Technology Management Strategy of Smartphone - The Samsung Electronics Case*

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Ⅰ. Introduction

The world's mobile phone industry, especially in Korea, has made rapid strides in the short term despite its short history. The world's first smartphone is "Simon", launched by IBM in 1993, but Apple's release of the iPhone in 2007 prompted the feature phone-focused mobile phone market to shift sharply to the smartphone era. The paradigm shift to the smartphone era has given Apple a chance to become a global emerging leader as the creator of the new market, destroying numerous mobile phone companies, including Nokia and Motorola, which seemed to be the perennial powerhouses in the mobile phone market. Amid the change, Samsung has established dominant design starting with Omnia in 2008 and with the launch of the Galaxy S series in 2010, and finally achieved the top global market share in 2012 through steady growth.

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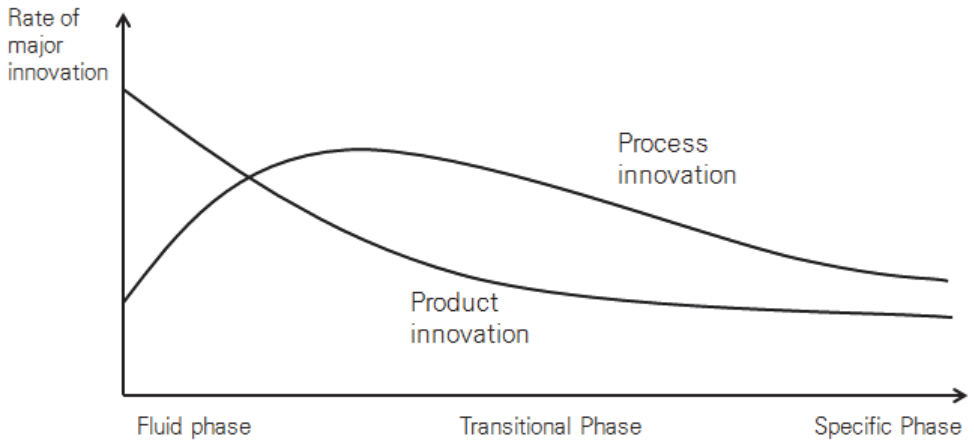
However, the smartphone market, which had been growing rapidly since 2010, has been stagnant since 2016, and Samsung's status as an industry leader has been gradually weakening due to the rapid growth and pursuit of Chinese latecomers such as Huawei and Xiaomi in the mid- and low-end markets over the past three years. Moreover, smartphone technologies such as OLED displays that minimize front bezel, rear dual-cameras, iris and face recognition, voice recognition artificial intelligence, wireless charging, waterproof and dustproof technologies are upgraded and standardized among manufacturers. Therefore, consumers no longer tend to respond to incremental innovation in function or performance, leaving it very difficult to create new value-added products.

Samsung's strategy, which was a latecomer in the smartphone market in the past, was a 'fast second' strategy, or 'fast follower' strategy to embrace innovation and quickly dominate market standards, which is commonly talked as a strtegy to catch up with the leading competitors. Which strategy does Samsung need now?

To overcome the risks at hand, new innovations are needed to redefine the rules of the game. That is, it is time to focus on discovering and introducing new innovations rather than improving performance, and to create new markets beyond the current stagnant period - a 'first-over' strategy. Based on the theory of management of technology, this study analyzes the current situation of Samsung Electronics and find out what strategy can create and re-engage new growth engines.

Ⅱ. Evolution of smartphone technology

Based on the Abernathy-Utterback model that shows the process of introducing and settling innovation within the industry, the change of smartphone technology evolution over time from a product, process, market and competition perspective is illustrated as Figure 1 (Utterback & Abernathy, 1975; Abernathy & Utterback, 1978).



(Source: Abernathy & Utterback, 1978)

〈Figure 1〉 Abernathy-Utterback Model

2.1 Fluid phase: 1992~2006

Starting with IBM's Simon, which was born in 1992 through a recombinant innovation of mobile phone functions and PDA functions (daily calendar, address book, calculator, etc.), in 1996, a variety of companies, including Nokia, Ericsson, Microsoft, and RIM, launched various products on the market based on their respective concepts and their own innovations. At this time period, the product itself was largely innovated to take a dominant position in the market, but the growth was very slow as it did not resonate much in the market.

2.2 Transitional phase: 2007~2015

In 2007, the advent of iPhone, armed with differentiated designs and features such as multi-touch interfaces and MP3 players, drew an explosive response from consumers and created an opportunity to instantly stabilize the smartphone market. The iPhone won the competition and became the dominant design. As companies such as Samsung, HTC, and Google competitively launched new products with similar performance and design or technology in 2010, there began to be more incremental product innovation based on standardized and controlled products and manufacturing and process

innovation to reduce production costs rather than radical product innovation.

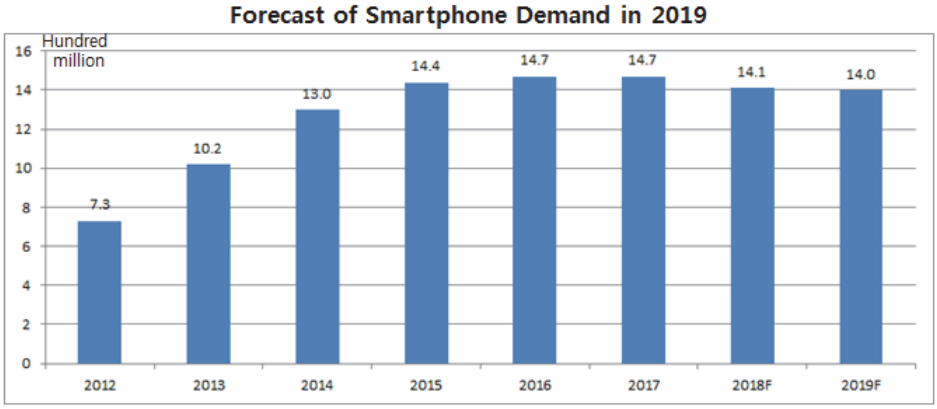
2.3 Specific phase: 2016~current

The smartphone market, which had been on an explosive rise since 2010, has entered a period of stagnation since 2016. While the growth has continued to slow down since then, the competition among manufacturers is getting fiercer due to the emergence of Chinese latecomers such as Huawei and Xiaomi, who have competitive prices.

Samsung, a latecomer in the smartphone market, released Omnia with Windows OS in 2007 in the absence of its own OS technology, and failed. It has since emerged as the Android powerhouse against Apple, however, launching a new smartphone every year, starting with the Galaxy S1 with Android OS in 2010. It was the world's top smartphone maker in terms of market share in 2012, and has since achieved a market share of about 32 percent with the success of Galaxy S2 and S3 and has continued to innovate products and technologies such as waterproof/dustproof, edge display, and high-capacity batteries. However, the technology leadership in the market is gradually weakening as it has been difficult to display the same technological leadership as in the past due to the fact that it maintained a very conservative position in applying bold innovation technologies in the wake of the Note 7 ignition accident in 2017.

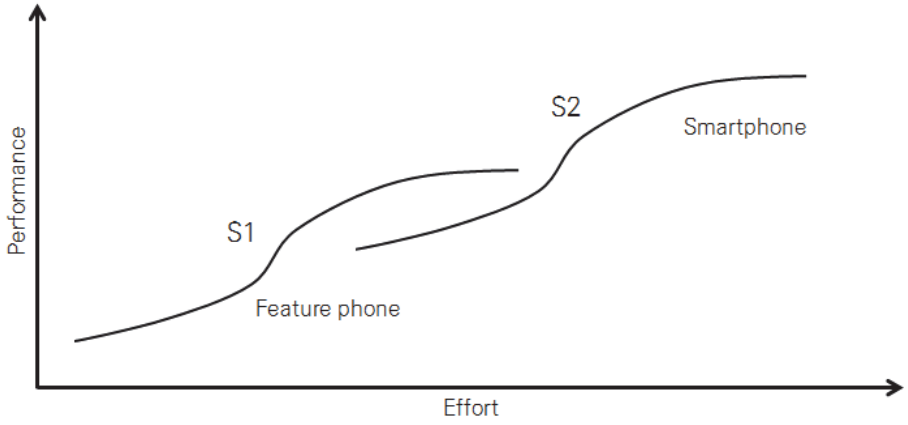
With the smartphone market itself entering a dramatic maturity, shipments are forecast to fall on a steady basis in 2019 due to the deepening saturation as figure 2 shows (유진투자증권, 2018). Therefore, the company faces a difficult situation to overcome with the gradual innovation and performance innovation it has been using.

So how can Samsung overcome these difficulties and regain market and technological leadership? Ironically, as Steve Jobs said, "The way to win the competition is to create a new market," Samsung boldly presented a new form factor: a foldable device.



(Source: 유진투자증권, 2018)

〈Figure 2〉 Forecast of smartphone demand in 2019



(Source: Schilling, 2011)

〈Figure 3〉 S-curve in the smartphone market

Ⅲ. Samsung's smartphone innovation strategy

Will a new form factor, called foldable, be able to create new markets beyond the limitations of existing smartphones?

Over the past decade, Samsung has been able to maintain its competitive edge over its rivals' products through hardware manufacturing excellence-based differentiation. The Table 1 below is a major form factor changeover for Samsung smartphones.

〈Table 1〉 Samsung Smartphone Form Factor Transformation

Year	2012	2015	2017
Model	Galaxy S3	Galaxy S6	Galaxy S8
Form factor & Core technology	4.8″ pebble design 4G communication support	5.1″, 5.7″ The first full edge Wireless Charging, Waterproof, Dustproof	5.8″, 6.2″ Full front screen Bixby interface Iris recognition

Display is the most important part of Smartphone form factor. It showed innovation through early OLED displays and later achieved innovation in form factors with the first flexible display-based single-edge display, later double-sided edge and more recently full-screen-based infinity display. But such form factor is a incremental innovation that competitors can easily follow, and Samsung have failed to create an overwhelming super gap by competitors′ quick launch of similar products, and innovation through current technology and form factor has reached its limits.

Samsung has been trying to figure out consumers′ unsatisfied needs in various ways to break through this frustrating market slump and maximize the gap with rivals. Consumers had contradictory needs that preferred a large screen but wanted a portable product. The large-screen tablet is less portable, and customers are mostly using it at home or at work and are continuously complaining about its portability and mobility. Similar to the smartphone market, the tablet market has been identified as needing to create a new category between smartphones and tablets, which has continued to stall.

In addition, innovation based on traditional H/W leadership such as H/W performance and screen size, has been found to be the biggest differentiating point that consumers feel. Based on consumer needs and the strength that Samsung Electronics currently has, the new form factor and new business category created through another display innovation is the Galaxy fold. Galaxy fold supports 1.5R radius of curvature for the first time in the world, and has no problem even if it is folded and unfolded more than 600,000 times. It is expected that Galaxy foldable display will be able to create gap in technology for about a year compared to its competitors.

Ⅳ. New smartphone form factor spread strategy

Although the Galaxy fold, which is built on a foldable form factor, is a radical innovation, the market price is too high, the compatibility of OS and applications supporting new form factors is not sufficiently secured, and the market may struggle to spread in the early stages of its introduction due to limitations in display H/W technologies.

In order to spread the product effectively, we used Geoffrey A. Moore's 'Crossing the Chasm' theory to develop a diffusion strategy. According to the theory, the characteristics of the adopters purchasing new technology products should be understood and appropriate strategies should be implemented to match their characteristics. The table below shows the characteristics of adopters (Chilling, 2010; Shane, 2009).

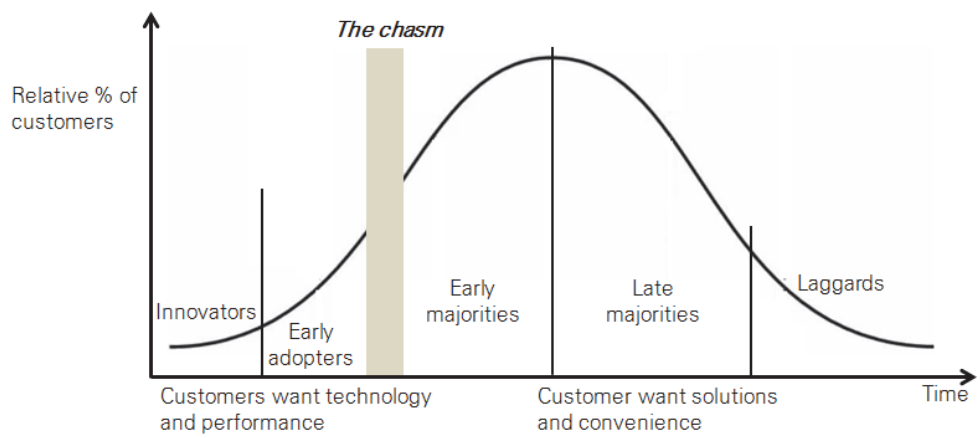
〈Table 2〉 Characteristics of adopters

Adopters	Characteristics
Innovators	- A positive attitude toward new products - Customers who come to themselves before attempting a marketing campaign - Technology is at the heart of your life. - A technology enthusiasts - Approximately 2.5% of all customers
Early adopters	- Purchase new products in the initial market - Early adopters are not intended to be technology itself - Visionaries - Evaluate the potential of technology - Purchase regardless of whether others accept the new product or not - Approximately 13.5% of all customers
Early majorities	- Value practicality in purchasing - Pragmatists - Waiting for the product to become practical and useful - About a third of all customers - The foundation of growth and high returns
Late majorities	- Similar to Early Majorities but more conservative - Conservatives - Wait without buying until market standards are established - Buying products from a large enterprise firmly established in the market - About a third of all customers
Laggards	- Not interested in new technology - Doubtful about the potential of the new product - May interfere with the sale of new products - How much negative influence can be neutralized is important - About 16% of customers

According to the theory, the adopter distribution curve should be understood and appropriate countermeasures should be prepared for each step, depending on the time the product is spread. Based on the adopter distribution curve model, Galaxy folds, a new technology product based on foldable form factor, were developed to target innovators and some early adopters, and a production plan was established in anticipation of sales of around 1 million units.

Reflecting the high interest of innovators and early adopters for the Galaxy fold, all preorders were completed in one day on April 15, when the preorders began. So, can the Galaxy fold spread smoothly to early majorities in the market?

Because it is still before its official release, there is no exact answer. But given the improvements mentioned by the reviewers after the release of the Galaxy fold to each major tech reviewer, it is expected to be difficult for the product to spread smoothly from early adopters to early majority groups. The reviewers put forward the following negative views: expensive price, thickness when folded, heavy, durability concerns, small battery capacity compared to a screen, multi-tasking support and performance concerns.



(Source: Moore, 1991)

〈Figure 4〉 The chasm model

The improvements mentioned by the tech reviewers in the innovator group will have to be addressed to spread the market beyond early adopters to early majority. But can the market spread naturally if we solve the issues that are derived from the survey? According to the Cross the Chasm theory, when a new technology product is first introduced to the market, there is a gap, or chasms, in which early adopters and early majority of the population delay the spread of the product due to the difference in the main view of the product. So how can the Galaxy fold overcome the chasm and quickly spread to the market?

4.1 〔Strategy 1〕 Bowling Alley strategy

A strategy for expanding the market by selecting a niche market and then securing a new customer base in the adjacent segment market is called 'Bowling Alley'. The initial market mainly targets the maniac, so the scope of targets is narrow, but when expanded into the main market, the size of the market or the customer base will vary, and marketing cannot be carried out to all customers. Therefore, in order to find a niche for implementing a Bowling Alley strategy, the customer must first have a strong buying impulse reason, and find a user scenario that can fully meet that need.

A user scenario is expected to be a small tablet market, with a new technology based on a foldable form factor that can create strong buying impulse reasons, including innovators and early adopters. The majority of people who first experienced the Galaxy fold gave a uniform opinion, saying, "I don't think there's any reason to carry a tablet and smartphone together if I use Galaxy fold." The Galaxy fold has a display size of around 4.6″ when folded, providing the same usability as a regular smartphone, and the size become 7.3″ when expanded to provide a large screen, similar to a small tablet. Marketing activities that emphasize these key value positions can stimulate the buying urge of customers who are uncomfortable with carrying smartphones and tablets together, and if this works effectively, it can affect the large number of users around early users and help spreading the products.

4.2 〔Strategy 2〕 Whole product & partnership

It is also important to fundamentally enhance product perfection. The major improvements mentioned in a market survey of Galaxy Fold products are the problems that must be solved for consumers to purchase and use them without resistance. Since the first generation of Galaxy foldable display modules is not yet equipped with a mass production system, the initial sales price is very high, as it is not in a state of being able to lower the unit price of products through economies of scale. If Samsung Display, which provides foldable display modules when making second and third-generation products in the future, lowers unit cost of components and improves performance and durability, prices could go down more than they currently are. This could be an acceptable price for early majorities.

There are also S/W functions that must be considered in order to enhance product completeness. The Galaxy fold introduced multi-tasking function, in which 1) three applications run simultaneously, and 2) app connectivity function, which naturally leads to large screen running applications when the application is used while the Galaxy folds are folded. However, many applications in the market do not implement multi-resume functions to support multi-tasking simultaneously and app connectivity functions that naturally connect external and internal screens, leaving many of those functions inoperative.

By enabling Samsung to quickly support these two key functionalities through close partnerships with the major application providers, consumers will be fully aware of the value of the S/W that the Galaxy fold can offer. If the Galaxy fold provides consumers with sufficient value and solves the issues that need to be resolved to become a viable finished product, it is thought that the company could provide the early majorities with a reason to purchase the Galaxy fold soon.

4.3 〔Strategy 3〕 Get the right time to compete and communicate

Finally, securing a suitable competitive edge in each phase of the proliferation of new technology products and communicating it with consumers will help overcome the chasm. When new products are launched into the market, new markets are

created, so there are no competitors and no competing products. Therefore, in the early launch of Galaxy fold, it should communicate with foldable displays and multi-tasking to innovators, and will have to communicate with the potential for the Galaxy fold product to early adopters. For example, a Galaxy fold should be actively informed that it could potentially replace the small tablet market.

Since it may be a situation in which a third party is already competing by launching similar products, it will have to do marketing activities based on product differentiation, performance and price against early majorities. Finally, since it is no longer possible to compete only with product differentiation against the late majorities, the company should raise the brand image of the company to create a perception that customers has purchased the products of a good company. If Samsung prepare important competitive edge based on the above adoption curve of new technology products and communicate with consumers, it could expand the market for new products centered on the Galaxy fold.

Ⅴ. Conclusion

Samsung Electronics has shown its determination to lead the market with its first mover strategy by unveiling foldable phones for the first time amid a slowdown in the global smartphone market. Introduced on the 10th anniversary of the birth of the Galaxy S series, Samsung Electronics′ foldable phones have become a technology to break down the technical barriers of displays and redefine mobile, and explore a new market of Galaxy fold.

First mover is a creative leader who leads industrial change and paves new fields. The fast-follower strategy, which quickly follows new products or technologies that have driven growth so far, has reached its limit, and Samsung Electronics has to become the first mover to find a way to pioneer itself. A company that becomes the first mover to provide the market with the first product or service may take the following first mover advantage;

- Achieve technology leadership and the ability to lead products on the market to industry standards
- Strong impression on consumers to enhance brand awareness and loyalty
- Preempting the major supply chain and having priority in recruiting relevant personnel
- High switching costs may prevent latecomers from settling down

However, the first mover may also have the following disadvantages:

- Needs to invest heavily to attract consumers' attention and awareness, and latecomers can benefit from it
- Latecomers can learn from the failures of first-time market entrants
- Latecomers can save costs through reverse-engining and gain a technological edge by launching products that are better than those of the first entrant

Samsung Electronics tried to gain a solid differentiation advantage by gaining profits by becoming the first mover with foldable phones and preempting display technology dominance and contents and applications, but it was recently embroiled in a number of controversies, including delaying the U.S. launch due to display damage and other reasons. It is important to overcome these first mover's shortcomings and secure durability in order to gain the benefits of first mover as soon as possible.

References

1. 유진투자증권. 2019 산업전망: 전기전자/IT부품 - 2019 스마트폰의 변화.
2. Abernathy, W. J., & Utterback, J. M. (1978). Patterns of industrial innovation. *Technology Review*, 80(7), 40-47.
3. https://www.samsung.com
4. Moore, G. (1991) Crossing the Chasm. New York: Harper Collins.
5. Schilling, M. A. (2010). Strategic management of technological innovation. Tata McGraw-Hill Education.

6. Shane, S. A. (2009). Technology strategy for managers and entrepreneurs. Pearson/Prentice Hall.
7. Utterback, J. M., & Abernathy, W. J. (1975). A dynamic model of process and product innovation. *Omega*, 3(6), 639-656.