# Competition for Platform Leadership: The Smartphone War between Samsung Electronics and Apple

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This paper examines the recent smartphone war between Samsung Electronics and Apple Computers. By pioneering the smartphone, Apple opened a new horizon in the mobile phone industry. Samsung, a latecomer in this segment of the market, belatedly yet rapidly pursued Apple. Nokia, formerly an ironclad leader in the communications and information technology industry, fell behind. In this study, key success factors of the smartphone industry are found to be totally different from those of the feature phone industry. Samsung and Apple compete intensively for the critically important software portion of the market. Platform leadership and industry ecosystems are particularly highlighted in this analysis of the smartphone war. Relationships between smartphone manufacturers and operating system developers are also discussed, and comments on patent litigation are provided.

Key Words: Apple, industry eco-system, platform strategy, Samsung, smartphone

## Ⅰ. The Emergence of the Smartphone Industry

Nokia is one of the world's top mobile phone vendors. As of 1998, Nokia was the world's largest phone maker, and it has been a dominant leader in the mobile phone industry since then. Researchers, journalists, and business people have tried to learn the secrets of Nokia's success. One decade later, however, scholars are studying Nokia's failure. What happened to Nokia in the interim? Gone are the days when people used feature phones only for phone calls and text messaging. Instead, the era of smartphones has arrived. Apple Computers and Samsung Electronics are at the center of the rising smartphone industry. These leaders of the smartphone revolution compete fiercely to gain platform leadership in the smartphone market.

A smartphone is "[a] device that combines a cell phone with a hand-held computer, typically offering internet access, data storage, e-mail capability, etc." (Random House Dictionary). In the early days, the smartphone

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failed to penetrate the market due to its high prices, weight, and lack of infrastructure. Since 2002 and the birth of Research In Motion (RIM)'s Blackberry, however, the smartphone has rapidly gained popularity. Apple, a latecomer to the mobile phone industry, opened a new epoch in the smartphone industry with its first iPhone (2007).

Established firms failed to respond adequately to the paradigm shift in the mobile phone market. Nokia bungled its entry into the smartphone business. Although software is a key success factor in the smartphone industry, including operating systems (OS) and applications, most companies' smartphone strategy remained identical to that of the feature phone: improving the hardware specifications. As a result, established leaders in the feature phone market such as Nokia, Motorola, Samsung Electronics, and LG Electronics had difficulty being competitive in the smartphone industry.

Not all former leaders, however, gave up the chase and just watched Apple's rise to the top. Samsung Electronics, in particular, successfully rebounded in the smartphone industry by developing a series of Galaxy smartphones in direct competition to the iPhone. Samsung's software capability, which had been far inferior to that of Apple, was complemented by Google's OS, the Android. As a consequence, Samsung Electronics successfully recovered its competitiveness in the mobile phone market. According to Strategy Analytics, a market research firm, Samsung was the top seller in the global mobile phone industry in the first quarter of 2012.

A clash is anticipated between Apple and Samsung Electronics as the new model, the iPhone 5, goes up against the Galaxy S3. The upcoming battle will be fierce; the dynamics and idiosyncrasies of the smartphone industry have brought these two electronics giants to this historical point.

## II. The History of the Smartphone Industry

Although it was not the first mover in the market, the iPhone marked a milestone in the evolution of the smartphone. We consequently divide the history of the smartphone industry into the periods before and after the advent of the iPhone.

### 2.1 Before the iPhone

Before the emergence of the iPhone, several mobile phones emerged that could be called smartphones. The first product was IBM's Simon, released in 1993. It combined the features of a mobile phone, pager, personal digital assistant, and facsimile. In 1996, Nokia announced its Nokia 9000 Communicator. Its successor, the Nokia 9210 Communicator, is considered to be the first modern smartphone because of its color display and open source OS. Microsoft and Palmone also released their

own smartphones in 2002 and 2003, respectively. In South Korea, Samsung Electronics and LG Electronics launched smartphones in April 2000. The smartphone market, however, was premature and lacked infrastructure. Consumers were unwilling to pay a large amount of money for smartphones (See **Exhibit 1**).

## 2.2 After the iPhone

Smartphones came into the spotlight in the middle of the first decade of the twenty-first century. Three major factors contributed to the rise in the smartphone market. The development of infrastructure, such as different forms of fast and ubiquitous wireless internet access - Wi-Fi, Wibro (Wireless Broadband), and 3G networks, in particular - was fundamental to the success of the smartphone. Secondly, social and cultural changes emphasizing personality and pluralism contributed to the increase in smartphone usage. Consumers came to expect distinguishing features and diverse activities reflecting their identities with their mobile phones - "a new world in my hand". Lastly, technology has improved in response to consumers' complicated and fastidious needs. Advances in touch-screen and battery technologies were particularly important.

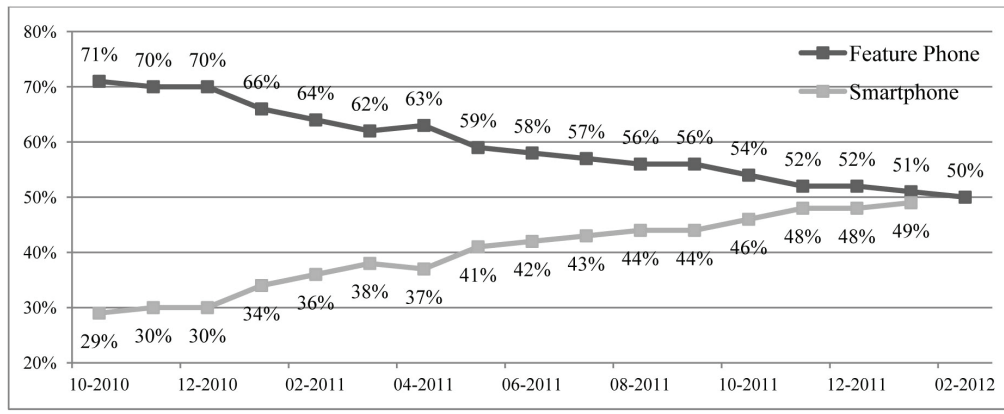
Apple announced the launch of the iPhone (2G) in 2007 when all the aforementioned conditions had been sufficiently established. The consumer response this time was very positive. Nearly 200,000 iPhone units were sold on the first day of their release. Since then, the smartphone market has surged. As of February 2012, it occupied more than 50% of the total mobile phone market (See **Exhibit 2**). On the other hand, the feature phone market occupied by Nokia, Motorola,

〈Exhibit 1〉 Early Smartphones

| Year | 1993 | 1996 | 2000 | 2002 | 2002 |
|---|---|---|---|---|---|
| Firm | IBM | Nokia Communication | Samsung Elec. LG Elec. | MS, HP | RIM |
| Product Name | Simon | 9000 Series | SCHM Series CYON Smartphone | Pocket PC Phone edition | Blackberry5810 |

Source: Firm webpages, Wikipedia

〈Exhibit 2〉 U.S. Mobile Phone Users by Type




Data for all mobile phone users. The proportion of smartphone users among new subscribers exceeded 70% in the second quarter of 2011.
Source: Nielsen, as cited in Slash Gear (http://www.slashgear.com/nielsen-first-time-smartphone-and-feature-phone-usage-equal-30220760/)

LG Electronics, Sony Ericsson, and Samsung Electronics began to shrink.

In the same year (2007), Google announced its open source mobile OS, Android. Android was like a welcome rain to feature phone manufacturers who sought to enter the smartphone business, yet lacked software capabilities. Many established feature phone manufacturers therefore adopted Android to allow them to compete against iPhone and its iOS. After a paradigm shift from feature phone to smartphone and intensified competition, the structure of the mobile phone market was dramatically changed. The feature phone segment of the market became a single entity including both high- and low-end products. In addition, a highly profitable and value-added smartphone segment was introduced.

Apple originally led the smartphone market, taking about 50% of the profit share from the total mobile phone market, with Samsung Electronics close behind (See **Exhibit 3**, **Exhibit 4**, **Exhibit 5**). More recent research revealed that Samsung regained the lead as the world's largest smartphone vendor in the first quarter of 2012, shipping 44.5 million products.

〈Exhibit 3〉 Main Smartphone Products of Samsung Electronics and Apple

| Year | 2008 | | 2009 | | 2010 | | 2011 | |
|---|---|---|---|---|---|---|---|---|
| Firm | Apple | Samsung | Apple | Samsung | Apple | Samsung | Samsung | Apple |
| Product | iPhone3G | Omnia | iPhone3GS | Omnia 2 | iPhone 4 | Galaxy S | Galaxy S2 | iPhone4S |

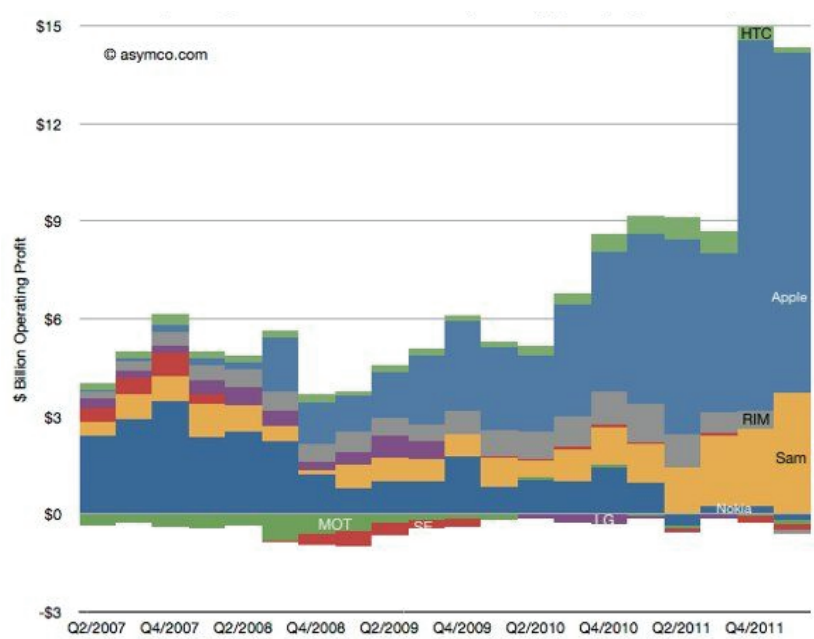
Source: Company webpages

〈Exhibit 4〉 Comparison of Galaxy S2 and iPhone 4

| iPhone 4 | | Galaxy S2 |
|---|---|---|
| Sep 2010 | Release Date | Apr 2011 |
| iOS 4 | OS | Android 2.3 |
| A4 (1 Ghz) | CPU | Dual core 1.2 Ghz |
| 3.5" (960 × 640) | Display | 4.3" (800 × 480) |
| App Store, iTunes Store, iBooks Store | App Market | Google Android Market (Play Store), SK T-store, Samsung app store |
| 500 million pixels, LED flash | Camera | 800 million pixels |
| Impossible | Battery Change | Possible |
| 9.3 mm | Thickness | 8.9 mm |
| 137 g | Weight | 121 g |
| Gyroscope sensor (6-dim motion sensing device) | Other | T-DMB (Terrestrial Digital Multimedia Broadcasting) |

Source: Company webpages

〈Exhibit 5〉 Operating Profit of Major Mobile Phone Manufacturers (Unit: billion dollars)




Note that Samsung and Apple combined have a 99% operating profit share in the mobile phone industry.
Source: asymco.com, as cited in BGR (http://www.bgr.com/2011/07/29/apples-iphone-accounted-for-66-of-q2-smartphone- profit-among-top-vendors/)

# Ⅲ. Value Chain of the Smartphone Industry

## 3.1 Value Chain

A value chain – a notion first introduced by Professor Michael Porter – entails the varied processes involved in producing goods and services. The value chain of the smartphone market largely consists of hardware, software, and distribution channels. Software is the most important element of the smartphone market, which is a complete change from the feature phone market, in which hardware specifications are most important.

Even within the smartphone market, the relative focus within the value chain varies among participant firms. For example, Samsung Electronics developed various hardware components specific to its devices, such as displays, application processors, and flash memory chips compatible with the OS systems of Google and Microsoft. By contrast, Apple concentrated on the software component by developing its own OS and application store, while outsourcing development of the majority of its hardware components. Apple utilized mobile processors and displays from competitors in the finished product market such as Samsung Electronics and LG Electronics.

### 3.1.1 Hardware

Smartphone hardware basically consists of mobile display, battery, and semiconductor components, including application processors, flash memory, and mobile dynamic random access memory. The major players in the smartphone market have different approaches to their hardware components.

Samsung Electronics has a continuous supply of components optimized for its various smartphone models, since it manufactures almost all its hardware components itself. Economies of scale, however, may not be achieved due to the variety of specifications of its many products. On the other hand, Apple focused on its core competencies: product design and software development, while outsourcing the manufacture of hardware components and assembly processes. Moreover, Apple's single standardized smartphone model guarantees economies of scale for supply and an assembly of iPhone components. This production strategy, however, involves certain risks. For instance, in 2011, several workers from Foxconn, an Apple subcontractor, committed suicide due to their working conditions. This incident caused a boycott against Apple products. Moreover, launch of the iPad2 was delayed due to a fire at a Foxconn factory. Apple was recently strongly criticized for its control and exploitation of Chinese and Taiwanese subcontractors and their workers.

### 3.1.2 Software

*"We must strengthen software capability as the worldwide IT industry enters the smart era."*

-Kun-Hee Lee, Chairman of the Samsung group, 17 Aug 2011

In the smartphone industry, the fate of participant firms is determined largely by their competitive advantage in the software component of the market, which consists of OS and application software.

3.1.2.1 Operating Systems (OS)

Unlike feature phones, smartphones come with an OS that acts as a platform for various types of application software. The relationship between mobile OS and application software is equivalent to their counterparts for personal computers (PC), such as Windows 7 and MS Office. Although an OS seldom provides functionality to end users, it is one of the mainstays of the smartphone "ecosystem". Two types of OS have been developed for smartphones: open-source OS and closed-source OS (see below) (See **Exhibit 6-1**, **Exhibit 6-2**, and **Exhibit 7**).

3.1.2.2 Application Software

Application software - simply called an "app" - is smartphone software designed to provide users with various functions and conveniences. Examples include instant messengers, work processors, web browsers, and application markets. Customers can shop at an online application store and download various apps to their devices. Together, Apple's App Store and Google's Play Store offer more than a million apps.

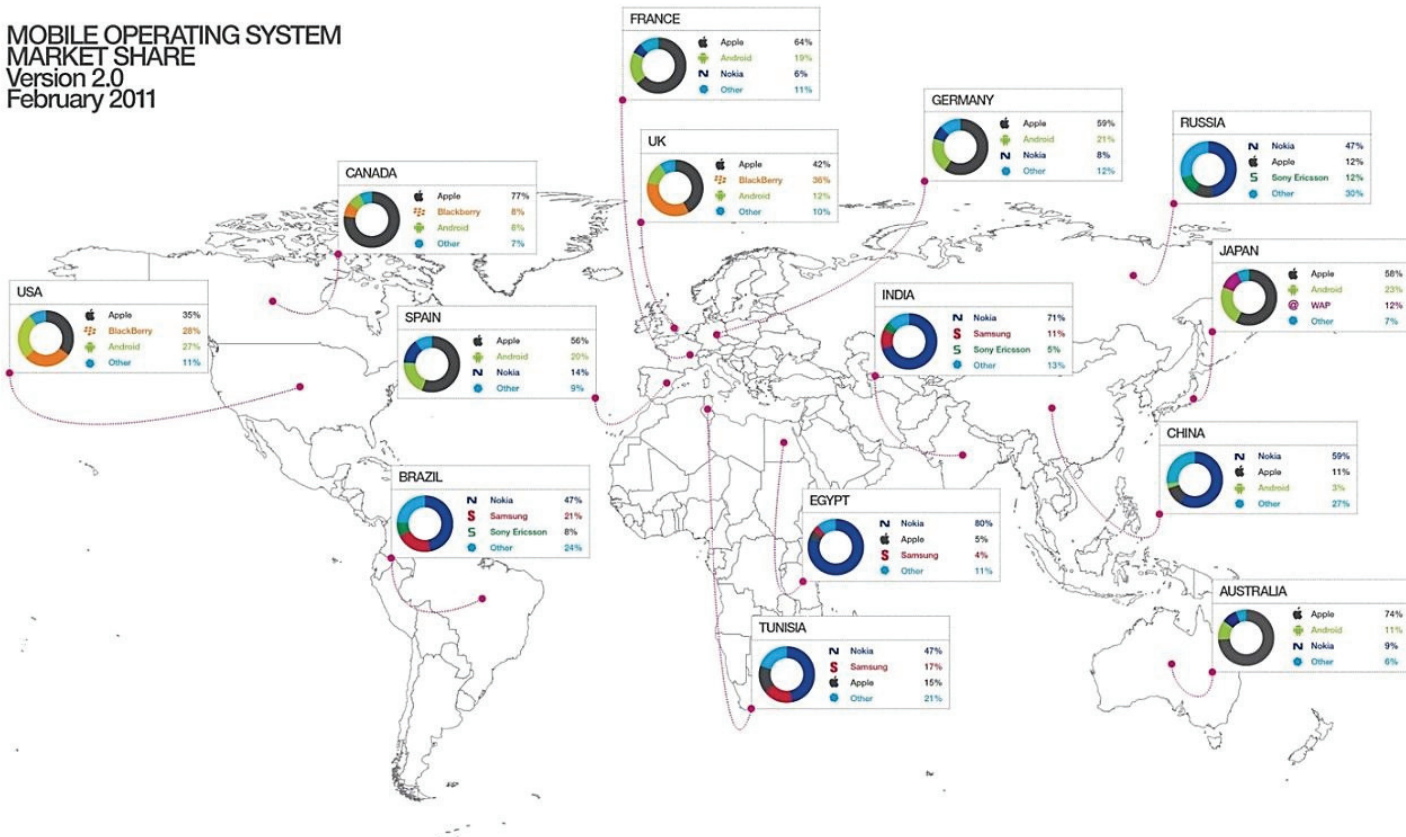
3.1.2.3 Distribution Channels

Smartphones are mainly distributed by Mobile Network Operators (MNOs). MNOs have traditionally held a higher position than that of manufacturers in the mobile phone industry. With its well-developed ecosystem and customer loyalty, however, Apple has broken the tradition and secured strong negotiation power over the MNOs. When entering the Korean market, for instance, Apple required MNOs to agree to its conditions and provisions regarding pricing and sale of iPhones. Apple refused to supply iPhones to any MNO that did not agree to these conditions. Since SKT, the largest operator of South Korea, did not accept Apple's strict requirements, KT Olleh, the second-largest operator, was the exclusive distributor of iPhones in the Korean market at first. The situation in other countries is similar. In the U.S. and China, the second-largest operator - AT&T and China Unicom, respectively - distributes Apple products; in Japan, the third-largest operator, Softbank, distributes Apple products. Later on, however, Apple gradually provided iPhones to multiple operators to improve sales and negotiation power.

## 3.2 Revenue Structure of the Value Chain

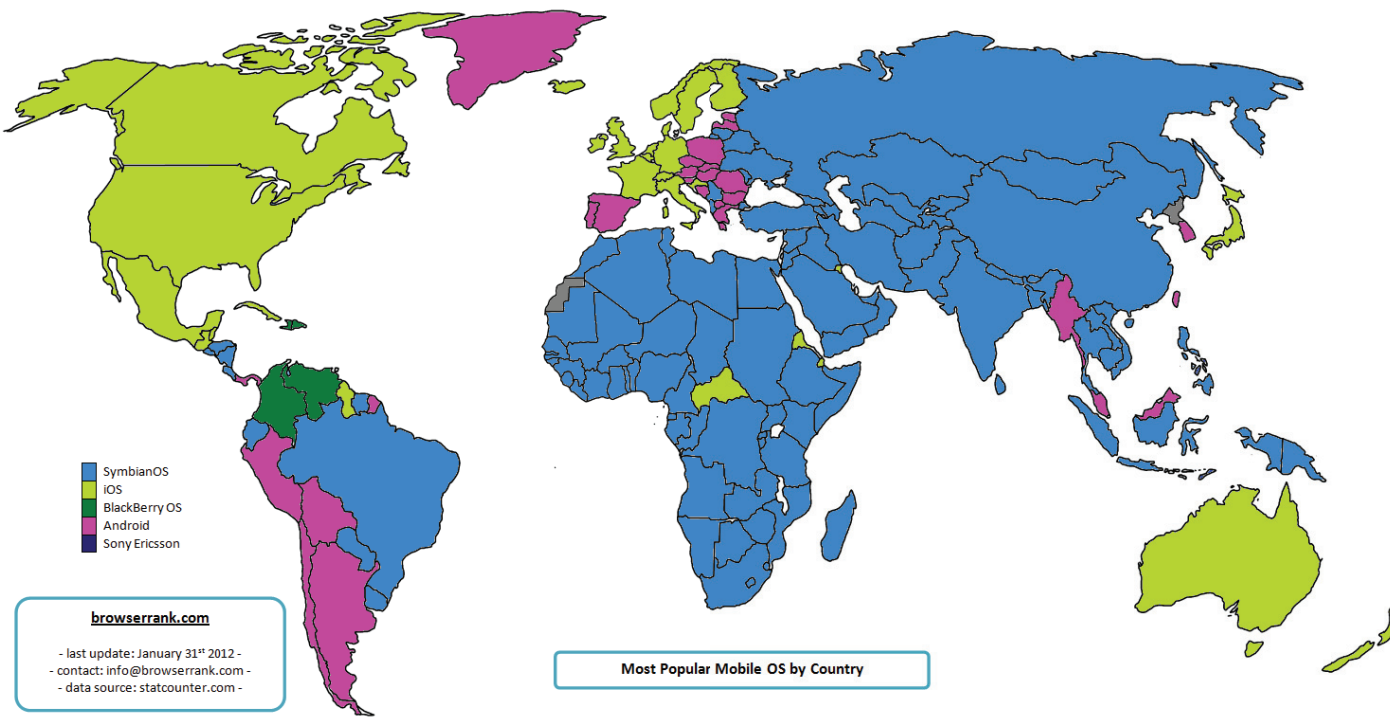
The profit structure of the smartphone market differs from that of the feature phone market. In the feature phone market, MNOs and phone manufacturers share revenue. As smartphones gained popularity, Voice-Over-

〈Exhibit 6-1〉 Mobile OS Market Share by Country (Feb 2011)



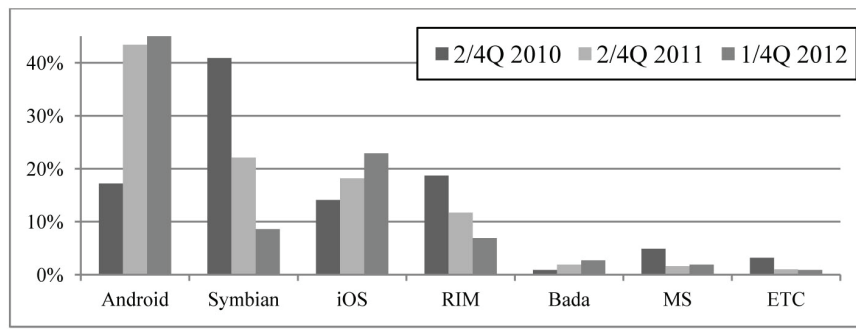

Source: http://gs.statcounter.com

〈Exhibit 6-2〉 Most Popular Mobile OS by Country (Feb 2012)




Source: browserrank.com

〈Exhibit 7〉 Mobile OS Market Share Worldwide

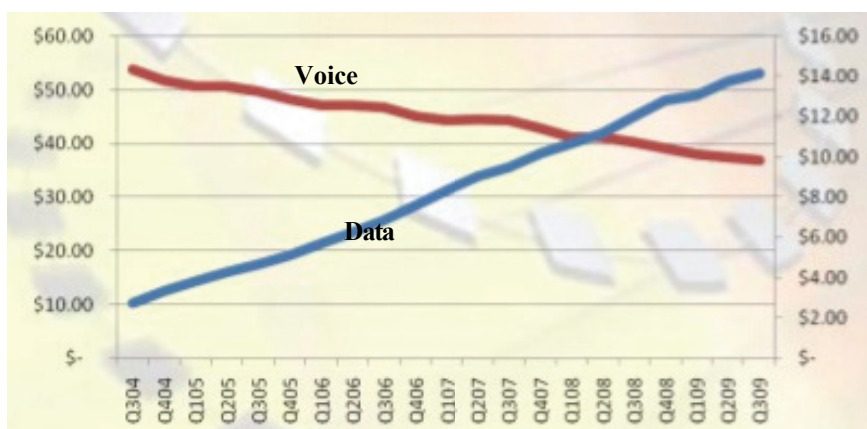



Source: Recomposition of Comscore, Blotter.net, and Gartner.

Internet-Protocol and social networking service application software encroached on their profits by utilizing the wireless internet infrastructure (See **Exhibit 8**). Moreover, MNOs had to increase their investments in network infrastructure and voice channel quality in order to cope with the skyrocketing rate of mobile data traffic (See **Exhibit 9**). For instance, KT Olleh suffered from chronic call dropping due to network overload in the early stages of selling the iPhone 4. In addition, Apple's terms for selling iPhones intrinsically decreased profits for MNOs because the revenue stream to smartphone users and Apple had to be redistributed.

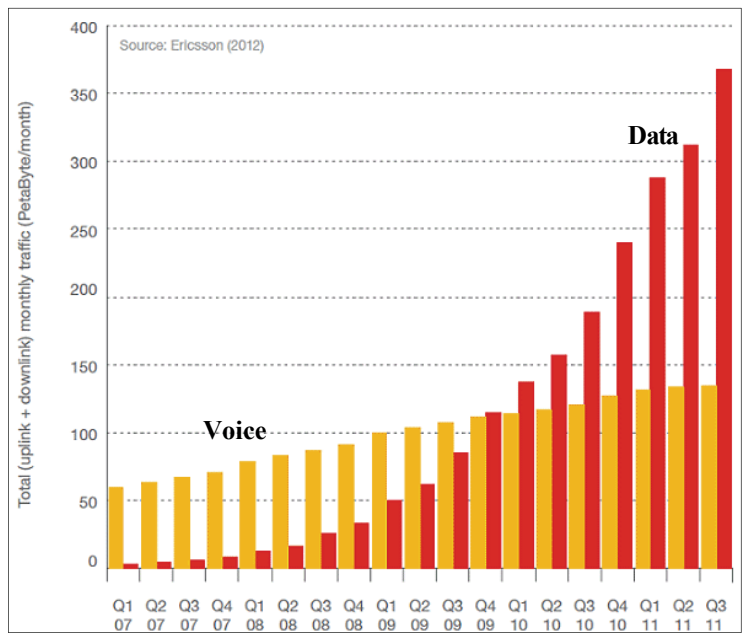
On the other hand, application developers have profited from the smartphone market. This is because the duopolistic OS devel-

〈Exhibit 8〉 Average Revenue per User Trends for Voice and Data in the U.S. Market




Source: Chetan Sharma Consulting, as cited in FierceWireless (http://www.fiercewireless.com/press-releases/condor-capitals-ken-schapiro-smartphone-growth-fast-tracking-telecommunications-trend)

〈Exhibit 9〉 Global Total Traffic in Mobile Networks 2007 - 2011




Source: Ericsson. 2012. "Traffic and Market Data Report."

opers, Apple and Google, implemented a so-called "7:3 policy". Under this policy, application developers get 70% of the profit margin, whereas market managers such as Google and Apple take only 30%.

## Ⅳ. Players and Strategies

Competition in the mobile phone market has become fierce since the Apple and Google carved out the smartphone market with iOS and Android, respectively. Major players in the market can largely be classified by OS into the Android camp and non-Android camp.

### 4.1 Non-android Camp

#### 4.1.1 Apple

Apple has changed the rules of the game in the mobile phone market. The market has shifted from hardware-oriented to software-driven competition. As part of Apple's market strategy, the company concentrates on its mobile OS, application market, and product design while outsourcing hardware components and manufacturing. This decisive strategy saved the costs of construction, maintenance, owning, and running factories, while allowing Apple to improve its product design and software competitiveness radically. This resulted in

overwhelming operating profits (See **Exhibit 5**).

Apple created an ecosystem in the application market by designing a new business model that actively distributes profits to developers. Moreover, Apple led the market based on the intuitive UI (User Interface) of its OS and the accessibility of its App Store, through which a large number of software applications have been sold. The unique syncing system and UI/UX (User Experience) have created a lock-in effect that retains consumers who have already adopted Apple products. As the number of iPhone users increases, the positive feedback loop and indirect network effects are generated and reinforced, which in turn reinforce the lock-in effect. Consequently, Apple's iPhone has won top rankings for customer satisfaction (See **Exhibit 10**).

4.1.2 RIM (Blackberry OS; Blackberry)

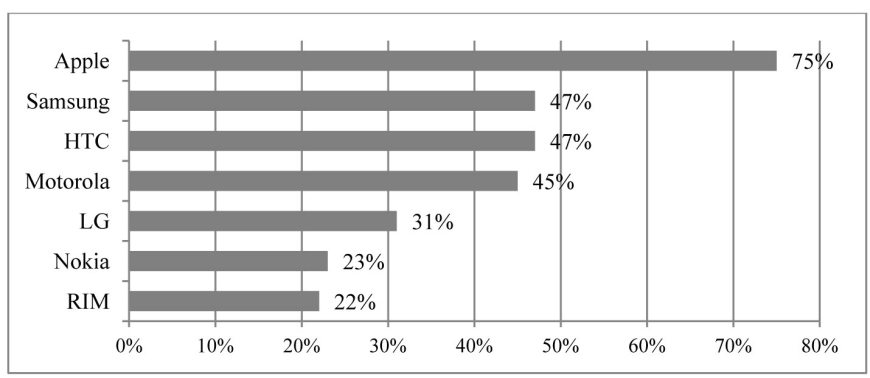
RIM's Blackberry, which has been used by more than 19 million people worldwide, was a pioneer product in the smartphone market. The first model, Blackberry 5810 (2002), was a great success, especially in the corporate market. Consequently, RIM emerged as a major phone manufacturer. Blackberry's QWERTY keypad, in particular, has proved very useful for sending e-mail and business messages.

However, RIM gradually lost its identity as industry leader. An inconvenient UI and inactive mobile application market, Blackberry World, contributed to this decline. In addition, after large-scale restructuring, core RIM employees moved to rival companies like Samsung Electronics. Inability to cope adequately with fast changes in the industry has dropped RIM to fourth position in the global market as of the second quarter of 2011.

4.1.3 Microsoft

Microsoft entered the smartphone and pocket PC markets with its Windows Mobile OS in 2000. After the failure of Windows Mobile,

〈Exhibit 10〉 Smartphone Satisfaction Rating by Manufacturer ('Ratio of Very Satisfied')




Source: 2011 ChangeWave Research 〈http://blog.changewave.com/〉

Microsoft researched day and night to develop a new mobile OS. The result was the Windows Phone 7 in 2010 and Windows Phone 7.5 (Mango) in May 2011.

Despite the well-known concerns of experts, the Windows Phone 7 has successfully increased its market share. The number of applications for this smartphone OS increased about 270 times, from 100 in November 2010 to 27,000 in July 2011. One staff member of Microsoft Korea pointed out with ambition that "Although we are a step behind in the smartphone industry, Microsoft's ecosystem grows quite fast." Achim Berg, Microsoft's vice president, expressed certainty that the Windows Phone 7 will take the dispossessed market back from Google and Apple.

Its successor product, the Windows Phone 8, will be released in late 2012. This product offers compatibility with Windows for PCs as its main selling point. Windows Phones, however, gained only 1.4% of the market in 2011, which is much less than Samsung Electronics' Bada OS (2.7%). What is worse, LG Electronics, Microsoft's main partner in the smartphone market, reduced the number of researchers on the Windows Phone 8 by half in early 2012. If nothing changes, the outlook for this product line is bleak.

#### 4.1.4 Nokia

Nokia, which started as a paper company, successfully made the transition to an electronics company and became the world's best mobile phone manufacturer. The so-called "Nokia Kingdom", however, has had a tough time in the smartphone era. Its first foray into the smartphone market was the development of the Symbian OS, which failed to secure a sufficient user base. Then, Nokia changed its main OS for smartphones from Symbian to MeeGo, which was jointly developed with Intel, and Microsoft's Windows Phone 7. Despite these developments, Nokia's smartphone strategy has been drifting. Nokia laid off more than 7,500 employees in 2011, and plans to reduce by another 10,000 employees in late 2012. Sadly, this 20-year-old mobile phone kingdom was vanquished within only 2 years. Although Nokia poured its resources and capabilities into Lumia, the first product of the Nokia - Microsoft alliance, it was not successful, and Nokia's credit rating was downgraded.

### 4.2 Android Camp

#### 4.2.1 Google

Google, founded by two Stanford Ph.D. students, was incorporated in 1998. Google provides internet-related products and services, including internet search engines, cloud computing, software, and advertising technologies.

Google acquired a firm, Android, in 2005, and introduced a mobile OS by the same name in 2007. Google opened the Android source code to the public free of charge so that smartphone manufacturers could easily adopt Android

for their devices. Moreover, by developing an easy-to-use software development kit (SDK), Google expanded its developer pool from an expert group to the general public. This strategy was successful in that the number of software applications for Android is expected to exceed that of Apple in late 2012.

Google has not directly produced any smartphone equipment so far. On August 15, 2011, however, Google suddenly acquired Motorola Mobility, a mobile phone manufacturer. Although Google announced that the acquisition was made for the purpose of patent assets, smartphone manufacturers were concerned about Google's entry into the device market. The whole smartphone industry is now carefully watching Google.

4.2.2 Samsung Electronics

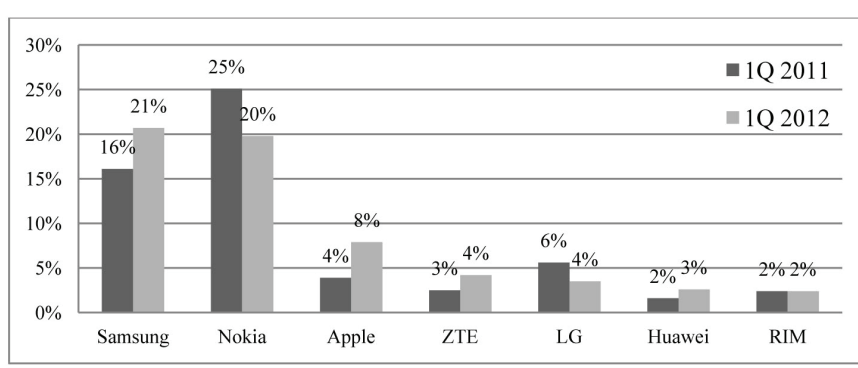
Samsung Electronics was founded in 1969 and originally manufactured electronic appliances such as televisions, calculators, refrigerators, air conditioners, and washers. It launched its line of mobile handsets in the 1990s.

Observing the smartphone craze led by the iPhone, Samsung Electronics reignited its own smartphone business by introducing the Omnia series equipped with a Microsoft's Windows Mobile OS. Both the Omnia I and Omnia II, however, failed to beat out the mighty iPhone.

Samsung Electronics then announced the Galaxy S, with the embedded Android OS, as a competitor against the iPhone 4. Although this device failed to supplant the iPhone 4, about 10 million Galaxy S units were sold worldwide within a year. Since then, ironically, Samsung Electronics has secured a position of leadership in the Android camp.

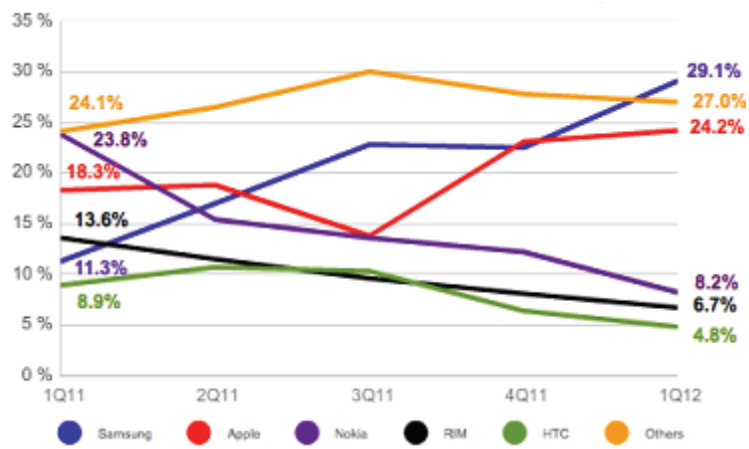
As a successor to the Galaxy S, the Galaxy S2 was released. Samsung enjoyed huge success with this device; its smartphone sales were the highest in the world in the first quarter of 2012 (See **Exhibit 11**, **Exhibit 12**). Subsequently, Samsung Electronics re-

〈Exhibit 11〉 Worldwide Mobile Phone Sales in the First Quarter of 2012 (by shipment)




Source: Gartner, as cited in intomobile (http://www.intomobile.com/2012/05/16/worldwide-mobile-phone-sales-down-2-q1-2012/)

〈Exhibit 12〉 Top Five Worldwide Smartphone Vendors in the First Quarter of 2012




Source: 2012 IDC Report, as cited in Korea IT Times (http://www.koreaittimes.com/story/21252/worldwide-smartphone-market-continues-soar-carrying-samsung-top-position)

leased the Galaxy Nexus, which is Google's new reference phone, including the latest version of the Android OS: Ice-cream Sandwich.

4.2.3 HTC

HTC, established in 1997 in Taiwan, grew fast after partnering with Microsoft to develop the Windows Mobile platform. HTC also established an alliance with Google, releasing the HTC Dream, which was the first Android-embedded smartphone.

As a smartphone specialist, HTC has released various smartphone models: the HTC Sensation (Android), EVO (Android), and HD7 (Windows Phone 7), for example. HTC also produces tablet PC products, including the gPad. Once, HTC was a fierce competitor with Samsung Electronics. However, recently, it lost market shares due to the huge success of Samsung's Galaxy series.

4.2.4 LG Electronics

LG Electronics enjoyed a temporary heyday with the release of its CYON series (e.g., the so-called Chocolate Phone, BL40) in the feature phone market (Kang and Gu, 2012). LG, however, stuck to the feature phone industry too long and consequently fell behind in global competition. Belated release of the Optimus series (Q, Z, One, 7, and Z) was unsuccessful. The final outcome was the resignation of CEO Yong Nam, who took responsibility for the firm's poor performance in the smartphone segment.

Recently, LG Electronics has found its feet again. LG smartphones occupied a market share of 11.7% in the North American market in the second quarter of 2011, which is

four times larger than that of the same period in the previous year. LG Electronics may eventually launch a counterattack with the Optimus 4X and LTE 2 to win back its lost glory in the mobile phone industry.

## Ⅴ. Strategic Challenges

### 5.1 Platform Strategy

Application developers must choose a mobile OS on which their software will be programmed. Although "porting" may be feasible, it entails substantial costs. The success or failure of smartphone businesses depends on attracting competent application developers. Developers and their software applications determine consumer choices of smartphone devices and OS. Thus, the smartphone manufacturer's platform strategy is very important. To make their platform ubiquitous, for instance, difficult decisions must be made about the trade-off between direct/indirect network effects inherent in an open-source OS and the compatibility and stability that come with a closed-source OS.

An open-source OS is available in source code form. The source code and certain other rights are generally provided free of charge with the end-user license. Licensees are free to modify the kernel and framework of the OS. Android, Tizen, Bada, Symbian, and MeeGo are examples of open-source OS. With an open-source OS such as Android, developers are easily attracted because software applications can be run on all smartphones embedded with the same OS. Android, for instance, has the advantages that its software applications can be downloaded to various Android devices regardless of the manufacturer. This feature may generate network effects. For this reason, experts expect the number of Android applications to overtake that of iOS applications in the near future.

Moreover, smartphone manufacturers obtain source code from OS developers and then customize and optimize them especially for their smartphone products. They are thus able to complement their inferior software capability at little expense. This is why so many smartphone manufacturers adopt open-source OS like the Android.

However, with open-source OS, stability and quality are not guaranteed, as OS developers have little control over the application market. In addition, customization by manufacturers can cause compatibility problems. For example, software applications that work well on the Galaxy S2 may crash on the HTC Dream, although they operate with the same version of Android. Applications must run properly with all kinds of mobile processors, display sizes, OS versions, and smartphone models; development in this context may be hugely expensive. In addition, the overall degree of completion and stability of open-source OS is generally inferior to that of closed-source OS.

*"iOS is a closed box, while Android is a box with the lid flaps still open"*

-Stephen Elop, Nokia's CEO, 7 June 2011

On the other hand, source codes of a closed-source OS remain undisclosed; examples include iOS, Windows Phone 7, and Blackberry Mobile. For a closed-source OS, inter-equipment and inter-version compatibility is easily secured; since only OS developers can modify the code, a closed-source OS has no compatibility problems. Windows Phone, for example, cannot be customized by phone manufacturers. For the same reason, optimization between hardware and software of smartphones from different manufacturers is also easy. Debugging is much easier as well. In addition, the content and quality of software applications in the App Store can be easily controlled.

*"We believe Integrated will triumph Fragmented every time. And we also think our developers can be more innovative if they can target a singular platform rather than a hundred variants. They can put their time into innovative new features rather than testing on hundreds of different handsets."*

-Steve Jobs, Former CEO of Apple

Smartphone manufacturers, however, are limited in their ability to pursue their own customized versions of a closed-source OS. In addition, if customers fail to adopt it in the early stages of the market, a closed-source OS can hardly extend its market share, since it cannot fully enjoy direct/indirect network effects. In other words, development of software applications may be discouraged if the user base of the closed-source OS does not reach a critical level. In the case of Apple's iOS, strict control over the App Store (e.g., a prior approval system and application fees) is a major impediment for developers.

The lock-in effect is an important factor in platform strategy. Once users have adapted to a certain OS interface, or they purchase software applications or content, the lock-in effect encourages them to continue using that platform. Apple in particular maximized this effect by providing differentiated UI/UX and quality software applications.

*"Those who are satisfied with their current set-up will be difficult to tempt to a new platform and the more services they use, the greater a consumer's loyalty to a brand."*

- Ryan Garner, GfK analyst, Nov 2011

## 5.2 Industry Ecosystem

When developing software applications, developers consider the characteristics and user bases of each OS in which the app will run. Then, users consider the quantity and quality of software included with the OS when they purchase smartphone devices. This factor also affects the choice of OS by application developers and smartphone manufacturers. Throughout the whole process, OS, software applications, application developers, smartphone manufacturers, and end users altogether form the industry ecosystem.

In determining the best strategies to build a well-developed smartphone industry ecosystem, Steve Jobs, former CEO of Apple, suggested a new business model. Former vertical business relationships among application developers, phone manufacturers, and MNOs were discarded. Apple boldly distributed 70% of the revenue from its software application sales to its developers, providing great incentive to develop high-quality software only for iOS. As a result, more and more users chose to purchase the iPhone/iOS, which further stimulated application developers' enthusiasm for developing iOS apps. Individuals and small- to medium-sized enterprises were provided with business opportunities in the smartphone industry through Apple's horizontal business structure. When developers actively released software applications that met user expectations within the new ecosystem, Apple's smartphone eventually became a "truly smart" device.

Throughout whole this process, a loop of positive feedback is formed, enabling Apple to enjoy indirect network effects. In this way, Apple pioneered a new industry ecosystem by building a horizontal collaboration system. As a result, the company secured a platform leadership position in the smartphone industry.

To compete with Apple's iPhone, Samsung Electronics focused on developing a brighter and larger display and a thinner body in development and promotion of the Galaxy S. In the early stages of its smartphone business, Samsung seemed not to understand the importance of the new industry ecosystem. The company maintained the conventional vertical strategy that had been successful in the feature phone market. The rules of the game in the smartphone market, however, turned out to be completely different. Hardware superiority alone did not guarantee success; rather, hardware was a necessary rather than a sufficient condition of product success.

A major reason why Samsung's operating profit was less than half that of Apple was that they had failed to create an ecosystem premium based on the application market. After all, Samsung recognized the importance of software capabilities, and strengthened these substantially. Samsung Electronics formed alliances with Google and the MNOs to overcome its weak ecosystem and thereby build an Android-based ecosystem for its application software.

> *"The balance of power in the IT industry is shifting to software."*
>
> -Kun-Hee Lee, Chairman of the Samsung group, 17 August 2011

Samsung's efforts to strengthen its ecosystem and software capabilities to add to its world-class hardware and manufacturing capabilities paid off in a smash hit: the Galaxy S2. Furthermore, Samsung racked up 9 million pre-orders for their Galaxy S3 around the world as soon as pre-order applications became available. The success of Samsung Electronics, a fast-growing, key player in the Android-based ecosystem, was based on the

platform leadership of Google's Android.

### 5.3 Relationship between Manufacturers and OS Developers

Six major platforms are available in the smartphone industry: iOS, Android, Windows Phone, Web OS (Palm OS), Symbian/MeeGo, and Bada. Apple utilizes the self-developed iOS only, while other manufacturers adopt various OS.

Both Samsung Electronics and Nokia also have their own OS. Despite the success of the Android-based Galaxy series, Samsung Electronics has pursued a multi-OS strategy. It utilizes Google's Android for premium smartphones, while adopting Windows Phone or the self-developed Bada for middle- and low-end products. Furthermore, Samsung recently developed a general-purpose OS, Tizen, in collaboration with major IT firms including Intel, Vodafone, Sprint, and NTT DoCoMo.

In contrast, Apple sticks to its iOS, and permits no licensing from other manufacturers. Although the kernel of iOS, Darwin, is open to the public, its framework and user interface are closed (See **Exhibit 13**).

> *"So we are in a period where the investment in Symbian absolutely continues. Even as we go through a transition to our primary smartphone platform, Windows Phone, you will see that continued investment."*
>
> -Stephen Elop, a CEO of Nokia, 3 June 2011

On August 16, 2011, the head office of Samsung Electronics was quite busy even until midnight. Since Google had acquired Motorola Mobility, a smartphone manufacturer, Samsung's close relationship with Google seemed to be threatened. Kun-hee Lee, the chairman of the Samsung group, called an urgent executive meeting asking for a new strategy for Samsung in the rapidly changing IT and mobile phone industry.

Both Samsung Electronics and Nokia continuously invested and utilized in their own OS due to the concern of being dependent on an external OS platform. Despite the variety

〈Exhibit 13〉 Smartphone OS by Manufacturer

| | iOS | Android | Windows Phone | MeeGo | Symbian | Bada | Blackberry OS |
|---|---|---|---|---|---|---|---|
| Apple | ● | | | | | | |
| Samsung | | ○ | ○ | | △ | ● | |
| LG | | ○ | ○ | | △ | | |
| Nokia | | ○ | ○ | ● | ● | | |
| HTC | | ○ | ○ | | | | |
| RIM | | | | | | | ● |

●: Self-developed OS, ○: Licensed OS, △: Previous OS
Source: Company webpages

of OS from which manufacturers can choose, excluding the not-for-sale iOS, the disadvantages of this dependence posed a real concern. In this duo- or oligopolistic market structure, OS developers naturally held the hegemony. The relationship with OS developers, therefore, was an important strategic issue for smartphone manufacturers. For instance, although Google provided Android to smartphone manufacturers free of charge, no one could be sure that this policy would continue after it reached a market-dominating position. Moreover, manufacturers that depend completely on an external OS may have difficulty creating their own differentiated features as a source of competitive advantage. Moreover, a considerable amount of time and money must be invested in optimizing and customizing the external OS. For these reasons, major smartphone manufacturers such as Nokia and Samsung invested in the development of their own OS, no doubt at much higher development and maintenance costs.

As software capabilities are becoming more and more important and OS developers have gained more power, smartphone manufacturers find themselves in a quandary. Strategic choices between self-developed OS and licensing OS from external developers became a critical strategic issue in the smartphone industry.

### 5.4 Relationship between OS Developers and Application Developers

The fundamental attraction of a smartphone is its software applications, with which consumers enjoy unlimited activities. Smartphone users buy this software directly from application markets such as the App Store (Apple) or Play Store (Google). This is different from the feature phone market, in which consumers are provided with content and software applications through MNOs. As discussed earlier, bringing competent developers into the ecosystem was one of the most important strategic goals for smartphone manufacturers and OS developers. This is why Apple and Google distributed 70% of their profit margin to application developers.

An important shift has occurred that may change the relationship between OS developers and application developers: the advent of cross-platform (multi-platform) development environments. Standardized development environments now available to programmers enable applications to be developed for various platforms without additional coding or modification. For example, a cross-platform system already exists that supports both iOS and Android.

Furthermore, the WAC (wholesale application community), often called the "Super App Store", has more than 60 members, including MNOs and phone manufacturers. The WAC is committed to helping application developers innovate by using operator network application programming interfaces (API) delivered by a single cross-operator API platform. Since WAC Standard and SDK support the HTML5 language, developers can create and distrib-

ute their applications regardless of OS or device type (smartphone, tablet PC, etc.). The WAC aims to serve more than 3 billion users by simplifying the application development process and deploying applications across multiple platforms and operators.

> *"WAC does not mean that we compete with Apple or Google. Rather, this is to expand the whole ecosystem for the potential global market of more than 3 billion users."*
>
> -Hyun-Myung Pyo, CEO of KT Olleh, 4 July 2011

Given this situation, Apple's closed operation and proprietary control over the App Store, once the source of Apple's great success, may not be effective any more. The smartphone industry is paying close attention to the impact of the cross-platform development environment and WAC's emergence into the smartphone industry ecosystem.

### 5.5 Patent Litigations

Intellectual property disputes are characteristic of the smartphone industry as well. No firm is free of lawsuits. Apple, Samsung Electronics, Nokia, Motorola, HTC, Google, Oracle, Microsoft, and RIM have all become entangled in the patent war.

> *"We have seen an explosion of Android devices entering the market and, because of our successes, competitors are responding with lawsuits as they cannot respond through innovations."*
>
> -Eric Schmidt, former CEO of Google, 21 July 2011

For example, Samsung Electronics and Apple have taken legal action in more than 50 cases since Apple brought a lawsuit against Samsung Electronics' tablet PC Galaxy Tab. They filed continuously for a temporary restraining order to ban the sale of the other party's new product. This practice has spread to more than 10 countries including the U.S., Korea, Japan, Australia, and the E.U. Even the District Judge, Lucy Koh, ordered the CEOs of Apple and Samsung to meet face to face for a mediation session to reduce or simplify their complicated lawsuits. Although Apple CEO Tim Cook has said that he hates litigation, Samsung Electronics and Apple failed to reach an agreement to end one current patent dispute. A rough sketch of their patent war can be understood from the following article:

> *Samsung has invested heavily in 4G technologies, especially those that enable the efficient use of high-speed bandwidth … Samsung, according to iRunway, is by far the largest holder of 4G patents. Apple, by contrast, does not make the Top 10 in patent count. "Samsung is way ahead of the curve, with about 50 percent more patents than its nearest rival," Mr. Kumar said. "And Apple will have to license a lot of 4G technology."*
>
> *Not all patents are created equal, though. iRunway also did an analysis of what it calls "seminal patents," a category in which the firm tried to estimate the market impact, technological innovation and the legal strength of a patent. By that measure, Qualcomm ranks first, with 81 seminal patents, and Samsung is second, with 79. Qualcomm is well-known as a leader in chip sets and other technology for mobile devices, and it is a prodigious licensor. Apple's new iPad licenses its 4G technology from Qualcomm.*

> *Samsung's 4G patent portfolio suggests the Korean company is in a strong position to negotiate a settlement with Apple in their current court fights – and one that might well include a lucrative licensing deal for Samsung.*
>
> *But Apple may not be so eager to settle. Apple's patent claims mainly involve the user interface technology that determines a person's experience when using a smartphone. Samsung is not strong in user interface technologies, and most of that is determined by the smartphone operating system. Apple is suing Samsung over its smartphones that run Android, the operating system created by Google, Apple's main target in the patent wars.*
>
> – "Smartphone Patent Wars: The Coming Sequel," Bits Blog of New York Times, 26 Apr 2012.

Patent lawsuits regarding smartphones are likely to be prolonged because the issues surrounding IT patents require in-depth investigation, and most lawsuits induce countersuits. Since these processes are time-consuming and costly, many firms adopt cross-licensing or merger and acquisition strategies in the patent war. Defending and managing patent lawsuits is obviously just as important in the smartphone industry as developing products and building ecosystems.

## Ⅵ. The Ultimate Winner of the War

Leading industry-wide paradigm shift, Apple and Samsung Electronics have become the new market leaders in the smartphone era. By redesigning a business model and developing an innovative smartphone, the latecomer Apple successfully caught up with industry incumbents. Samsung adopted Google's Android OS platform and outsold both Apple and Nokia with its blockbuster smartphone products, the Galaxy series.

A clash between the two finalists, Apple and Samsung Electronics, has only just begun. The Galaxy S3, released in May 2012, has passed 30 million sales in five months. It topped U.K. mobile chart for seventh straight month, according to the uSwitch. Furthermore, Samsung released the Galaxy Note II, noted for its combination of a large display (5.55-inch) and an innovative stylus support, in September 2012. Apple did not stand by. Apple introduced its new product, the iPhone 5, in September 2012. Although some who expected major updates were disappointed, the iPhone 5 continued to sell well. The *Time* Magazine named the iPhone 5 its "2012 Gadget of the Year" praising the iPhone 5 as one of the most artfully polished gadgets anyone's ever built.

The opening ceremony is now over. As the smartphone war moves toward its climax and both the Apple and Samsung Electronics are expected to release its new flagship smartphone device in the first half of 2013, an inevitable head-to-head contest is imminent. Apple and Samsung Electronics may have learned a lesson from the fallen incumbent Nokia. The firm that secures a position of platform leadership by building a strong industry ecosystem, satisfying customers' di-

verse needs, developing key success factors better and quicker than its competitors, and managing patent disputes effectively will be the eventual winner. To win this fierce race, smartphone manufacturers like Samsung Electronics and Apple exert their last spurt of energy while their engineers work late to find ways to outdo their competitors.

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# 플랫폼 리더십을 향한 경쟁:
## 삼성전자와 애플의 스마트폰 전쟁에 대한 사례 연구

강효석* · 장성용** · 송재용***

요 약

본 사례는 삼성전자와 애플의 "스마트폰 전쟁"을 통하여 변화하는 휴대폰 산업의 특징과 이에 대한 기업 전략에 대하여 논의한다. 휴대폰 산업은 피처폰 중심에서 스마트폰 중심으로 산업 구조가 변화하였는데, 애플이 스마트폰 산업생태계를 혁신하며 휴대폰 산업의 새로운 지평을 열었다. 삼성전자는 스마트폰 산업의 후발 기업이지만 빠른 속도로 애플을 추격하였다. 반면 정보통신 산업의 확고한 리더였던 노키아는 추락하였다. 본 사례를 통하여 플랫폼 리더십 확보와 산업생태계 조성을 위한 삼성전자와 애플의 치열한 경쟁과 전략을 분석한다. 또한 스마트폰 제조업체와 운영체제 및 애플리케이션 개발자 사이의 관계를 조명하고 특허 소송과 같은 쟁점도 탐구한다. 본 사례는 패러다임 변화 하에서의 기업 전략과 플랫폼 산업에서 리더십 확보를 통한 경쟁 전략에 관하여 시사점을 제공한다.

주제어: 산업생태계, 삼성, 스마트폰, 애플, 플랫폼 전략

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〈Teaching Note〉

# Competition for Platform Leadership: The Smartphone War between Samsung Electronics and Apple

## Ⅰ. Synopsis and Objectives

The mobile phone industry experienced a significant change in late 2000s. Nokia, who had been an ironclad leader for 14 years, underwent a crucial moment. As of June 2012, Moody's dropped Nokia's credit rating to "junk". On the other hand, a group of laggards and new entrants – Apple and Samsung Electronics, in particular – has leapfrogged the long-time leader, Nokia. For the new era, Apple and Samsung Electronics have been at fierce "Smartphone War." This case investigates what is behind this evolution, and who will be the winner in the war.

The unique characteristics of the smartphone industry offer an ideal venue for a number of important theories and concepts such as network effects and platform leadership to be applied. This case can be taught effectively to B.A. students, MBA students, or executives at any level in courses regarding corporate strategy, platform strategy, network theory, latecomer's catch-up, or innovation. The case can be used for many other purposes as well and instructors are encouraged to experiment with the case at will. When used in the general context, specific teaching objectives are:

1. To learn and apply key theories and concepts for the knowledge-based economy such as network effects, industry eco-system, loop of positive feedback, and complementary good.

2. To understand reasons why incumbents, who have superior resources and capabilities, may fail and how latecomers leapfrog them.

3. To understand the competition in the high-technology industry. What are key aspects of competition and how do firms formulate strategies in such industry?

## Ⅱ. Structure of the Case

This case consists of six sections. The first section begins with the story of Nokia's falling behind in the mobile phone industry.

Then, Apple and Samsung Electronics' intense competition for platform leadership is introduced. This first section is intended to explain the "diastrophism" in the mobile phone industry and give a background for the recent smartphone war which is a main theme of the case.

The second section provides with a brief history of the smartphone industry. Apple, a latecomer, has made a stroke in the industry. Although there had been several early smartphone models, it was Apple who activated and led the market. The case discusses three environmental backgrounds for the iPhone's success: widespread wireless internet access, social/cultural changes, and technological advances. Then, we focus on the paradigm shift and the subsequent strategic competition between Apple and Samsung Electronics.

Before going to the main discourse, in the third section, a value chain of the smartphone industry is discussed. One has to grasp the characteristics of the smartphone industry to reach a profound understanding of the competition. This section consists of three sub-sections, with a strong focus on the software part.

The fourth section of the case deals with major players in the market. Since the structure of the smartphone market is complicated, competitors in the market and their key features are discussed. In fact, we observe multidimensional or hierarchical competition in the smartphone industry; there are competitions for operating system, application software, and smartphone devices, which coexist under the name of smartphone eco-system.

The kernel of this case is the fifth section, the "strategic challenges". There are multifarious strategic issues in the smartphone business, and we discuss the most important ones: platform strategy, industry eco-system, relationship among the value chain constituents (OS developers, application developers, and smartphone manufacturers), and patent litigation. All these, combined with each other, are critical factors that determine the fate of the players in the smartphone industry.

In the last section, key success factors for achieving the platform leadership are briefly illustrated. Then, we raise a question of "who will be the ultimate winner of the smartphone war." Based on the theories, discussions, and materials in the case, a reader is required to assess each player's platform leadership and eco-system as well as its own strengths and weaknesses, and then predict the final outcome of the war in a logical manner.

## III. Suggested Assignment Questions

1. Apple, a latecomer in the mobile phone industry, made a meteoric rise in the smartphone market. In contrast, incumbents lost their ground to Apple in a short time. Explain why.

2. Was Samsung Electronics' initial strategy for the smartphone market appropriate? If not, suggest alternative strategies for Samsung Electronics to cope with competitors and environmental changes. Explain why.

3. Describe the potential threats Apple confronts with. Will Apple be able to overcome those threats and secure its (platform) leadership in the smartphone industry?

4. Compare the pros and cons of developing one's own OS and being licensed external OS. If you were a CEO of a start-up smartphone manufacturer, what kind of platform strategy would you adopt?

5. Based on the above answers and discussions, predict who will eventually win the "Smartphone War".

## Ⅳ. Key Issues and Concepts

### 4.1 Platform Strategy

*"Platforms emerge, and with them, platform leaders, who drive coalitions of firms who innovate around a platform. Platforms are industry 'building blocks' which attract other firms' investment and innovation on add-on products or services. To compete and win in these ecosystems, firms need to learn new strategies."*

–Annabelle Gawer, Professor of Imperial College Business School

#### 4.1.1 Platform

A platform is a product or service that needs complementary goods to provide consumer value or utility (e.g. Video Cassette Recorder, MP3 Player). The complementary goods largely determine consumer value (e.g. iPod and iTunes music).

#### 4.1.2 Platform Leadership

A platform leadership refers to a firm's ability to propel an industry-wide innovation to make an evolving system – or, eco-system – from independently and separately developed technologies. "If a platform leader emerges and works with the companies supplying complementary products and services, they can together form an ecosystem of innovation that can greatly increase the value of their innovations as more users adopt the platform and its complements (Gawer and Cusumano, 2008)."

There are ***four levers*** that organizations can utilize for enhancing their platform leadership. The following four subsections directly come from Cusumano and Gawer (2002).

##### 4.1.2.1 Scope of the firm

Scope comprises the amount of innovation

the company does internally and how much it encourages outsiders to do. Managers of companies that are platform leaders – or that want to be (wannabes) – must weigh whether it is better to develop an extensive in-house capability to create their own complements, let the market produce complements or follow a middle road.

4.1.2.2 Product technology

Platform leaders and wannabes must make decisions about the architecture of a product and the broader platform, if the two are not the same. In particular, they need to decide how much modularity they want, how open their interfaces should be, and how much information about both platform and interfaces to disclose to outsiders who might become complementors – or competitors.

4.1.2.3 Relationships with external complementors

Managers must determine how collaborative or competitive they want relationships to be between platform producers and complementors. Platform producers also need to work on creating consensus and handling potential conflicts of interest (for example, how to behave when the move to a complementary market turns former collaborators into competitors).

4.1.2.4 Internal organization

The right internal structure can help platform producers manage external and internal conflicts of interest. Organizational options include, first, keeping groups with similar goals under one executive or putting them in distinct departments if they have outside constituencies or potentially conflicting goals; second, addressing organizational culture and processes; third, improving internal communication of corporate strategy. Because of the ambiguity of innovative, modular industries, a company culture that encourages debate can accelerate strategy reformulation when it's needed.

4.1.3 Lock-in Effects

Lock-in effects indicate a customer's dependence on a vendor. In other words, the customer is unable to use another vendor without substantial switching costs. The lock-in effect confers a great competitive advantage on firms that know how to take advantage of it (Shapiro and Varian, 1999). There are two sources of lock-in effects: *switching cost* and *network effects*.

4.1.3.1 Switching Costs

Switching costs (or, switching barriers) stand for any real or perceived barrier to a customer's change of product or service suppliers. Thompson and Cats-Baril (2002) define the switching costs as "the costs associated with switching supplier". Farrell and Klemperer (2007) state that "a consumer faces a switching cost between sellers when an investment specific to his current seller must be dupli-

cated for a new seller". The presence of such switching cost well-explains various business practices.

Burnham, Frels, and Mahajan (2003) suggested three types of switching costs: (1) *procedural switching costs*, primarily involving the loss of time and effort; (2) *financial switching costs*, involving the loss of financially quantifiable resources; (3) *relational switching costs*, involving psychological or emotional discomfort due to the loss of identity and the breaking of bonds.

> *"In view of the potential importance of switching costs, the impact of all strategic moves on switching costs should be considered."*
>
> – Michael Porter (1980:122).

4.1.3.2 Network effects

See below.

## 4.2. Network effects

Network effects are also called network externality, consumption externality, or demand-side economies of scale. It refers to an effect that one user of a product or service influences the value of that product to other people. When network effects are present, the value of a product or service is largely determined by the number of other users. Customers, therefore, watch what others choose when they buy a product or service. Utilizing network effects are especially important when there is no compatibility between the systems. Facebook, MS Office, or Mac OS are the notable examples of the products enjoying network effects.

> *"We look for opportunities with network externalities—where there are advantages to the vast majority of consumers to share a common standard. We look for businesses where we can garner large market shares, not just 30%-35%."*
>
> – Bill Gates, 1995

The network effect is closely related to the *loop of positive feedback*: "as the installed base of users grows, more and more users find adoption worthwhile (Shapiro and Varian, 1999)." The network effect or loop of positive feedback can lead to a winner-take-all market in which a single firm or technology conquers all others (Shapiro and Varian, 1999). **Figure A** illustrates this phenomenon.

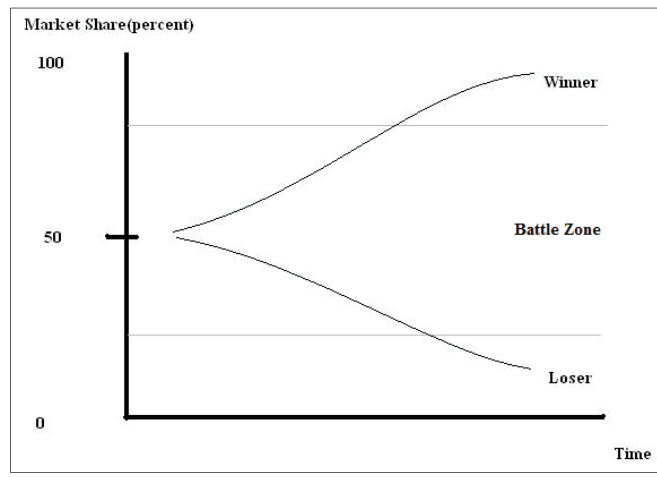
### 4.2.1 Direct Network effects

When a (marginal) increase in user base directly heightens a value of the product or service for other users, it is called "direct network effects". Telephone systems, fax machines, and social networks, for example, all imply direct contact among users (Wikipedia). The users' benefits are arisen by the interaction between the users. Another example is e-bay users who benefit from participation of other users as distinct from how they benefit from e-bay operators.

4.2.1.1 Metcalfe's Law

In a complete network, a value of the net-

〈Figure A〉 Winner-take-all Market with Loop of Positive Feedback




Source: Shapiro and Varian (1999)

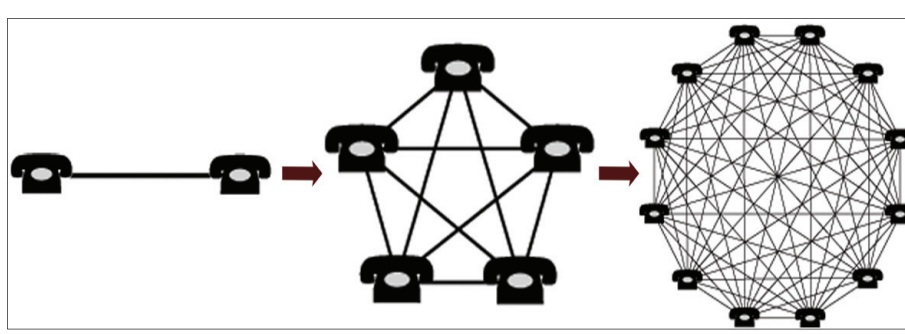
work is proportional to the square of the number of users of the system (). It, therefore, is hard for a firm with a small network to compete with the other firm who has a large network. **Figure B** shows how two telephones can make only one connection, five can make 10 connections, and twelve can make 66 connections.

Note, however, that there can be negative network effects/externalities. *Congestion* occurs as more and more people drive on the road. This reduces the value to people already using it.

4.2.1.2 An Exception - Instant Messaging

AOL, who had been a dominant leader in the instant messaging (IM) service market, has offered incompatible services since 1996. Conventional wisdoms suggest that latecomers with smaller user base are under a handicap

〈Figure B〉 Network effects for Physical Networks



Source: "Metcalfe's law," Wikipedia.

in attracting users. MSN and Yahoo, however, succeeded in narrowing the gap between AOL and them rapidly.

Lee and Song's (2003) explanations are like this: "The key to our explanation lies in connection topologies. IM users build up a highly clustered network like a coworker network, where any pair of acquaintances will share common acquaintances and where strangers' contacts are deliberately blocked. Unlike chat room, email or fax, where contacts with strangers are sources of customer benefits, the IM service does not grow valuable simply because more and more people use it. Indeed, the majority of adopters in the installed base are irrelevant to customer benefits. Instead, network benefits come from a swift exchange of notes between close acquaintances. In such a network, a lead technology may not be able to drive out its smaller rivals in the long run."

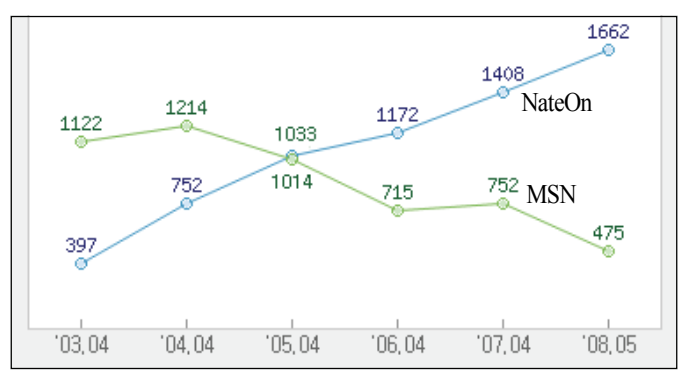
We observe this catch-up and further tipping phenomenon in the case of the Korean instant messaging service market. In the **Figure C**, NateOn, a latecomer, leapfrogged MSN who had been a dominant leader.

4.2.2 Indirect Network effects

When an indirect network effect is present, a large user base of one product or service induces development or improvement of *complementary products*, which can in turn increase the value of the original. Examples of such complementary goods include Blu-ray Discs (for Blu-ray players) and Office packages (for PC operating systems). For this reason, Apple and Google compete for not only end-users, but also application developers.

Indirect network effects are frequently observed in the platform industry (e.g. smartphone OS and its application software). The larger the user base of the platform, the more supply of the application software developed by the complementors. This indirect network effect will make the network more valuable and ensure platform leadership.

〈Figure C〉 Market Share of NateOn and MSN Messenger in South Korea




Source: SK communications, cited in datanews (www.datanews.co.kr)

# Ⅴ. Case Analysis

## 5.1 The Smartphone Industry

A smartphone is categorized as a mobile device that provides with advanced connectivity and computing capability with an embedded mobile computing platform. In the initial stages, people didn't pay much attention to the smartphone. RIM and Apple, however, aroused and boosted the smartphone industry with their Blackberry 5810 (2002) and iPhone 2G (2007) devices respectively.

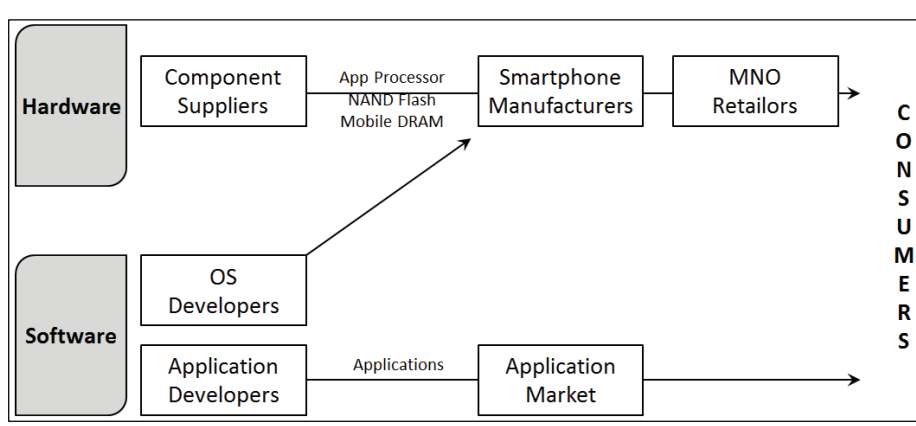
How have smartphones suddenly become popular after the mid 2000s? There have been three external factors. First of all, wireless internet accesses – Wi-Fi, Wibro, and 3G networks, in particular – had become widely distributed. They made it possible for the consumers to access the internet ubiquitously, and thus fully enjoy their application software and active networking. Second, social and cultural changes emphasized personality and pluralism, which promoted various activities via smartphones. Pursuing differentiated activities, smartphone users download different application software, customize their smartphones, and show off their activities with distinctive application software and devices. Lastly, technology had been improved according to consumers' complicated and fastidious needs. A touch-screen with high resolution, a high-performance mobile CPU with less power consumption, and enhanced battery life, for instance, have been critical for modern smartphones.

Value chain of the smartphone market is illustrated in the **Figure D**. Major players and its operating systems are presented in the **Figure E**.

## 5.2 The Emergence and Rapid Growth of Apple

There has been a significant paradigm shift in the mobile phone market. As seen in the

〈Figure D〉 Value Chain of the Smartphone Market



〈Figure E〉 Major Players and their Smartphone Operating Systems

| | iOS | Android | Windows Phone | MeeGo | Symbian | Bada | Blackberry OS |
|---|---|---|---|---|---|---|---|
| Apple | ● | | | | | | |
| Samsung Electronics | | ○ | ○ | | △ | ● | |
| LG Elec. | | ○ | ○ | | △ | | |
| Nokia | | ○ | ○ | ● | ● | | |
| HTC | | ○ | ○ | | | | |
| RIM | | | | | | | ● |

●: self-developed OS, ○: licensed OS, △: previously adopted OS (yet not any more)

**Figure F**, the feature phone market has been declining, while the smartphone segment has been gaining more and more share in the market.

The key success factors (KSF) of the smartphone market are different from those of the feature phone market. The software part (OS and application software) is much more important than the hardware part. Therefore, one has to establish *platform leadership* and innovating an *industry eco-system*, by securing *network effects* and *lock-in effect*. Understanding the KSF of the smartphone market, Apple has made great success with industry-wide innovation. **Figure G** shows the iPhone's surging shares, revenues, and profits.

5.2.1 Apple's Key Success Factors

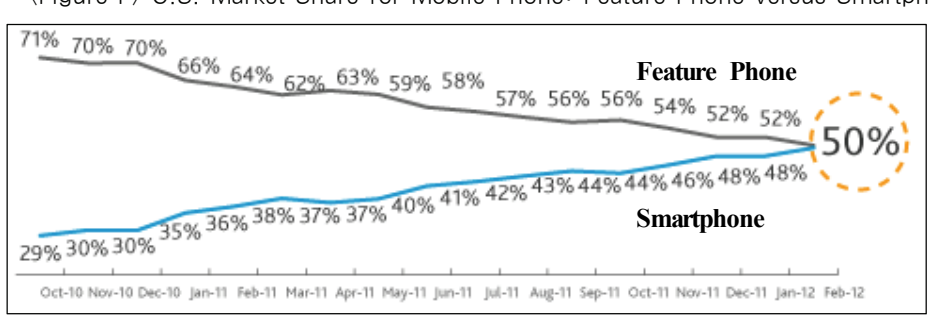
5.2.1.1 Innovation on smartphone industry eco-system

Apple deviated from the stereotype that a mobile phone is a device only for phone-call and text messaging.

5.2.1.2 Platform leadership

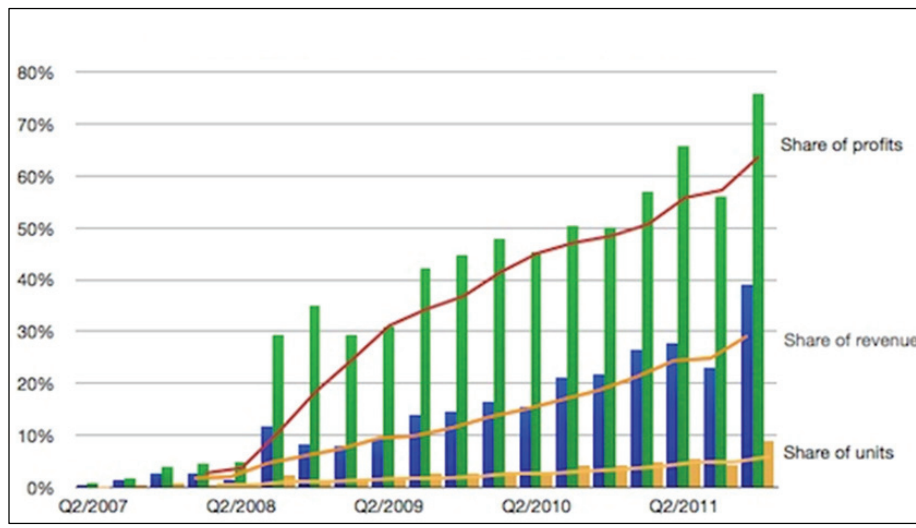
Apple developed an innovative win-win business model and thereby built a horizon-

〈Figure F〉 U.S. Market Share for Mobile Phone: Feature Phone versus Smartphone




Source: Nielson, cited in Slash Gear
(http://www.slashgear.com/nielsen-first-time-smartphone-and-feature-phone-usage-equal-30220760/)

〈Figure G〉 iPhone Share of All Phone Units, Revenues, and Profits




Source: asymco.com, cited in iPhoneRoot
(http://iphoneroot.com/apples-profit-share-among-top-mobile-phone-manufacturers-reached-75/)

tal collaboration system. Apple established fair rule of sharing profit and attracted high-quality application developers. By doing this, Apple enjoyed a loop of positive feedback and indirect network effects, which brought and secured Apple's platform leadership.

5.2.1.3 Consumer value creation

Apple provided with quality application software through App Store. In addition, it adopted innovative product designs, user interface (UI), and user experience (UX) to maximize lock-in effects and switching costs.

5.2.1.4 Compatibility and complementarity between Apple products

Application software and user's data are shared and synchronized between various Apple products such as iPhone, iPad, and Mac PC via AppStore, iTunes, or iCloud. This made existing Apple users further prefer other Apple products by generating substantial switching costs.

5.2.1.5 Time to Market

Apple entered the market in a timely fashion when following infrastructures were developed.

- Worldwide spread of mobile communications and internet access
- Social changes for individuality and pluralism
- Development and commercialization of relevant technology

5.2.2 Implications from Apple's Success

1) It is critical to understand the driving

forces - which reside in the foundation of the industry - for performance and winning the "standard war". (Cf. Apple's open vs. closed strategy in the PC industry).

2) It is important to lead or respond quickly to paradigm shifts, and grasp ever-changing KSF.
3) One cannot achieve sustainable competitive advantage only from the merits of hardware technology (Lee and Chang, 2011). E.g. iRiver (Reigncom), Yepp (Samsung Electronics), and Optimus (LG Electronics).
4) From a broader perspective, a smartphone manufacturer has to ensure industry-wide platform leadership and network effects (rather than focusing only on its hardware products).

### 5.3 Samsung Electronics' Catch-up Strategies

Samsung Electronics overlooked the emergence of the "smartphone era" and thus failed to develop necessary capabilities such as software capabilities. Rather, Samsung Electronics initially focused on its feature phones in spite of the emergence of the smartphone industry. This can be called a *success trap*. A success trap refers to focusing on the exploitation of the firm's current, successful business activities and as such disregards exploration for new area and enhancing its long-term viability (March, 1991; Levinthal and March, 1993).

Even after entering the smartphone business, Samsung Electronics failed to cultivate the industry eco-system; it could not provide developers with voluntary incentives to develop application software. As a result, Samsung Electronics was unsuccessful to activate its own app-store and secure direct/indirect network effects. As Professor Cheol-soo Ahn of Seoul National University commented, Samsung Electronics squeezed out all the partners rather than motivating them, and thereby fabricated "zoological garden" instead of eco-system.

After an initial strategic mistake, fortunately, Samsung Electronics finally became aware of underlying KSF and eco-system of the smartphone industry. Recently, Samsung concentrates on strengthening its competitiveness in the software part and industry eco-system by allying with Googld in the short run and developing its own capabilities in the long run.

### 5.4 Counterattack of the Android Camp

#### 5.4.1 Potential Threats to Apple

- Side effect of (partially) closed iOS: limited network effects due to incompatibility with other OS.
- Strict control of AppStore (E.g. prior permission requirement and registration fee).
- Emergence of standardized environment for developing application software: Apple's platform leadership and high-quality developers, which have been Apple's core

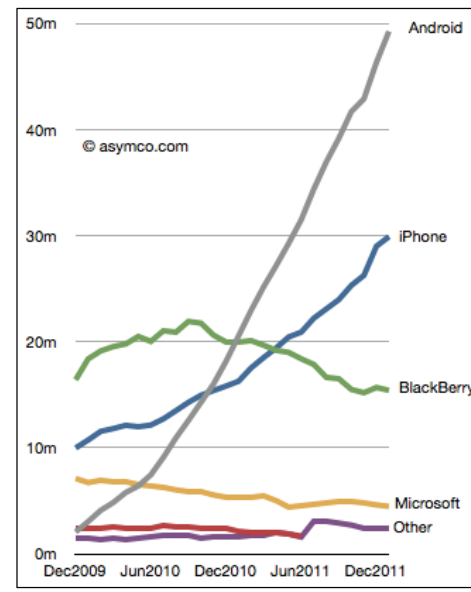
assets, are shared.

- Threats from competing products: fast-follower advantages and information leakages help competitors to grow fast.
- A void of strong leadership for innovation: Tim Cook, a successor, faces leadership challenge.

### 5.4.2 The Rise of the Android Camp

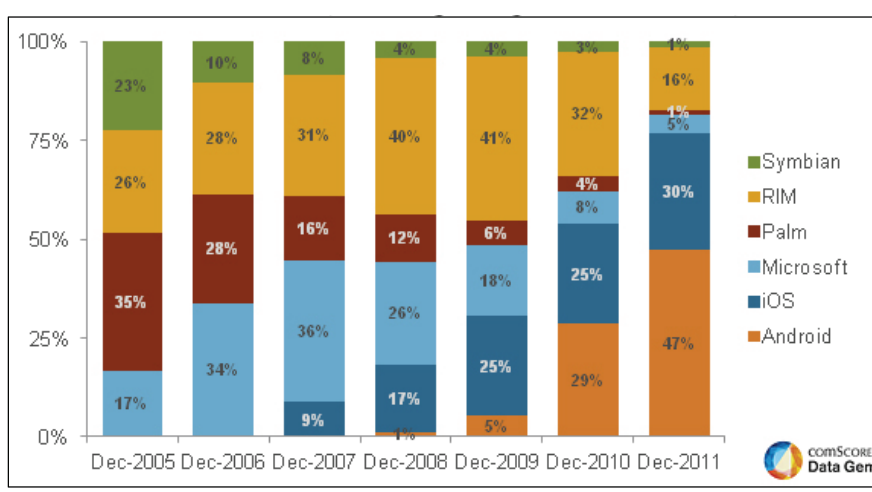
The Android camp, led by Samsung Electronics' leadership with Galaxy series, has recently outcompeted Apple. **Figure H** and **Figure I** shows the Android camp's leapfrogging. Figure J and Figure K are about a proliferation of the Android camp. **Figure J**, in particular, shows that various versions of Android have attracted numerous smartphone manufacturers. The explosion of the number of Android application is shown in **Figure K**.

〈Figure H〉 Installed Base of Smartphone Platforms



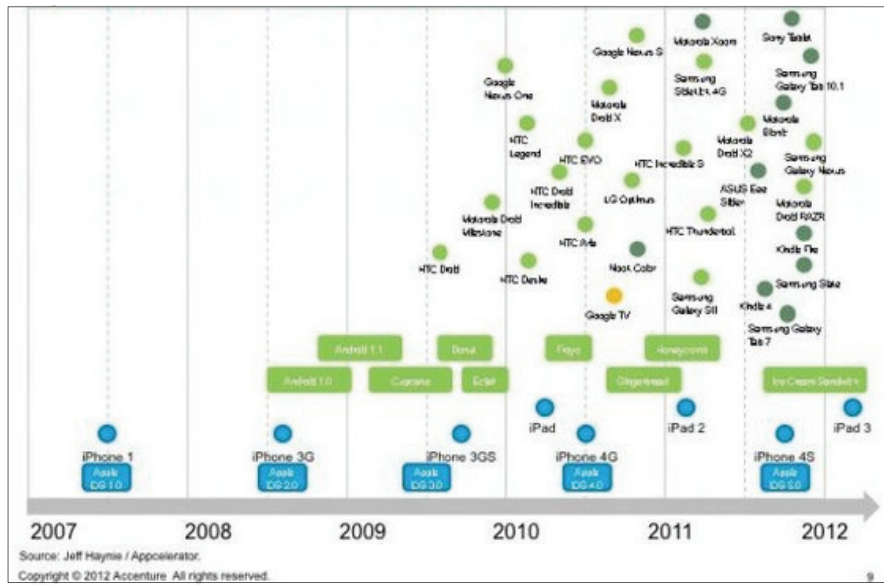

Unit: millions of US users
Source: asymco.com (http://www.asymco.com/2012/03/07/the-unrelenting-trends-in-the-us-smartphone-market/)

〈Figure I〉 U.S. Smartphone Market Share by Operating Systems



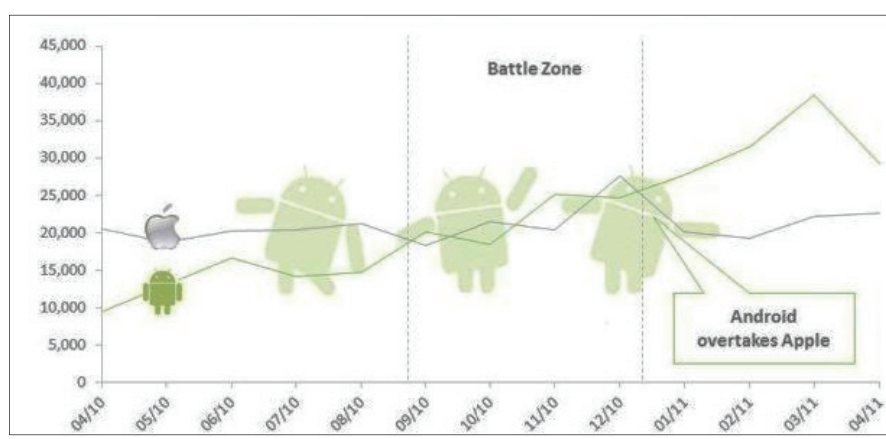

Source: comScore MobiLens, cited in Floating Path (http://www.floatingpath.com/2012/03/01/u-s-smartphone-platform-market-share-time/)

〈Figure J〉 Proliferation of the Android camp: Explosion of OS Versions and Device Flavors




Source: Accenture's presentation at MWC (Mobile World Congress), cited in Android Authority (http://www.androidauthority.com/android-growth-statistics-accenture-70695/)

〈Figure K〉 The Number of Applications Submitted




Source: Research2Guidance, cited in Touch Reviews (http://touchreviews.net/android-market-overtake-apple-app-store-august/)

## 5.5 Issues regarding Operating System

### 5.5.1 Complexity of Selecting an OS (Complexity of the OS Strategies)

For smartphone manufacturers, it is hard yet very important to properly set up their OS strategies. The OS is closely linked to devices, application developers, and even end-users. There largely are three OS strategies for the manufacturer: developing its own OS,

using licensed OS, and doing both.

5.5.1.1 Developing One's Own OS

When a smartphone manufacturer develops its own mobile OS, it can easily secure interoperability or compatibility between OS and device. Moreover, the manufacturer is able to optimize and customize the OS for the device, and thus provide differentiated products to the consumers. It may also acquire enhanced negotiation power against other OS and application developers. As mentioned in the case, dependence on a specific OS developer is an important strategic issue for smartphone manufacturers. As of June 2012, for instance, Microsoft – who had been a mobile OS developer – released its own tablet PC "Surface". It is obvious that MS would be favorable for its own product than other tablet PC products that adopt MS' OS.

There, however, are disadvantages of self-developed OS as well. First, it is quite difficult to get technologies and capabilities required to develop the OS. In addition, it entails a huge amount of developing costs and follow-up service costs. There is no guarantee of success as well. Lastly, it generally is difficult to expand a consumer base and enjoy network effects only with a single, self-developed OS.

5.5.1.2 Using Licensed OS

With a licensed OS, a smartphone manufacturer can complement its inferior software capabilities and focus on core competences and business. For instance, HTC could enter the smartphone market by adopting external OS such as Android or Windows Phone. Moreover, it is easier to expand consumer base and enjoy network effects because a group of smartphone manufacturers jointly adopts the same OS. Smartphone manufacturers like Samsung Electronics and HTC could enjoy advantages of network effects derived from widespread Android OS and its eco-system. In addition, one would have an option to choose the best OS in the market, avoiding uncertainties and risks of developing OS which may end in failure.

The disadvantages for manufacturers are as follows. Firstly, there is a possibility of being dependent on the OS developers. Second, it is hard to ensure interoperability or compatibility because each licensed manufacturer will independently customize or differentiate the OS. Third, customization and optimization of licensed OS to the manufacturer's own device entail additional works and costs.

5.5.1.3 Do Both: Seeking An Ambidextrous OS Strategy

By doing both, the manufacturer may enjoy all the advantages of both strategies. Disadvantages of each strategy will be covered by the advantages of the other strategy. If Google threatens Samsung Electronics by suspending its supply of Android or developing its own smartphone hand-set, for example, Samsung Electronics can cope with the threat because it has its own OS – Tizen and Bada.

This strategy, however, suffers from huge

redundant costs on developing OS and getting a license for external OS. One has to pour its time and money not only for developing its own OS, but also for optimizing and customizing licensed OS. Moreover, having multifarious OS on its devices may confuse customers.

5.5.2 Google's Acquisition of Motorola Mobility

In July 2011, there was an important event: Google's acquisition of Motorola Mobility. Google announced that the purpose of this acquisition was to acquire intellectual properties of the Motorola Mobility. Still, it should be noted that Google now has abilities to develop its own smartphone devices (even though Google has spent hard time integrating Motorola Mobility until recently.)

5.5.3 An Exemplar: One Possible Strategy

Given a complex environment and fierce competition in the smartphone market, a smartphone manufacturer should be ambidextrous. In other words, it has to develop its own OS and utilize a licensed OS simultaneously. Having plural OS will make OS developers compete more flexibly. For instance, Samsung Electronics developed independent OS such as Bada or Tizen while it adopted Google's Android and MS' Windows Phone. This strategy has been beneficial for managing the relationship with OS and application developers, and attracting various types of end-users.

Note that OS strategy itself is not a final destination. The most important factor in the smartphone industry is to attract application developers into the eco-system. Network effects come from the intricate interactions among application software and its developers, OS strategies, and consumer choices. A critical mass for "tipping" will eventually be reached at which the network effects of a firm dominate those of the competitors.

## Ⅵ. The Ultimate Winner of the War

- Up to now, the Android camp, which offers a completely open business model, is likely to win the smartphone war against Apple. Based on the common Android OS, the camp releases a variety of devices, satisfying consumer needs. The nature of openness and freedom of the Android application market, the Play Store, also attracts application developers.
- The upcoming war is not confined to the smartphone market itself; it is the extended "smart war" including various smart devices. Connecting its diverse electronic products such as camera, personal computer, smartphone, tablet PC, and television, Samsung Electronics has built unified user experience. Apple's smartphone, tablet PC, and computer also provides with consistent user interface under the iOS platform. A firm has to

manage the whole mobile eco-system well to secure the platform leadership.

- A firm should watch out the next big thing or paradigm shifts that will change the "rules of the game" and modify its business model. Platform business model from open and win-win partnership is required in the network-based economy.
- Differentiated technology – which is achieved by cooperation of *set* and *device* – has to be developed and sustained.
- A firm has to accumulate capabilities not only as a fast-follower, but also as a first-mover and innovator.
- It is important to cope with the emergence of web platform (based on HTML5) and the growth of service platform such as social networking service (SNS) in a strategically agile fashion.

After all, the firm that secures a position of platform leadership by building a strong industry ecosystem, satisfying customers' diverse needs, developing key success factors better and quicker than its competitors, and managing patent disputes effectively will be the eventual winner.