Reviewing historical events

Through Echo to understand the major events that have occurred in history today and let Echo state it.

- Music metronome

Echo can play the role of the metronome to control the rhythm of music, and even can replace the traditional metronome.

- Amazon package

Echo can track users Amazon packages based on the order numbers and query which area that are currently located.

#### (4) Closed ecosystem

Amazon uses Alexa Skills Kit to encourage developers to develop more third-party applications, and invested 100 million US dollars to create Alexa Fund to attract more manufacturers to join the ecosystem. In the academic community, Amazon sets up 2.5 million US dollars Alexa Prize to guide students to develop voice skills for Alexa, and there are many project awards. Amazon hopes to let Echo more diversified and be more intelligent. Closed ecosystem can create competitive advantages, and enterprise can control



each part of the design and filter third-party applications to achieve the best result. Amazon also hopes that more smart home auxiliary devices enterprise join the ecosystem and develop exclusive voice skills. Echo for Amazon is no longer just a smart home hub, it has become Amazon major layout in artificial intelligence and smart home market.

#### (5) Product line

- Echo Dot

Amazon released Echo Dot in October 2016 when Google launched home. The price was less than half of Echo to storm the market. Although the price low, but it overall performance is almost same as Echo. The only difference is that Echo Dot adopt small speaker, so the sound quality is slightly worse than Echo. Echo Dot can use Alexa and connect smart home auxiliary devices too. This study believes that Amazon use differentiated price between Echo Dot and Echo. It attracts those who want to buy smart home hub to buy Echo Dot first and then buy Echo to put them in different room that connect together. According to (Adobe Digital Insight, 2017), Echo Dot's sales lead Echo and other smart home hub in the first quarter of 2017, in figure 4.2.

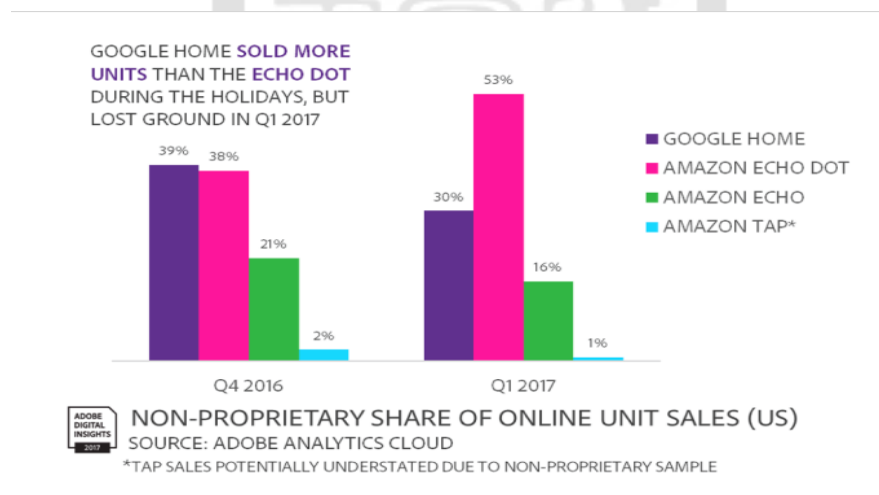


Figure 4.2 Echo Dot sales

Source: (Adobe Digital Insight, 2017)

- Echo Show

Amazon released Echo Show in May 2017. Echo Show has 7-inch screen and 8 microphones to make the sound quality better. In addition, it has 5 million pixel camera lens to let which also has Echo Show to make video calls between each other. Echo that added the screen has breakthrough many directions of application. Through the interaction with Alexa, the interactive process can be displayed on the screen and show the connection with smart home auxiliary devices. For example, through the screen on Echo Show can watch the status of Nest's monitor. According to TechCrunch, news that broadcasted on Echo Show is related to technology and Alex also recommends video content based on trends and preferences. Third party Applications become more diversified because the screen on Echo. For example, user can display lyric to sing karaoke at home, display electronic recipe in kitchen, and display detail information of commodities through the screen and then users can voice shopping on e-commerce.

(6) Amazon's marketing strategy for Echo

- Prime-membership with marketing

Amazon uses prime-membership of 99 US dollars a year for free shipping to enhance the shopping frequency of customer to maintain a good relationship with the customer. In addition, Amazon often presents discounts through the festivals and shoots the relevant video in ad to introduce Echo. Although the ad only has 10 seconds, the ideas are from real user's inspiration and numerous product reviews.

- Physical Amazon Books to promote Echo

Amazon has opened the first Amazon physical bookstore Amazon Books in Seattle. Amazon expands the business layout from online platform to offline that open the physical store and it not just to sale the books. In fact, physical bookstore can show their own electronic products and provide consumers with practical experience and consulting

channel. It has a positive impact for Amazon to increase consumer impulse that take Echo and other smart home auxiliary devices into their house.

## 4.2 Google Home

Although Google Home launched lately in October 2016, its artificial intelligence voice assistant Google Assistant is embedded the advantages of Google search engine, Google's calendar, and Gmail. Most of the functions are same as Echo, and it sells for a competitive price 139 US dollars. Google adopts similar strategy to expand smart home ecosystem and actively enhance network effect with their huge resources.

### (1) Artificial intelligence voice assistant

The difference between others smart home hub and Google Home is its search engine, and the exact search engine with artificial intelligence voice function allows users quickly find information that meets the requirements. Person in charge with Google Assistant said: Being continually interact with the user, so that Google Assistant can not only learn more about natural life pattern, but also better understand users need. The most important thing to create this service is to provide more convenient and intuitive search experience for users.

- Play video and music

Google Home is same with Amazon that cooperates with Spotify and Pandora music. When user does not remember the name of the song, Google assistant will find through the lyrics of the songs and play it. In terms of video, Home can deliver content to users monitor which supported Chromecast, but it only for Netflix and Youtube now.

- Check traffic and weather

Through Home to help users set up the traffic path to reach destination and query the weather conditions. If it can combine a number of features with google map, such as check the popularity of the destination and it will be convenient for users.

- Google's calendar and Gmail

Google Assistant can help users add events to Google Calendar and also integrate route navigation. In the part of mail is integrated Gmail so that Google Assistant can read the contents of mail for user and also through the voice control to send the mail.

- Combine with Google Pixel

Users who have Google Pixel phones that support Google Assistant can get some information from the Home that when you are interested in and want to check further detail information. Users can use Google Assistant to send information to phone, besides it also can find the phones location. The combination of cross device is what Echo does not have.

- Entertainment

Users can find the latest sports information from Home, and if users want to learn more about the favorite team information, Google Assistant can find by search engine. Besides sports, movies information can get through Home, and then deliver content to users monitor which supported Chromecast.

- Control smart home auxiliary devices

Users can control smart home auxiliary devices that cooperation with Home through Google Assistant, ordering the devices switch on and off or with some customized requirements.

- Natural interaction with Google Assistant

To Compare with Alexa that just only response to user's problem, Google Assistant can not only respond it, but also according to the previous issue to extend the interaction with users to achieve the interactive effect. Such as through Google Assistant to find a song and it will help you to find the song you want to play based on your clues.

## (2) The cooperation of smart home auxiliary devices

Google launched Android Things in 2016, which is the platform that offers for smart home auxiliary devices enterprises work on it. Google also renew Weave protocol to let smart home auxiliary devices to support Home. In the begin it only supported by Philips hue, SmartThings, and Nest, but there are more smart home auxiliary devices enterprises join the ecosystem such as August, Lifx, Honeywell and so on.

- August smart lock

User can unlock August smart lock and view the status of it through Google Assistant, the difference between Echo is that it cannot use pin code to unlock. Google said it will develop security unlock mechanism that specifically designed for home use.

- Lifx and Philips hue

Lifx light bulb just like Philips hue that can adjust the brightness and color of the bulb through Google Assistant, but the difference is that user can through Google home's account to connect it. But the most special feature with Philips hue is to download many third party applications to make the bulb change, such as Hue Party this program, with the music flash, show candlelight, fast flashing, random color change, so that you can open a live concert with Philips hue.

- Nest thermostat

User can voice control Nest thermostat to control the indoor temperature through Google assistant. It has circular appearance of an LCD display and external control ring outside the device. User can through thermostat to understand the indoor temperature and humidity, and the sensor contained in the device. Nest also uses machine learning algorithm to build a programmable schedule containing temperature and time through Linux software, allowing the thermostat to record the user's preferences to set the schedule. Another feature is that if the sensor detects the house for nobody in two hours, and it will

start the automatic idle mode and automatically reduce the temperature to avoid the waste of electricity.

- Vivint smart home

Vivint smart home security system has a touch display and sensors such as doors, windows, motion, and water flow to provide user multiple choices. User must set 4 digit passwords to turn on. It is convenient for Home's user to use the display on Vivint to monitor the sensors, such as monitor. In addition, it also can through the smart phone to remote control sensors, it supported ios and android.

### (3) Third-party Applications

Google launched Google actions which is the platform that opens for developers to develop third-party applications in December 2016. Developers can choose two models to use: Direct Actions and Conversation Actions. Direct Actions suit for very simple conversation, such as query the weather and switch smart home auxiliary devices. In this case, Google Assistant is only responsible for giving users simple feedback. Conversation Actions is more like a conversation between user and Google Assistant. In the Conversation also accompany changing and modifying the message. It is more complex but closer to the level of artificial intelligence.

- Netflix

Netflix is the first third-party application in Google actions. Users can deliver content to your monitor which supported Chromecast through Google Assistant.

- Domino

With Home, user can order Domino's pizza. When you place your order, you can track your order anytime and Domino will tell you which service process is now about your order.

- Wall Street and NBC

Through Google Assistant to read Wall Street and NBC, and Google Assistant can create flash briefing of news if the topics users are care about.

- Uber

Uber can be used based on the home address through Google Assistant to call the car service. The choices of the car is same as using app, the different is the control interface change to Home.

- WebMD

User can ask about health related issues through WebMD and get healthy recipes. This third party application becomes more important for the society that emphasis on health issue.

#### (4) Closed ecosystem

From Google launched Android Things that open for smart home auxiliary devices vendors work on it and the third-party application platform Google Actions to see, Google actively expand the smart home market to overtake Amazon. Also Google's Weave Protocol provides the cloud based environment that allows developers do not need to invest in the cloud services. Although Google Actions only has about 100 third-party applications now and it's far worse than Echo that more than 10,000 third-party applications. This study thought that Home's advantages are search engine, combine with Pixel, and integrate Google's services. Although the diversified functions slightly worse than Echo, but Google actively expand the ecosystem of smart home to expand network effect as the second-mover.

#### (5) Product line

Google released mini Home in October 2017, and the prices is same as Echo that 50 U.S. dollars. According to (CNET, 2017), mini Home's sound quality is better than Echo

Dot, but the disadvantage of it is didn't have Bluetooth to connect the audio and user should buy Chromecast audio to deal it. Mini Home is same as Home that can connect smart home auxiliary devices and adapt Google assistant. Because Google assistant is better than Alexa to interact with Echo, the expert of CNET thought in the same price, user will tend to buy mini Home.

#### (6) Google's marketing strategy for Echo

- Google through ad to market Home

Google use go home as the topic to introduce Home during the 2017 Super Bowl. All you need is voice control, and Google home can check weather, traffic conditions, control smart home auxiliary device, and even help your family get up. In the advertisement, Google home perfectly integrate into normal family life and change the technology more human. Google also reminds that go home is a story to us.

- Pop up physical store to market Home

In October 2016, Google opened Pop up physical store called Made by Google in SOHO, Manhattan, and New York to showcase their products, including Pixel phones, Google home, Google Wi-Fi routers and DayDream View VR boxes. Pop up physical store didn't provide purchase service and it only let people experience Google's products. People through the experience to know how convenient the Home are and have the motivation to buy it. In the future, Google will plan to open more physical store to market its products.

#### 4.3 SmartThings

Samsung released SmartThings hub in April 2015 to take the smart phone control as the core advantage and enables smart home app monitoring for remote control the home environments. It supports Zigbee and Z-wave connection to control smart home auxiliary devices. The price is 99 US dollars and it is the most affordable in these three Smart home hubs. Samsung also actively provides developers the develop tools to reduce the entry



barriers through the open system to increase the developers and then expands smart home network effect.

#### (1) Artificial intelligence voice assistant

So far, SmartThings hub do not has artificial intelligence voice assistant and it must connect Echo or Home to use it, so this is a disadvantage for SmartThings hub. Samsung announced in March 2017 that it will have a new artificial intelligence voice assistant Bixby to install in SmartThings hub and smart phones in the future. According to Samsung's official website, Bixby will simplify the user's voice and let Bixby better predict the user's command. Bixby allows user to interact with the most comfortable and intuitive way, including in any context.

#### (2) The interactive model of SmartThings

- Wake up in the morning

Through user set the time to wake up, SmartThings hub automatically help users turn on the lights and open thermostat in the morning. User can through the phone to remote control coffee machine and media player to feel great morning.

- Go out from home

When user is ready to leave home, it can unlock the door, turn off the lights and thermostats, and start the surveillance camera to maintain home safety through the phone.

- Outside

When there is something sudden accident in the house like leak or smart lock being opened, SmartThings will send an alarm back to the phone and user can watch the situation through the surveillance camera to see what wrong.

- Back home

User can unlock the garage door through smart phone when returning home and walk into home to play favorite music or control smart home smart home auxiliary devices.

- Go to bed

When the user is ready to go to sleep, SmartThings can automatically turn off thermostat and light. If window or smart lock moves during sleep, it will send an alarm.

Everything you control via SmartThings can be done on smart phone system IOS and Android. SmartThings's feature is basic, including the startup process of device. It not just manual control, SmartThings can also perform a series of automatic operations.

### (3) The cooperation of smart home auxiliary devices

The main purpose of SmartThings is to connect all of smart home auxiliary devices from different manufacturers.

- Philips Hue

Users can control Philips Hue switch on and off or change color through smart phone, and set the schedule with other smart home auxiliary devices. For example, when users get up, and the Philips Hue and Nest thermostat will synchronously open.

- Nest thermostat

User can control Nest thermostat to control the indoor temperature through SmartThings. It has circular appearance of an LCD display and external control ring outside the device. User can through thermostat to understand the indoor temperature and humidity, and the sensor contained in the device. Nest also uses machine learning algorithm to build a programmable schedule containing temperature and time through Linux software, allowing the thermostat to record the user's preferences to set the schedule. Another feature is that if the sensor detects the house for nobody in two hours, and it will start the automatic idle mode and automatically reduce the temperature to avoid the waste of electricity.

- Samsung home appliances

Through SmartThings to control Samsung home appliances such as: washing machine

or refrigerator. When the refrigerator needs to change the filter or when the laundry is completed, user will get the alarm from smart phone.

- Surveillance camera

Samsung's SmartCam is equipped with a 1080p HD video camera and it can control the switch through smart phone. User can watch the situation through the camera when the smart phone has an alarm.

#### (4) Third-party Applications

SmartApps is the platform for third-party applications, it offer development tools for developers and smart home auxiliary vendors to develop third-party applications for users to download. Users can through the Marketplace to download third-party applications which have been classified and add into SmartThings.

- Home safety

Users can download this type of third-party applications to enhance the security of the smart lock and customize the sound of alarm or notification.

- Bulb

Users can change color of the light to transform the home scene by downloading this type of third-party applications. For example, the Gemtle Wake Up application allows user to set the time to turn on the bulb in the morning.

- Health and sport

Users can be offered some healthy information or remind users to eat medicine every day. It can remind users to achieve daily goals on sports.

- Power saving

When users reach the goal of limitation, SmartThings will send an alarm through smart phone and turn off the idle device to achieve power savings.

#### (5) Opened ecosystem

Samsung cooperate with other enterprises to build the open source alliance, and

through the openness and interoperability to reach Internet of Things. Samsung has a very strong developer community, even if you are not an official partner, and Samsung also provides API for developers to program the connection between SmartThings and smart home auxiliary devices. The premise is that developers should follow the protocol to develop. To Compare with Amazon and Google, they need the permission to cooperate with them, but Samsung's open resource strategy reduce the barriers to entry it ecosystm.

#### (6) Samsung's marketing strategy for SmartThings

- Use the advantage of smart phone to market

According to the TrendForce report, figure 4.3. Although affected by the Note7 bombed in 2016, Samsung still grab 22.6% of the global market share. Due to the smart phone revolution, the public life cannot leave without it. Therefore, someone who is interested in using technology to change family life is the target customer for Samsung.

Rankings	2015 Company	Market Share	2016 Company	Market Share	2017 Company	Market Share
1	Samsung	24.70%	Samsung	22.80%	Samsung	22.60%
2	Apple	18.20%	Apple	15.30%	Apple	15.60%
3	Huawei	8.30%	Huawei	9.60%	Huawei	11.10%
4	Lenovo	5.40%	OPPO	7.20%	OPPO	8.50%
5	LG	5.20%	BBK/vivo	6.00%	BBK/vivo	7.10%
6	Xiaomi	5.20%	LG	5.50%	LG	5.50%
7	OPPO	3.80%	Xiaomi	3.70%	Xiaomi	3.80%
8	TCL	3.70%	Lenovo	3.70%	Lenovo	3.80%
9	BBK/vivo	3.60%	TCL	3.70%	TCL	3.20%
10	ZTE	3.40%	ZTE	3.50%	ZTE	3.00%
	Others	18.50%	Others	18.90%	Others	15.90%
Annual Global Volume (Unit: M)		1,298.30		1,359.60		1,459.00

Figure 4.3 Samsung's smart phone global market share

Source: (TrendForce, 2017)

- Physical store to market SmartThings

Samsung build the Physical store let people experience the Smart home. People experience how convenient SmartThings are and have the motivation to buy it.

#### 4.4 The comparison of smart home hub

Table 4.1 The comparison of smart home hub

	<b>Amazon Echo</b>	<b>Google Home</b>	<b>SmartThings</b>
Artificial intelligence voice-assistant	1.Customized voice command skills 2.Combine shopping function with e-commerce	1.Combine with Google pixel 2.The best voice assistant that understand users need and interact with users	1. Simplify user's voice and let Bixby better predict user's command
The cooperation of smart home auxiliary devices	1.Philips Hue 2.Nest thermostat 3.August smart lock 4.Smart fridge	1.Philips Hue 2.Nest thermostat 3.August smart lock 4.Vinvint smart home	1.Philips Hue 2.Nest thermostat 3.Samsung's home appliance
Third-party Applications	1.Uber 2.Domino 3.Ted 4.Reviewing historical events	1.Netflix 2.Domino 3.Wall Street and NBC 4.WebMD	1.Home safety 2.Bulb 3.Health and sport 4.Power saving

	<b>Amazon Echo</b>	<b>Google Home</b>	<b>SmartThings</b>
	5. Amazon's package	5. Uber	
Ecosystem	Closed ecosystem	Closed ecosystem	Opened ecosystem
Product line	1. Echo 2. Echo Dot 3. Echo Show	1. Home 2. Home mini	SmartThings
Marketing	1. Prime-membership With marketing 2. physical Amazon Books to promote Echo	1. Google through Ad to promote Home 2. Pop up physical store to market Home	1. Use advantage of Smart phone to Market 2. Physical store to Market SmartThings

Amazon、Google and Samsung have their strategies in these six parts, but there are also some similarities inside it. For example, Amazon actively increases the number of the cooperation of smart home auxiliary devices and third-party applications to expand smart home ecosystem. Google focuses on its artificial intelligence voice-assistant to let the interaction with user more human. But both of them upgrade their software and hardware and open more resources to expand their smart home ecosystem and then attract more smart home auxiliary devices enterprises to join in. Samsung focuses on creating simple operation interface and combine with its smart phone to remote control and its strategy is not like Amazon and Google to integrate shopping function. In the part of marketing, Amazon、Google and Samsung use experience marketing to increase consumer motivation to purchase smart home hub.

# Chapter Five

## Model Analysis

### 5.1 Resource Based View Model

According to literature review, Resource Based View advocates the importance of internal review. It also thinks that enterprise's internal resources and capabilities will guide the direction of business strategy to become the main profits of enterprises. Therefore, this study focuses on Amazon's resources, capabilities, and core capabilities to determine competitive advantages.

This study introduces the assets which are divided into tangible and intangible assets of Amazon first.

#### 5.1.1 Amazon's tangible assets

Table 5.1 Amazon's tangible assets

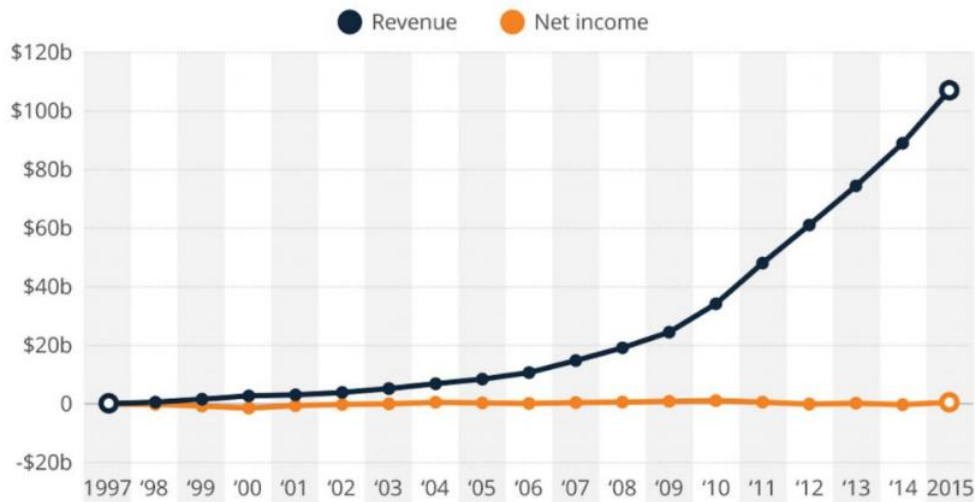
Tangible assets	Amazon
Financial Resources	Amazon constantly invest in R&D technology with cash flow
Organizational Resources	1.Imitating other enterprise's revolution to innovate 2.Using low price strategy to grab market share 3.Focus on customers demand
Physical Resources	1.E-commerce 2.Logistic network 3.Amazon books
Technological Resources	Cloud platform

Source: Data collected by authors

## (1) Financial Resources

In the past 20 years, Amazon's operating revenue closed to exponential growth, but its net income always closed to zero, to see in figure 5.1.

Figure 5.1 Amazon's operating revenue



Source: (TechOrange, 2017)

When most companies are trying to satisfy their shareholders and choose to convert their cash flow to dividend to shareholders, Amazon chooses to invest all of their cash flow from operating activities into R&D technology to innovate their operating efficiency. That is the reason how Amazon has started out as cross border e-commerce in online bookstore and gradually across logistics, cloud platform, and smart home with diversification. When e-commerce lacks of clear brand advantages, it is easy to be imitated by rivals. So, only relies on more remarkable and efficient distribution services to consolidate the leadership position. The only way of Amazon to sustainably operate in fast changing e commerce is to constantly invest in R&D technology with cash flow. This also verifies Bezos, the founder that always has the greatest and most profitable mission.

## (2) Organizational Resources

- Imitating other enterprise's revolution to innovate

Amazon's prime membership is mainly from Bezos that discussed with the founder of



Costco, James Sinegal. Bezos introduced prime membership that offered unlimited two-day shipping for 79 U.S. dollars per year in 2005. Prime membership gradually promoted the total sales of e-commerce, and the total sales exceeded 3 billion U.S. dollars in the first quarter in 2007. In addition, the types of commodities in Amazon warehouse have increased since then. This study believes that Amazon uses fast and free distribution services to attract users to become prime member and then encourage customers to place more orders than original. The revenue which gained from e-commerce can subsidize the logistic cost and the increase order also allows Amazon to get a better price when facing logistic operators.

In 2014, prime member's annual fee increased from \$ 79 to \$ 99 U.S. dollars, but prime member can enjoy the service is no longer only free shipping. It includes more services, such as enjoy movies online, borrow a book from Kindle e-book for free monthly, priority distribution, and experience Amazon's innovative projects. In June of the same year, Amazon took the digital musical that integrate in Amazon Music, and launched the Prime music which is a streaming music service for all prime members. In above all, prime member's annual fee increased from \$ 79 to \$ 99 U.S. dollars to bring more value to prime members and let Amazon to broaden their services.

According to (Statista, 2017), Amazon had over 90 million prime members in September 2017, to see in figure 5.2. In the first quarter in 2018, Amazon has exceeded 100 million prime members (Digital Trends, 2018). According to (Consumer Intelligence Research Partners, 2017), the most important thing for Amazon is that these prime members spend more money than non- prime members. In 2017, prime members spent about 1,300 U.S. dollars per year, and non- prime members spent about 700 U.S. dollars per year. Therefore, it could see that Amazon's prime membership increase the amount of consumption and enhance the frequency of customers to shop on e-commerce. The trend

shows that the future consumer habits will gradually shift to e-commerce, and Amazon will show the scale of the platform to attract more people to join the prime membership.

Therefore, the benefits of increasing prime membership for Amazon are:

- Additional annual fee of prime membership constantly increase
- Prime member is loyal customers of Amazon
- The data shows that the average amount of prime members spend about twice than non- prime members
- The scale advantages of Amazon's e-commerce platform enhance its bargaining power with suppliers and establish good relationship with other vendors to build the good cycle

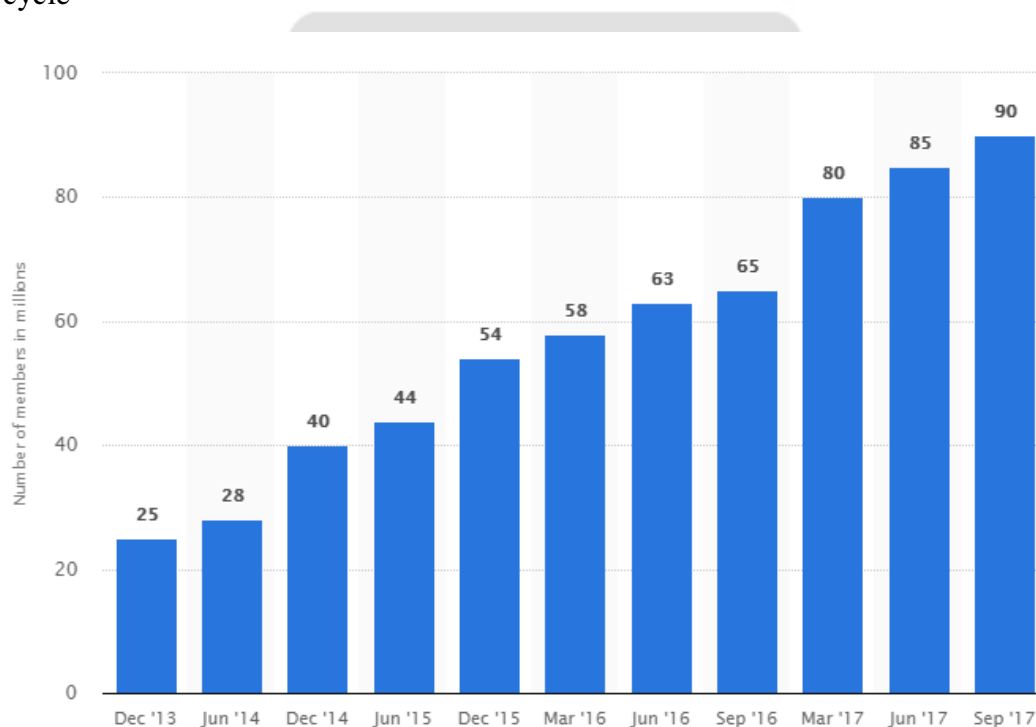


Figure 5.2 The amounts of prime members

Source: (Statista, 2017)

- Using low price strategy to grab market share

Amazon screens out the most popular products on e-commerce and constantly adjusts its prices to gain a dominant position in the competition. The dynamic pricing approach

uses data analysis to compare other e-commerce platforms to maintain the image of giving customers the cheapest prices when shopping on Amazon. In addition, the scale advantages of Amazon's e-commerce platform are the main reason why Amazon can maintain its low price strategies. Improving the bargaining power with suppliers and then reduce the long term average cost to use low price strategies to maintain its leading position in the highly competitive e-commerce market.

Amazon also uses low cost strategies when it entries new markets, including cloud platform services AWS. Bezos operates from the perspective of the electric power business. It let customers pay for what they need and even if Amazon lost money in the early stage. The goal is to make customers feel valuable and establish reputation, so Amazon adopts low cost strategies to cultivate customer loyalty.

- Focus on customers demand

Bezos mentioned the opinion for Amazon's staff from a book: they should wake up worried and terrified every morning to focus on customer's demand. Therefore, Amazon analyzes past purchase history of customers or the messages that clicks on promotional so that to recommend things they like and give some discounts. Also, Amazon provides customer customized recommendation and automatically stores addresses and checkout information to let customers place orders with one click to speed up their shopping experience.

Therefore, this study believes that focus on customers demand is the core value in Amazon's business strategy. Bezos believes that the enterprise's operational strategy can gain the inspiration from customers to continuously improve the quality and efficiency of Amazon.

### (3) Physical Resources

- E-commerce

Amazon's strategy of e-commerce basically centers on prime membership ecosystem. Using diversified service and competitive prices attract customers to join prime members and then enhance customer experience to increase the frequency of customers to shop on e-commerce.

More prime members shop on e-commerce and use Amazon's built-in search engine show that more vendors are willing to invest advertising funds on Amazon. According to (Amazon annual report, 2016), to see in figure 5.3, in the terms of others include revenue of advertisement. From 1.3 billion U.S. dollars in 2014 to 2.9 billion U.S. dollars in 2016, it could see that the annual revenue of advertisement has more than doubled. So this study believes that Amazon breaks the original thinking that e-commerce platforms only sell commodities, and uses the scale advantages of Amazon's e-commerce to attract more vendors invest in advertisement.

Net sales by groups of similar products and services are as follows (in millions):

	Year Ended December 31,		
	2014	2015	2016
Net Sales:			
Retail products (1)	\$ 68,513	\$ 76,863	\$ 91,431
Retail third-party seller services (2)	11,747	16,086	22,993
Retail subscription services (3)	2,762	4,467	6,394
AWS	4,644	7,880	12,219
Other (4)	1,322	1,710	2,950
	<u>\$ 88,988</u>	<u>\$ 107,006</u>	<u>\$ 135,987</u>

Figure 5.3 Amazon's revenue of advertisement

Source: (Amazon annual report, 2016)

According to (Raymond James, 2017), to see in figure 5.4, the statistic indicates that more Americans search products and use Amazon's built-in search engine on Amazon from 2014 to 2016, and the percentage is 38% to 52%. Comparing to Google from 55% in 2014 to 26% in 2016, it means that Americans gradually tend to search products on Amazon rather than Google. So, Amazon slowly grabs Google's core business of advertisement.

**Where do you typically start when searching for a product to buy online?**

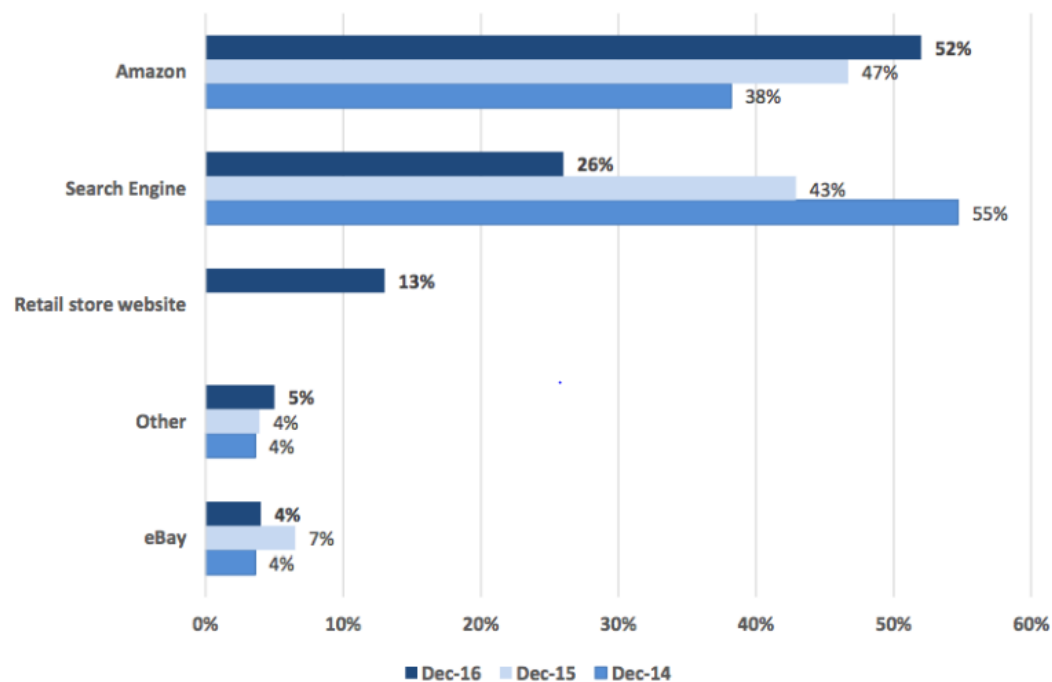


Figure 5.4 What website that customer search product on?

Source: (Raymond James, 2017)

- Logistic network

The increasing prime members caused Amazon to face huge logistic cost, and that why Amazon wanted to control logistic network. Therefore, Amazon has cooperated with USPS to reduce the reliance on UPS and FedEx since 2011. Amazon also has established some fulfillment centers to identify zip codes to sort different pages from different regions through machine learning since 2013.

Amazon purchased more than 4 thousand long-distance trucks to participate in land transportation, called drone to participate in air transportation, and developed vessels involved in maritime transportation in 2014. In the same year on August, Amazon purchased 40 Boeing 767-300F for Prime Air logistics services. The huge logistic network allowed Amazon to achieve global transportation and created 40 billion U.S. dollars in annual transportation revenue, but the shipping costs were as high as 80 billion U.S. dollars,

to see in figure 5.5. Therefore, Amazon used cash flow from other profit businesses through cross- subsidy to invest logistic centers to achieve higher logistic efficiency.

	Year Ended December 31,		
	2014	2013	2012
Outbound Shipping Activity:			
Shipping revenue (1)(2)(3)	\$ 4,486	\$ 3,097	\$ 2,280
Shipping costs (4)	(8,709)	(6,635)	(5,134)
Net shipping cost	\$ (4,223)	\$ (3,538)	\$ (2,854)
Year-over-year Percentage Growth:			
Shipping revenue	45 %	36 %	47 %
Shipping costs	31	29	29
Net shipping cost	19	24	17
Percent of Net Sales:			
Shipping revenue	5.1 %	4.1 %	3.7 %
Shipping costs	(9.8)	(8.9)	(8.4)
Net shipping cost	(4.7)%	(4.8)%	(4.7)%

Figure 5.5 Amazon's shipping cost

Source: (Amazon annual report, 2014)

Amazon released Amazon Flex which is similar to Uber's operational model in 2015. It let the people who have idle time to become Flex drivers and help Amazon carry out the last mile service from the logistics center to customers. This study believes that this is efficient for the layout of last mile and it didn't need to purchase vehicle to achieve logistic distribution services.

In addition to huge logistic network, Amazon's FBA (Fulfillment by Amazon) is more close to vendors. According to data base to track the inventory, it let system to query the proximity between vendors and consumers, and then select the most suitable warehouse to ship. It also helps Amazon to predict the commodities of each warehouse to minimize the shipping cost. The most important is FBA uses volume paying that is same as AWS to accommodate more vendors.

- Amazon books

Amazon opened the first Amazon books in Seattle in November 2015. As of November 2017, Amazon had opened more than 10 Amazon books in United States.

Amazon books according to the rank and classification on e-commerce to plan different regions and the books which sold on Amazon books don't have the price on it. Customers should login Amazon's website or use barcode scanner to query the prices which consistent with Amazon's website. This study believes that offline bookstores increase traffic and data for Amazon. When users search for prices through Amazon, they can collect user preferences and purchase records and then timely recommend books or offer discount coupon to attract customers. Amazon books installed multiple surveillance cameras to record customer purchase behavior and then send back to data analysis platform to analyze customer behavior.

#### (4) Technological Resources

Amazon Web Services (AWS) provides computing power, database storage, content delivery, and other functions to help enterprise broaden and manage their data. The price strategy uses volume paying and allows enterprise to use anywhere. In addition to provide cloud service, Amazon also provides solutions to enhance elasticity and security to let enterprises use without doubt.

Amazon's revenue of cloud platform was 3.2 trillion U.S. dollars in third quarter in 2016 and it is 55% growth over the same period last year, to see in figure 5.6. Although Amazon's revenue of cloud platform was only 10% of Amazon's overall revenue, the operating income was reach to 861 million U.S. dollars. It has become one of the most profit businesses of Amazon.

According to Amazon financial report, Amazon CFO Brian talked that price reduction is part of our core business philosophy. Financial reports in recent quarters have proven that it didn't affect our revenue. In addition to the reduction of AWS price, Amazon has also added more functions and services to attract more enterprises to join it.

## Segment Results – AWS

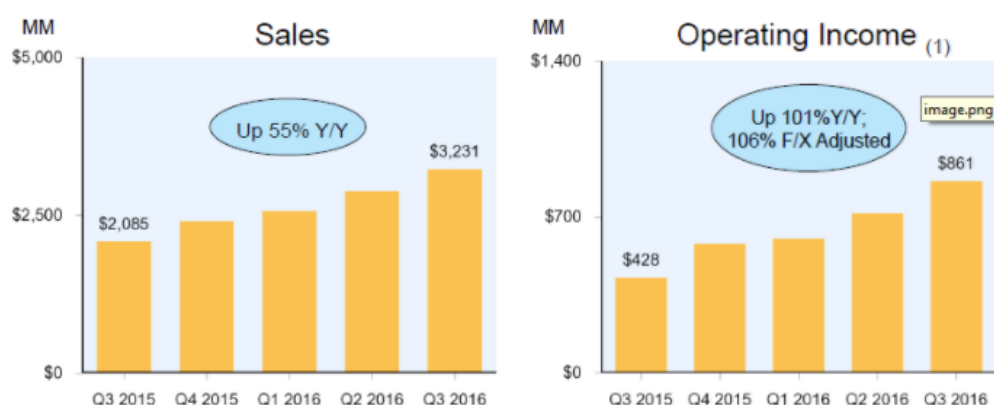


Figure 5.6 Amazon's AWS revenue

Source: (Amazon financial report, 2016)

### 5.1.2 Amazon's intangible assets

Intangible assets mean that enterprises have non monetary assets that are not identifiable in physical form. The value that intangible assets bring to enterprise sometimes is more important than actual revenue.

Table 5.2 Amazon's intangible assets

Intangible assets	Amazon
Human Resources	Transparent communication platform
Innovation Resources	Combine with small business' organizational culture with huge economic resources
Reputation Resources	Brand image and high quality management

Source: Data collected by authors



### (1) Human Resources

Amazon established transparent communication platform and discarded traditional human resources management to use anytime feedback for internal communication. This way encourages employees to express their views or point out the lack of colleagues that allow Amazon improve problem quickly.

### (2) Innovation Resources

According to The Most Innovative Company which BCG published in 2016, it analyzes the common features of innovative enterprises are use multiple channels and widely expand innovative network to transform external innovation resources into internal resources. This study believes that Amazon combine with small business organizational culture with huge economic resources to solve problems that many enterprises cannot solve.

### (3) Reputation Resources

Amazon uses high quality management to offer customers unlimited selection, the best shopping experience, and the lowest price. In the customer relationship, Amazon automatically stores addresses and checkout information to let customers can place orders with one click and speed up their shopping experience. Amazon constantly enhances customer shopping experience and let customers not just shop on it. Therefore, Amazon successfully hangs on the signboard that the service is the most considerate and the commodities are most cheapest and diversified e-commerce.

### 5.1.3 Amazon's capabilities

By integrating tangible assets and intangible assets to explore the enterprise's capabilities

Table 5.3 Amazon's capabilities

Enterprise's capabilities	Amazon
Using economic of scales to build e-commerce platform and give consumer good brand image	<p>In the aspect of commodities vendors, Amazon uses FBA to facilitate vendors in warehouse management and decreases delivery time to reduce shipping cost. In the aspect of customers, Amazon offers convenient e-commerce platform for customers and uses dynamic pricing to give consumer the cheapest brand image. Amazon constantly focuses on customers demand and gives customers the best shopping experience and then establishes word of mouth between vendors and customers. Therefore, Amazon attracts more vendors enter and more customers to use economic of scale to build e-commerce platform and then hangs on the signboard that the service is the most considerate and the commodities are most cheapest and diversified e-commerce.</p>
Strategy of diversification	<p>Amazon constantly invests in R&amp;D technology with cash flow and establishes huge logistic network to enhance distribution efficiency and then promotes potential customers to become prime members and increases value of existing prime members. Diversification services like cloud platform to let enterprises to place their resources and provide exclusive solutions for them. Cloud platform becomes one of the most profit businesses of Amazon. In addition to the e-commerce platform, Amazon widely opens Amazon books to combine online to offline service to give customers more shopping channels.</p>

Enterprise's capabilities	Amazon
Prime membership successfully cultivate customer loyalty	With the success of Amazon's prime membership, not only free shipping fee and reduce the time that customers spent on receipt, but also experience Amazon's innovative projects. In addition, prime member has special discount in the celebration of festival. These reasons indicate that prime membership successfully cultivate customer loyalty.

Source: Data collected by authors

#### 5.1.4 Amazon's core capabilities

Amazon constantly invests in R&D technology to make it stronger and stronger. In the future that customer tend to shop on e-commerce, Amazon sells diversified commodities and successfully cultivate prime members to constantly shop on it. According to Gartner's analyst that he indicated prime membership is the key to retail strategy and it enhance customer loyalty (Ben Fox Rubin, 2016). The establishment of huge logistic network enhances distribution efficiency and reduces the reliance on UPS and FedEx. It also can sell extra cargo space for other online retail vendors (Adam Levy, 2017).

The above two reasons are the key for Amazon become the leading e-commerce. This study believes that Amazon's core capabilities are through prime membership to accumulate prime members and focus on customer demand to constantly enhance shopping experience, also invests in R&D technology with cash flow to establish huge logistic network to firm the position of e-commerce leader.

#### 5.1.5 Amazon's competitive advantages

According to capabilities and core capabilities analysis, this research transforms capabilities and core capabilities which have value, rareness, imperfect inimitable, substitutable to be Amazon's competitive advantages. Through competitive advantages

to be different with competitors and sustainability profit to maintain sustainable development. Therefore, this study classifies Amazon's competitive advantage as the following points.

(1) Amazon's prime members is the highest number in all e-commerce websites

According to (Digital Trends, 2018), Amazon had over 100 millions prime members in the first quarter in 2018. Therefore, this study believes the incentives of low annual fee which 99 U.S. dollars per year and free shipping to be the motivation for customers to become prime members. In addition, prime member can experience Amazon's innovative projects and through huge prime members to debug and improve the services. Amazon uses prime membership that gradually pulls away from competitors and keeps prime membership as the core to firm the position of e-commerce leader.

(2) Amazon's total annual sales in 2016 far exceeds other e-commerce websites

According to (Business insider, 2017), Amazon accounted for 43% in total annual sales of all e-commerce websites in United States in 2016. Echo contributed to an estimated 18% of Amazon's total annual sales, the second are home and kitchen category about 15%, and the third are apparel and accessories about 12%. Amazon's success in e-commerce is also contributed to prime membership, high customer loyalty, and brand awareness. According to (Raymond James, 2017), there are 52% Americans search products and use Amazon's built-in search engine on Amazon. Amazon's success in e-commerce attracts more vendors move closer to Amazon and exerts the scale advantages of Amazon's e-commerce platform.

(3) Establish logistic network to reduce long-term average transportation cost

Due to the rapid growth of total annual sales, the huge transportation fee to pay for UPS and FedEx are burden for Amazon and it could let UPS and FedEx to have the abilities to decide the prices. Therefore, Amazon should establish logistic network to figure

out this problem. Amazon has established some fulfillment centers and purchased trucks through FBA to select the most suitable warehouse to ship. But the last mile services still reliance on UPS and FedEx. Therefore, Amazon released Amazon Flex to let the people who have idle time to become Flex drivers and help Amazon carry out the last mile service from the logistics center to customers. But Amazon Flex is not notable now. This study believes that Amazon establish logistic network is to relieve internal logistic transportation and the huge logistic traffic created by Prime Day or some festival event. Amazon still has good relationship with UPS and FedEx for last mile service. To see in the long term, Amazon establishes logistic network save a lot of transportation cost and even have a chance to do last mile service by own to achieve the blueprint that full logistic network.

#### (4) Effective recommendation system

Amazon uses item-based algorithms to enable recommendation system to give user some helpful information and quickly update as soon as user give Amazon some feedback. Amazon places a personalized recommendation module based on user purchase history and browsing behavior in homepage. In the Shopping carts, Amazon also recommends other items that can be added to be supplement to the products that already to purchase (Transbiz, 2016). Amazon's effective recommendation system increase total sales by 10-30%. That is one of the reasons why Amazon far exceeds other e-commerce websites. Through Big data analysis to provide more personalized shopping experience for customers.

#### (5) Dynamic pricing

Consumers always compare prices when they place orders in this transparent information era. Through the dynamic pricing to adjust the prices every hour and use consumer psychology to let customers think Amazon's products are the cheapest. According to (Boomerang Commerce, 2015), Amazon uses low price of bestsellers to lead consumers believe that Amazon has the best overall price.

## 5.2 Value Net Model

According to literature review, professor Adan M. Brandenburger in Harvard and professor Barry J Nalebuff in Yale mentioned that the essence of creating value is cooperation, and the essence of earning value is competition (Co-opetition, 1996).

Value Net Model emphasizes competition and cooperation, and it so called the division of value and the creation of value. Enterprise should work together with complementors, suppliers and customers who create value (win-win process), also compete with competitors, suppliers and customers to gain value (win or lose contest). The relationship combines with competition and cooperation are called co-opetition.

This chapter begins with Amazon Echo as the center to analyze, and then analyze the relationship with competitors, complementors, suppliers and customers. Through the relationship to analyze how to create value together in the dynamic competition or through competition to earn value for enterprise, to see in figure 5.7. According to (Co-opetition, 1996), Government plays an important role in Value Net and it responsible for providing infrastructure, formulating laws and regulations to maintain social order, and also control various business activities. Therefore, this study will analyze Government in Value Net.

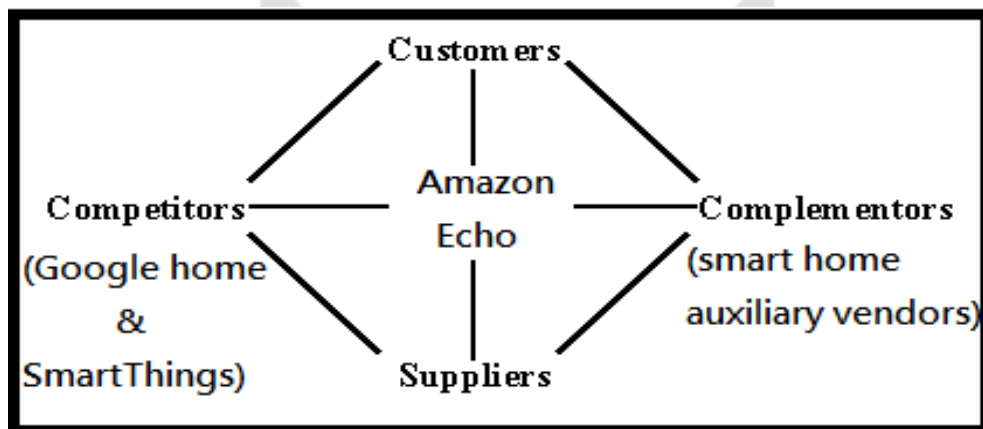


Figure 5.7 Amazon's Value Net Model

Source: (Brandenburger & Nalebuff, 1996)

### 5.2.1 Amazon Echo (The center of Value Net Model)

#### (1) Amazon's strategy on Alexa

Amazon's strategy that allows Alexa be used on other company's products, not only on its Echo. So Amazon publishes the Alexa SDK development tools for developers to use Alexa on their products for free. SDK includes developer auxiliary tools, hardware development tools, and user interface. It is easy to use for those enterprises who want to install Alexa on their products. The following will use case study to explain Amazon's strategy on Alexa.

- Wireless speaker

The second largest wireless speaker brand Sonos announced to cooperate with Amazon in October 2017. Alexa was officially the first voice assistant to be available on Sonos. Sonos's feature of wireless speaker is to connect with streaming platform, like Spotify, and another feature is that it supports the pairing between each Sonos's wireless speakers and put each Sonos's wireless speakers in different room through app control to form surround sound system at home (Inside, 2014). This concept is similar to Amazon's strategy that let user put Echo into different rooms at home to achieve the presence of Alexa everywhere in home.

This study believes that Sonos's wireless speakers focused on the design of audio quality, so the sound quality and microphone sensitivity are better than Echo. The cooperation between Alexa and Sonos will attract the customers that didn't like the sound quality of Echo to buy it. Sonos through the cooperation with Amazon to gain voice assistant, and compare to others wireless speakers are more technological and functional. For Amazon itself, it not only increases the usage of Alexa, but also through the cooperation with wireless speaker's vendor to broaden Echo's ecosystem.

- Smart appliances

LG released connected smart fridge ThinQ in 2017. It has a 29-inch front touchscreen with something called Instaview and it can show the contents of the fridge and the current temperature. The most important feature is that it can keep track of food expiration dates (The Verge, 2017). ThinQ integrates with Alexa to let user to voice control the functions of smart fridge. Through third party applications can find the skills of querying recipe and Alexa will show the recipe on touchscreen for user to cook. This study believes that the cooperation of Amazon and LG let Alexa extend to the kitchen area and also allow third party applications to be more diversified to attract developers to develop. Users can through Alexa to supply daily necessities in kitchen area on Amazon's e-commerce and then increase the total sales of Amazon.

Amazon cooperates with Samsung through Alexa on connected Robot vacuum in 2017. The premise is that users must have Echo to connect with Robot vacuum and then use voice control to clean the house. In addition to Robot vacuum, all of Samsung's smart appliances supported Alexa, including smart fridge, washing machine, and air condition. The third party application that controls all of Samsung's smart appliances is Samsung smart home. This study believes that the cooperation of Samsung and Amazon are to make up the lack of Samsung's voice assistant and through Alexa to improve the visibility of smart appliances. Samsung announced that all of its smart appliances will support voice assistant Bixby in the future, so whether keeps the cooperation with Alexa is the emphasis that Samsung need to think about it.

- Car

Many car brands like Toyota, Lexus, and ford indicate that they will install Alexa in their car in the future. The user scenario is similar to home, and car owners can check traffic, listen music, and check weather through Alexa. It also can control smart lock in



front of home and open smart home auxiliary devices in advance. This study believes that Internet of Vehicle is the positive trend for various car brands, so Amazon takes the lead in putting Alexa to allow users familiar with the operation. Third party applications can also be designed in response to the scenario of the car. The cooperation with cars let Alexa become more diversified and with the cooperation of leading brands to increase Alexa usage. In the long term, working with cars broaden Echo's ecosystem.

## (2) Third party application analysis

Amazon's third party applications are similar to iPhone's app store to let user select the skills and add on Echo. Alexa also actively recommends the skills to help increase the adoption of third party applications. Most of the developers are smart home auxiliary devices vendors to expand the functional with Echo and users could use new skills without purchasing latest model. Amazon offers wealth bonuses and subscription fee to reward other developers to develop third party applications. If skills become popular, Amazon will offer AWS for developers to use for free. In addition to the above, Amazon also opens workshops around the world to train students who specialize in developing third party applications. Echo have over 20 thousand third party applications since it launched. This study believes that these things really enhance the quality of third party applications. Developers will in order to gain the reward to increase the added value of skills to attract users to use and then increase the usage. Huge third party applications make Alexa more valuable than rival's voice assistant.

## (3) The relationship with Amazon Echo and e-commerce

- Keeping prime membership as the core to promote Echo

Amazon holds Prime day and Black Friday discount events every year, and the commodities sold on Amazon's e-commerce that over 10 thousand have discount. Echo's products evenly decrease 20 to 30 U.S. dollars for prime members in the discount events

and the best selling product is Echo Dot. According to (BUSINESS INSIDER, 2017), Prime day and Black Friday provide high price incentives to purchase Echo at home. This study believes that Amazon's role as the position of e-commerce leader is the key success factor to promote Echo, and the price that close to cost let Alexa spread throughout the United States. According to (BUSINESS INSIDER, 2017), more than 60% of prime members who already own Echo will purchase another one during the discount event. It indicates that Amazon's strategy to let user put into different room is effect. In addition to purchase Echo, customers also buy smart home auxiliary devices during the discount event to drive the sales of smart home auxiliary devices and then attract more vendors to cooperate with Amazon.

- Echo's voice shopping to increase e-commerce total sales

Echo enables users to purchase any commodities on Amazon's e-commerce via voice control, but the primes is users must be prime member to use this function. Users can set the home's address, payment method, and 4 digits password first to directly use voice control to shop on Amazon's e-commerce. When users ask for Alexa's shopping recommendation, Alexa will automatically recommend the best selling products on Amazon. According to (CNBC, 2017), Echo owners increased their purchase of consumer products by 14% in the third quarter of 2017, up from the 7.5% jump seen in the second quarter. This study believes that Echo's 70% market share is the best channel to increase e-commerce total sales. To combine the user scenario in home with Echo to let users directly purchase is the important development for Amazon.

#### 5.2.2 Goole Home (Competitors)

Google released Home in October 2016. Google Home only has Nest, Philips Hue, and SmartThings that support it in the begin, but now there are more than 1500 smart home auxiliary devices from 225 brands that support Google home (TechCrunch, 2018). Google

also released the low priced Home mini to increase market share. In the e-commerce, Google cooperates with Amazon's rivals: Target and Wal-mart to add the shopping function. The following will use case study to explain Google's strategy on Google home.

(1) Google's strategy on Google assistant

- Wireless speaker

The second largest wireless speaker brand Sonos not only support Alexa on voice Assisatant. Also, Sonos announced to support Google assistant in 2018. The reason that Sonos cooperates with Google and Amazon is to equip with leading voice assistants to promote its wireless speaker through its advantage of sound quality. In Google's aspect, it wants to cooperate with Sonos for its sound quality and brand awareness to increase the usage of Google assistant. In addition to the cooperation with Sonos, Google also cooperates with JBL and Bose to broaden Google assistant.

- Cooperate with other vendors with the smart display

Amazon released Echo Show in 2017. Echo Show is the smart home hub which has touchscreen and it can shows the process that interact with Alexa and some detail information on the screen. Google announced to cooperate with Lenovo, JBL, LG, and Sony with smart display which has touchscreen and Google assistant to compete with Echo Show. According to (TechCrunch, 2018), smart display supports all of the standard services on Google Home and welcomes developers to develop third party applications that exclusive for smart display. According to Google's product manager, Google wants its ecosystem more differential through the cooperation with these vendors. Because people have preferences for a particular design, working with these vendors can make sure the quality.

- Smart appliances

LG's smart fridge ThinQ and other smart appliances support Google assistant. It

means that LG doesn't choose to cooperate toward Amazon or Google, but supports both of them. According to (The Verge, 2017), anyone who purchases LG's smart appliances could receive a free Google home, and it indicates the relationship between them is good. According to (Cnet, 2017), Google actions give user step by step verbal instructions for more than five million recipes, and these recipes are useful on LG's smart fridge. Users can supplement required ingredients and consumer products through Amazon's e-commerce.

## (2) Google cooperates with Target and Wal-mart on e-commerce

Google announced to cooperate with Target and Wal-mart on e-commerce and integrated them on Google Express, which is the platform about Google's shopping services. There were some retail vendors like Costco in Google Express in begin, and it charged users for 95 U.S. dollars per year for membership. This strategy is similar to Amazon's prime membership. After announced to cooperate with Target and Wal-mart, Google Express ditched its member fees, and promised free delivery in one to three days, as long as customers order are above each store's minimums. According to (RBC Capital Markets, 2017), voice shopping will generate 10 billion U.S. dollars for Amazon by 2020. Therefore, it is necessary for Target and Wal-mart to cooperate with Google to fight against with Amazon on voice shopping. In Google's aspect, because e-commerce is not its core business, cooperate with various vendors is also a strategy for it.

## (3) The integration of Google assistant and smart phone

Google released App of Google assistant on Google play store in February 2017. Anyone who owns Android's smart phone that doesn't need to purchase Google home and still can connect smart home auxiliary devices through smart phone. This study believes that Google's strategy is different with Amazon and Google doesn't care this move may cut the potential sales of Google home. This strategy mainly reduces entry barriers to boost customers to join Google's ecosystem.

According to (BUSINESS INSIDER, 2017), Google assistant accounted for 46% of the smart phones equipped with personal assistant and Bixby only accounted for 13%. The analysis indicated that users who own Android's smart phone more like to use Google assistant and the analysis also predicted that Google assistant will expand its market share to exceed 60% and Bixby will decline to 5% by 2022. This study believes that Google mainly promotes Google assistant and sales Google home which supplements Google assistant to broaden smart home's ecosystem. Google assistant's depth and scope that interact with user are higher than Alexa, and voice assistant is the dominant factor in the future(ComputerWorld, 2018).

#### (4) Google released low priced Home mini

Because of Google home's market share always lower than Amazon Echo and most of Amazon's market share are Echo Dot. Thus, Google released Home mini and also bundled with its Pixel smart phone to compete with Echo Dot. Moreover, Google cut the prices of Google home and sold at least 6.8 million devices through Wal-mart and Target during Black Friday in 2017(BUSINESS INSIDER, 2018).

#### (5) Nest reunites with Google

Google acquired Nest in 2014 and it had been operating of the only profitable division of Alphabet for the past three years. Nest has sold more than 11 million products since its first thermostat released in 2011 and it is on leading position in the field of thermostat. Google announced to bring back Nest under its control and it means that Google's investment in AI and machine learning can benefit Nest products. Also, Nest reunited with Google can reinforce Google's hardware business and offer more bundled packages for Nest and Google products.

Since Nest reunited with Google, Amazon decided not to sell any of Nest products and disconnected the connection with Echo. Nest's thermostat always has very good

customer reviews and it is the preferred brand for customers to choose the thermostat. So, the biggest lost should be those customers who bought Echo and Nest.

### 5.2.3 SmartThings (Competitors)

Samsung released SmartThings hub in April 2015 to take the smart phone control as the core advantage and enable smart home app monitoring for remote control the home environments. But SmartThings's market share far below Amazon and Google, the reason probably can be it lacks of voice assistant. Samsung released voice assistant Bixby in 2017 and announced to install in it smart phone, smart TV, and smart fridge in the future. The following will use case study to explain Samsung's strategy on SmartThings.

#### (1) Develop smart TV and smart fridge as smart home hub

- Smart TV

While every TV maker works with Amazon and Google, Samsung tries to stick it out alone to launch smart TV with Bixby. Users can search for TV shows and movie, control smart home auxiliary devices, and listen streaming platform through smart TV. The smart TV with big screen displays the interact process with Bixby and receive the notification of smart home auxiliary devices, and also has more features through the connection with smart phone. This study believes that smart TV with screen to show the information is its main feature. TV is life necessity for people, so smart TV allows customers increase the new choice to join SmartThings's ecosystem.

- Smart fridge

Samsung and LG have been the competitive relationship for long time. Because of Amazon and Google cooperate with LG in smart fridge, Samsung released smart fridge which equipped Bixby in 2018. Samsung's smart fridge with touchscreen can display the interact process with Bixby and this function is similar to its smart TV. Smart fridge allows user to cast the information on smart TV through the advantage of cross devices and also

displays the food information on smart phones. The interaction of cross devices makes the control of smart home easier.

## (2) Combine with Samsung's smart phones

According to (BUSINESS INSIDER, 2017), Samsung released Bixby for Samsung Galaxy S8 and it just a half-baked voice assistant. Because Bixby is different with Alexa and Google assistant that it can only control basic functions on smart phone and can't interact with users or answer questions. In addition, all of Android smart phones has Google assistant. Therefore, Bixby must compete with Google assistant on smart phones and that also the reason why users don't adopt it. According to (BUSINESS INSIDER, 2017), Google assistant accounted for 46% of the smart phones equipped with personal assistant and Bixby only accounted for 13%. The analysis indicated that users who own Android's smart phone more like to use Google assistant. Therefore, Samsung should let Bixby more functional to convince users to adopt and use the advantage of cross device to broaden its ecosystem.

## (3) SmartThings Cloud

Samsung announced to release SmartThings Cloud on international CES (Consumer Electronics Show) in 2018. SmartThings Cloud is the platform allows people to control Samsung's smart home products and other smart home auxiliary devices from a single app. Customers can benefit from SmartThings Cloud to select smart devices that suit their budget with no constraints. For smart home auxiliary device enterprises, it only needs to code for one API to connect with SmartThings Cloud and it drastically lower the entry barrier for joining SmartThings's ecosystem. This study believes that Samsung released various smart home appliances to be the smart home hub and developed voice assistant to broaden smart home ecosystem. Although the launch time is relatively late than Amazon and Google, Samsung adopts SmartThings Cloud as the main control interface to integrate

all smart home products and uses the advantage of cross device to create value.

#### 5.2.4 Philips hue, Nest, and August (Complementors)

The complementors of Amazon Echo are smart home auxiliary device enterprises. Smart home auxiliary devices complete user's smart home setup and the number of smart home auxiliary devices and product quality also affect the value of Amazon Echo. The good relationship maintained with each enterprise can create overall value in dynamic competition. This study adopts one of the smart bulbs, thermostats, and smart locks enterprises that selected by Tom's guide(world index information technology website) of most compatible products that work with Amazon Echo to analyze(Toms guide, 2018). These enterprises are Philips hue, Nest, and August and their products are purchased by most of users.

##### (1) Philips hue

Philips has advanced technology and powerful advantages in lighting and it is fast growing enterprise and one of the global leaders. In the era of customer-oriented economy, integrating innovation concepts and technology is the weapon of the enterprise, so Philips invests 9% of its revenue into research and development every year and this makes Philips create dominant position.

Philips hue is the first enterprise that works with Amazon Echo in the bulb area. In addition the operating interface is well designed and intuitive, users can change bulb colors and schedule bulb to turn on at certain times through third party applications. Therefore it gains high score on various technological websites. Customers can buy Echo and Philips hue as a bundle to save 40 U.S. dollars on Amazon's e-commerce. This study believes that bulb is necessity for customers and Philips hue is leading brand in bulb area. Therefore, Amazon Echo facilitates its market share through the connection with Philips hue and both sides complement each other to create value in smart home market.



## (2) Nest

Nest has sold more than 11 million products since its first thermostat released in 2011 and it is on leading position in the field of thermostat. Users can voice control Nest thermostat to control the indoor temperature through Alexa. It has circular appearance of an LCD display and external control ring outside the device. Users can through thermostat to understand the indoor temperature and humidity. Nest also uses machine learning algorithm to build a programmable schedule containing temperature and time through Linux software, allowing the thermostat to record the user's preferences to set the schedule. The operating interface works with Alexa very well and allows users easily to operate, so it often considered the best thermostat.

So far, Amazon decided not to sell any of Nest products and disconnected the connection with Echo because of Nest reunited with Google. This decision lost the thermostat enterprise which has cultivated the complementary relationship with Amazon Echo for long time and also indicates that there is no cooperation between Google and Amazon.

## (3) August

August released smart lock to replace traditional lock and let the key is no longer a necessity to unlock the door. Users can voice control the smart lock to get the certificate to unlock the door. If users have private issue about smart lock, it also let users to set 4 digits code to get double protection. Although smart lock compare with bulb and thermostat that is not a necessity for customers, it still creates many applications. For example, Amazon announced Amazon Key that allows delivery people to enter customer's house to leave package through the cooperation with smart lock and it can save the time for customers to wait at home. This service may create privacy concerns for customers, so Amazon needs to figure out this problem to allow user accept this innovative service.

### 5.2.5 Customers

According to (eMarketer, 2017) analysis report, it indicated that about 13.6 million Americans use smart home hub every month. Among them, Amazon accounted for 70% market share, Google has 24%, and others have 6%. It indicates that Amazon Echo is the most popular products in smart home market. But smart home is in the emerging stage, user's behavior which Amazon pays attention about will affect development strategy of Amazon Echo.

According to (Techcrunch, 2017), 42 percent of Amazon Echo owners have two or more devices. It indicates Amazon's strategy that let user put Echo into different rooms at home to achieve the presence of Alexa everywhere in home is effective.

According to (National Public Research, 2018), it indicated that one-sixth Americans own smart home hub. This research also investigated user's behavior that over half of respondents keep their smart home hub in the living room, followed by kitchen (21%), and bedroom (19%). This survey further investigated which products replaced by users to use smart home hub. About 30 percent said smart home hub is replacing the time spent with TV and more than 34 percent said smart home hub s replacing the time spent with smart phone at home. Therefore, smart home hub gradually changes the lifestyle and gradually replaces the time spent with TV and smart phone at home. In the final part, this study indicated that 44 percent of smart home hub's owner started using their smart phone when using smart home hub. Therefore, it could push Amazon to add Alexa to its companion app where users manage settings and check some information.

### 5.2.6 Suppliers

The products of Amazon Echo almost outsources to suppliers. Therefore, the hot sales of Amazon Echo drive the supply chains which are almost Taiwan manufacturers. Echo's processors are supplied by MediaTek who equipped MT8163 and MT6625 on Amazon

Echo. Power supplies are handled by Chicony, AoET supply lens, and Hon Hai is responsible for assembling all relevant components. This study believes that Amazon has a good interaction with suppliers and clear division of work and both of them are quite optimistic about the future development of smart home hub. According to (ETtoday, 2018), the general manager of MediaTek said there are two reasons why they are quite optimistic about smart home hub. The first reason is the decline of prices causes the entry barriers for customers are gradually decrease. The second reason is they thought voice recognition reached high accuracy. Hon Hai also invested 870 million U.S. dollars to build factories in China to cooperate with Amazon. The factories are expected to develop 30 product lines for tablets and consumer electronics and 15 product lines for smart phones and other components. It indicates the establishment of long term cooperation.

#### 5.2.7 Government

Because smart home is in the emerging stage, US local government plays as backstage driving force to use third-party applications to enable citizens to communicate with the government through Echo. Georgia collaborates with startup enterprise called Acquia to develop third party application which called GeorgiaGov. GeorgiaGov transforms the visual contents of top 50 popular topics to voice contents on Echo and it also helps citizens which are disabilities to communicate with US local government (GeorgiaGov, 2017). According to (government technology, 2017), Micahael Sherwood, Las Vegas's director of information technology, said Alexa is important for public sector to develop innovative services. Sherwood also said every citizen should have one with the low price to have access to communicate with the government. So far, Las Vegas's government have already developed about nine skills which give users ability to ask about elections, parks, community calendar, and building permits.

### 5.3 Ansoff Matrix

The section adopts product (exist product and new product) and market (exist market and new market) to be horizontal axis and vertical axis. Ansoff matrix mainly analyzes the development strategies of different products in different markets, to see in figure 5.8.

	Exist Product	New Product
Exist Market	(Market penetration) (Market consolidation)	(Product development)
New Market	(Market Development)	(Diversification)

Figure 5.8 Ansoff matrix

Source: (Ansoff, 1975)

#### (1) Market penetration and Market consolidation

Amazon holds Prime day and Black Friday discount events every year and the price of Echo series products decline during the events to use price incentive to attract prime members or non prime members to purchase Echo. In addition, more than 60% of prime members who already own Echo will purchase another one during the discount event. It indicates that Amazon's strategy to let user put into different rooms is effect. Moreover, Amazon opens Amazon Books to show their own electronic products and provide consumers with practical experience and consulting channel. These strategies are the reasons that Amazon's market share up to 70%.

#### (2) Market development

Amazon publishes the Alexa SDK development tools for developers to use Alexa on their products for free. It is useful for smart home auxiliary device enterprises to equip

Alexa which is mature technology on their products to promote for customers and also have the connection with Echo and then sold on Amazon's e-commerce. The most benefit for smart home auxiliary device enterprises is they don't have to undertake the risk of developing voice assistant. For Amazon, it doesn't have to develop smart home auxiliary device itself and spend development cost, and it only need to publish Alexa SDK development tools to extend Alexa on many products. For example, Sonos wireless speaker, smart appliances (LG and Samsung), and cars all support Alexa. These cooperation increase the usage of Alexa and different user scenario to increase the number of third party applications and then make Alexa more valuable than rival's voice assistant.

### (3) Product development

Amazon released Echo Dot after released Echo a year. The price is less than half of Echo, but performance almost same as Echo and the only difference is sound quality. Amazon also released the promotion that bought five Echo Dots could get one for free. Therefore, people who already owned Echo could purchase Echo Dots to put into different rooms through this promotion and achieve the effect of Alexa everywhere in home.

After Amazon released Echo Dot a year, it released Echo Show. Echo Show has 7-inch screen and the interactive process with Alexa can be displayed on it. The screen has breakthrough many directions of application. For example, users can watch surveillance Camera allocated in different rooms on Echo Show, third party Applications can display electronic recipe in kitchen and display detail information of commodities through the screen to allow users voice shopping on e-commerce. These new functions attract who already own Echo or new users to purchase it.

### (4) Diversification

Amazon released Amazon Key service in November 2017. This service mainly provides for prime members to collaborate with Echo, smart lock, and surveillance camera

to allow delivery people enter customer's house to leave package which customer buys on Amazon e-commerce. Users can watch the delivery process through smart phone. This service intention let customers feel convenient and then purchase more commodities on e-commerce, but Parks Associates's (market research and consulting firm) research director, Brad Russell, said this service obviously crosses another boundary line and customers may have some privacy concerns and choose not to use it (DIGITAL TRENDS, 2017).

Therefore, this service is not effective in the new market and Amazon should carefully evaluate the range which customers can accept and then correct it.

#### 5.4 In-depth interview's result

This section according to the content which actually interviewed respondents and uses bullet points to present the interview questions. In order to maintain the authenticity of the information, the content which provided by respondents have not been modified and adopts series number to identify respondents. The purpose of in-depth interview is to verify the differences between this study's opinions and expert opinions and then reference expert opinions to write the conclusion of this study.

##### (1) Amazon's key success factor

A1: 「 1. Amazon first brought artificial intelligence into the smart home field 2. Amazon uses very low price through hardware subsidies (important reason) to attract customers to buy Echo and combine ecosystem with selling smart home auxiliary devices, O2O service, and digital content to earn money. Amazon uses the concept of Internet to play Internet of Things. 3. Amazon released skills platform (third party applications) and Alexa SDK development tools in begin. Amazon adopts opened attitude in hardware and software to encourage manufactures to join its ecosystem. 4. Amazon uses its advantage of e-commerce to sell Echo. 」

A2: 「 1. The leader of Amazon, Bezos, has precise foresight and the developmental strategy of Echo is right. Leader is key factor in technology industry. 2. Amazon opens up blue ocean market with Echo and doesn't compete with smart home auxiliary device enterprises to grab their market. 3. Amazon integrates software, hardware, and ecosystem in smart home market and uses Echo to assist retailers in e-commerce for digitalization and sells commodities. Echo and Amazon's e-commerce are two-way interaction. Amazon uses e-commerce to sell Echo and then increase Echo's market share and also through the Echo's function of voice shopping to sell commodities on e-commerce. 4. Amazon publishes Alexa SDK development tools for developers to use Alexa on their products. 」

(2) Google which is latecomer in smart home market, can it catch up with Amazon?

A1: 「 1. Google is familiar with the operation of ecosystem. For example: mobile phone system: Android. 2. Google's artificial intelligence is its biggest advantage and Google assistant has localized edition in the world which benefit from the revolution of Google translation. 3. Google integrates exist service: Google calendar, G-mail, and Google map 4. Google controls mobile phone system and built-in Google assistant. 」

A2: 「 1. Google still focus on exist search advertising on enterprise aspect and doesn't like Amazon to deeply integrate into consumer side. Although Google released Google home and Pixel, the market share is not so well. 2. Google home is more expansive than Echo and its sales channel are not diversified as Echo. Therefore, Google home is difficult to promote into consumer side. 3. Google always seizes the position of standard maker and it is the leader of technology but can't play a good integrator of technology. Otherwise, Amazon is a good integrator of technology. 4. Google perhaps can acquire startup which has patented technology in smart home to integrate with it. 」

(3) Whether the quantity and quality of smart home auxiliary devices contribute to the development of Echo?

A1: 「 1. More smart home auxiliary devices contribute to the development of Echo and it is the winning key to Echo. For example: Xiaomi's smart home 2. Google also think smart home auxiliary device is the winning key to Google home, so it integrates Nest to provide total solutions for customers. 3. Echo drives the development of smart home auxiliary device. 」

A2: 「 1. Alexa is a key factor. If smart home auxiliary devices want Amazon to sell its commodities on e-commerce and it must built-in Alexa on their products, and it contributes to the development of Echo. 2. The quantity and quality of smart home auxiliary devices absolutely contribute to the development of Echo and broaden its ecosystem. 」

(4) Whether Echo improve user's convenient of life?

A1: 「 1. User scenario is important. For example: User scenario combines with surveillance camera, smart lock, and different smart home auxiliary devices. User uses Echo as smart home hub and according to user's needs to purchase smart home auxiliary devices to improve the convenient of life. 」

A2: 「 1. User puts Echo in different rooms and uses Alexa as secretary indeed improve user convenient of life. 2. The screen of Echo Show displays the interact process more conducive to interact with users and improves user's convenient of life. 」

(5) How to make people who have not purchased Echo have the motivation to purchase it?

A1: 「 1. Smart home is in the emerging stage and customers need to be educated through multiple channels to have the motivation to purchase Echo. 2. Artificial intelligence is a key factor. If customers think smart home can through artificial intelligence to reach real smart home in the future and they will have the motivation to purchase it. 」

A2: 「 Localization and differentiation is the key of voice assistant and it needs toward to the development of customized market. 」



(6) How do stakeholders (Amazon, Google, and Samsung) of smart home market cooperate and compete each other in the emerging stage?

A1: 「 1. Amazon and Google develop their own smart home ecosystem and through intense competition to broaden smart home market. They expand the market share of smart home hubs to layout the road for earning the voice shopping advertisements in the future.

2. Because Samsung's Bixby is different with Alexa and Google assistant that it doesn't work well. But Amazon could consider the market share of Samsung's smart phone is the top to use Alexa to cooperate with it and then broaden smart home ecosystem in a complementary way. 」

A2: 「 1. Smart home is in the emerging stage and there are many possibilities in the future, so Amazon, Google, and Samsung can cooperate or compete each other. 2. Samsung is existing smart appliance enterprise and its development strategy is provide customers total solutions of smart home. Because Samsung's Bixby launched later and it needs time to cultivate the coping ability with users, it may be a wrong decision to insist on keeping release Bixby and invest a lot of research and development costs. So, when Bixby is not accepted by users and it is possible for Samsung to work with Amazon and Google. 」

## Chapter Six

### Conclusion and Suggestion

The first section of this chapter is research conclusion. This study organizes the data of case study and model analysis and integrates expert opinions to propose research conclusion. The second section is managerial implication. This study offers practical suggestion for Amazon. The third section is research limitation. This study provides research suggestion for future researchers be the reference in the final section.

#### 6.1 Research conclusion

So far, smart home is in the emerging stage. Amazon, Google, and Samsung use their competitive advantages to promote smart home hub. According to Resource Based View model, Amazon has over 100 millions prime members. Amazon constantly accumulates prime members and focuses on customer demand to enhance shopping experience and also invests revenue in establishing logistic network to reduce long-term average transportation cost. These strategies allow Amazon far exceeds other e-commerce websites on total annual sales and firms the position of e-commerce leader.

Amazon first brought artificial intelligence into the smart home field and actively builds the connection with smart home auxiliary device enterprises to let developers to develop third party applications. According to Value Net model, Amazon publishes the Alexa SDK development tools for developers to use Alexa on their products for free. For Amazon, it can extend Alexa on many products through Alexa SDK development tools. For example, Sonos wireless speaker, smart appliances (LG and Samsung), and cars all support Alexa. These cooperation increase the usage of Alexa and make it more valuable than rival's voice assistant.

Amazon's sales channel which is its e-commerce is better than Google and Samsung

and prime members and non- prime members are the target customers of Echo. Amazon uses very low price through hardware subsidies to attract customers and also holds Prime day and Black Friday discount events to stimulate the sales of Echo and smart home auxiliary devices with discounts every year. More than 60% of prime members who already own Echo will purchase another one during the discount event. Moreover, Amazon opens Amazon Books to show their own electronic products and provide consumers with practical experience and consulting channel. Echo's core value and these strategies successfully increase Echo's market share to 70% in smart home market. It is more helpful for Amazon to integrate Echo with its e-commerce with the increase of Echo's users and combine the user scenario with Echo to let users directly purchase commodities through voice shopping on e-commerce.

The competitor, Google home's biggest advantage is its Google assistant and it allows users quickly find information that meets their requirements and continually interacts with users. Comparing with other voice assistants, Google assistant is more understands user's need, so it gained high scores in every technology website reviews. Google cooperates with other vendors with the smart display to make it more competitive and ensures product quality. Google also cooperates with various vendors on e-commerce to grab the market share of voice shopping and fight against Amazon. Google mainly promotes Google assistant and sales Google home which supplements Google assistant to broaden smart home's ecosystem. Therefore, anyone who owns Android's smart phone that doesn't need to purchase Google home and still can connect smart home auxiliary devices through smart phone. This strategy mainly reduces entry barriers to boost customers to join Google's ecosystem.

Another competitor, Samsung SmartThings is the first released in smart home market and takes the smart phone control as the core advantage and adopts opened ecosystem to

allow various smart home auxiliary devices to connect with it as two main features.

However SmartThings's market share far below Amazon and Google, the reason can be it lacks voice assistant. Samsung released its voice assistant Bixby in 2017 and announced to install in its smart phone, smart TV, and smart fridge in the future. Samsung's strategy mainly provides total solutions for customers in smart home. In addition, Samsung's smart phones adopt Android system. Therefore, Bixby must compete with Google assistant on smart phones and that also the reason why users don't adopt it and Bixby only accounted for 13% market share on smart phones.

Amazon and Google respectively expand their own smart home ecosystem. As of 2017, there are one-sixth Americans own smart home hub and about 95% are from Amazon and Google. Among them, Amazon accounted for 70% market share and Google accounted for 25%. The data indicated Amazon and Google through intense competition to broaden smart home market since their smart home hub released and use their own strategies to cultivate consumer usage habits. The following are their competitive strategies of smart home hub enterprises.

Amazon:

- (1) Amazon publishes Alexa SDK development tools for developers to let Alexa be applied in various fields in smart home.
- (2) Amazon uses its core business e-commerce to sell Echo through hardware subsidies.
- (3) Amazon increases total sales of e-commerce through voice shopping of Echo.
- (4) Huge third party applications enhance the value of Echo.
- (5) Amazon released different Echo series products to allow customers put into different rooms to achieve the goal of Alexa everywhere in the house.

Google:

- (1) Google adopts bilateral strategy (Google home and Google assistant) to broaden smart

home ecosystem and will integrate its search advertising in the future.

- (2) Google cooperates with other vendors with the smart display
- (3) Google cooperates with Target and Wal-mart on e-commerce
- (4) Google acquired Nest to reinforce Google's hardware business.

Samsung:

- (1) Samsung promotes Bixby on smart phone and smart appliances to provide total solutions for customers.
- (2) SmartThings Cloud allows various smart home auxiliary devices on single platform.

So far, Samsung's smart appliances also adopt Alexa on it. Because Bixby is different with Alexa and Google assistant that it is not useful and it only accounts 13% market share on smart phone. Therefore, it may be the wrong decision for Samsung to keep promoting Bixby. But Amazon could consider that Samsung's market share of smart phone is the top and the existing advantage of smart appliances to keep the cooperation of smart appliances and also equips Alexa on Samsung's smart phone to broaden smart home ecosystem together.

## 6.2 Managerial implication

- (1) Increase the intelligence of voice assistant

Amazon first brought artificial intelligence into the smart home field, but Alexa is currently in second place in the ranking of technology website and the depth and scope of interacting with users and answering questions fall behind Google assistant. Google dominates smart phone system, so the usage of Google assistant far exceeds Alexa. Voice assistant is core value of smart home hub and smart home hub may not dominate smart home market in the future. Maybe smart home auxiliary devices which built-in voice assistant will replace smart home hub. Therefore, this study suggests Amazon need to increase the intelligence of voice assistant.

## (2) Focus on the connection of smart home hub and smart phone

According to customer analysis of Value Net model, it indicates that 44 percent of smart home hub's owner started using their smart phone when using smart home hub. But Google has dominated advantage on smart phone and it accounts for 46% market share on Android system. Therefore, this study suggests Amazon need to adopt some strategies to allow users to use Alexa on smart phone. The more usage is much easier to get user's usage habit to design the connection with smart home hub.

### 6.3 Research limitation

This study adopts in-depth interview and limited by time and money considerations, so this study couldn't visit internal directors of Amazon, Google, and Samsung or experts of smart home of foreign well-known technological media website.

Because smart home in Taiwan is still in the beginning and it isn't the target market of Amazon, Google, and Samsung. Therefore, there are few experts deeply research the development of smart home hub of Amazon, Google, and Samsung. So, this study only interviewed two experts to verify the analysis.

### 6.4 Research Suggestion

This study mainly adopts mature smart home market in United State as the object of discussion. Smart home in Taiwan is still in the beginning, so this study suggests follow-up researchers who have interests in smart home can use exploratory factor analysis to analyze the development of smart home or use positive analysis to analyze customer's usage habit in Taiwan.

# Chapter Seven

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