

# 지속적 성장 관점에서 본 한국 스마트폰 산업 생태계

## The Ecosystem of the Smartphone Industry in Korea: Perspectives on Its Sustainable Growth

박진수 (Jinsoo Park)

서울대학교 경영전문 대학원

최영석 (Youngseok Choi)

서울대학교 경영대학

### 요약

한국의 스마트폰 시장은 그 성장세만큼이나 많은 변화를 거듭하고 있다. 이러한 가운데 2012년 5월부터 시행될 Whitelist Policy는 한국의 스마트폰 산업에 적지 않은 영향을 미칠 것으로 보인다. 본 사례 연구에서는 한국 스마트폰 시장을 산업 생태계 분석의 관점을 통해 바라보고, 스마트폰 시장의 생태계 모형을 제시한다. 이를 바탕으로 새로운 정책의 도입과 시장 변화를 스마트폰 산업 생태계의 각 주체들이 어떻게 대응해야 할 지에 대한 전략을 모색하고자 한다.

**키워드 :** 스마트폰 산업, 스마트폰 생태계, 한국 스마트폰 산업

## I. Introduction

As the use of the mobile phone increases worldwide, so do the functionalities of the device. The smartphone meets the consumer's need for a more powerful mobile device. Especially, with the convergence of mobile telephony, Internet service, and personal computing devices, the "Mobile Internet" has become one of the main purposes for mobile phone usage. The smartphone is the key device for the connection to the Mobile Internet world. Although there is no formal definition for the word 'smartphone' (Abowd *et al.*, 2005; Ballagas and Borchers, 2006), it can be seen as a ubiquitous computing platform, as well as a hybrid of the mobile phone and the PDA (Personal Digital Assistant)

(Anderson and Blackwood, 2004; Marcus and Chen, 2002).

The smartphone is a powerful device that offers traditional wireless voice services in addition to various Internet-based services including e-mail, streaming video, and social networking services. The "APP" (short for application but not referring to the traditional software application for PC) is enabling software for these kinds of services and is installed on the smartphone's operating system. The business opportunities offered by various smartphone services have attracted many of the major global information and communication technology (ICT) companies into a complex and competitive landscape. These companies can be viewed not as members of a single industry but as parts of a business ecosys-

tem that crosses a variety of industries (Jo and Oh 2011). According to James Moore’s article in the *Harvard Business Review*, in a business ecosystem, companies co-evolve capabilities around a new innovation: they work co-operatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovation (Moore, 1993).

Recently, the business ecosystem that many companies associated with smartphone had formed in Korea is facing a new environmental change. It is that smartphone handset security policy changed from Whitelist Policy to Blacklist policy starting from May in 2012. This institutional change is expected to have a short- and long-term impact on Korean smartphone-related company’s strategies. Therefore, this study aims to analyze how this institutional change will have an impact on the domestic smartphone ecosystem members and the overall smartphone industry. In addition, based on this analysis, this study proposes strategies for the sustainable development of this ecosystem.

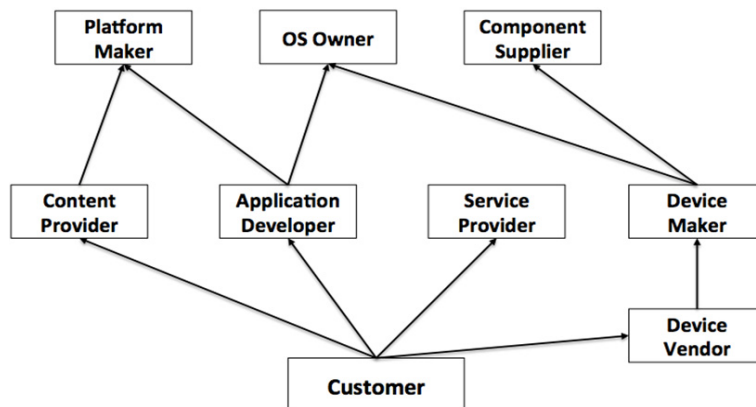
In this respect, this study is organized as follows. Section II explains the Smartphone Ecosystem Model

and Section III considers the characteristics of the Korean Smartphone Industry. Based on these, Section IV analyzes Korean Smartphone Ecosystem and its growth mechanism. Both Sections V and VI analyze the impact of Blacklist policy on smartphone ecosystem and describe strategies that the smartphone ecosystem members will take for their sustainable growth. Finally, Section VII mentions the changing patterns and development directions of the domestic industry after the application of Blacklist policy.

## II. The Smartphone Ecosystem Model

To understand the competition among the companies in the smartphone industry, it is first necessary to understand the environment in which they exist. The ecosystem approaches of Lin and Ye (2009) and Kenney and Pon (2011) provide a very useful framework for understanding the competition in the smartphone industry.

Making an analogy between the smartphone industry and the natural ecosystem, Lin and Ye pro-



Note) Direction of arrow presents cash flow.

〈Figure 1〉 The Smartphone Industry Food Web Model

pose a “Food Web” in the smartphone industry. They derived the “eating relationship” among participants in the smartphone industry. <Figure 1> describes the smartphone industry’s “Food Web” (Lin and Ye, 2009). In this “Food Web”, customers provide a revenue stream to support the whole system. In the low level, revenues flow from customers to device vendors, service providers, application developers, and contents providers. The customer purchases a smartphone from the device vendor; downloads music, movies, and other contents from the contents providers; and installs APPs provided by the application developers. All of these services are accessed by the customer through the service provider’s network.

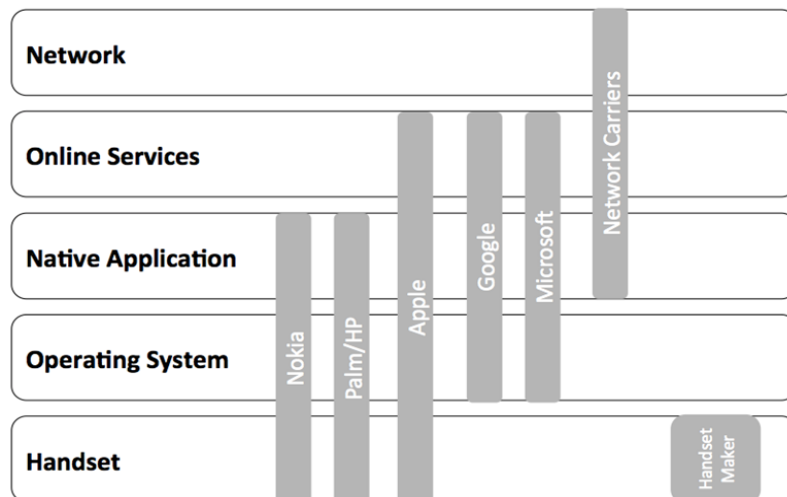
The device makers supply smartphones to vendors while purchasing components (hardware and technology) from component suppliers. The OS developers license the OS to device makers and certify applications produced by developers. The platform developers are contents aggregators and application distributors; thereby sharing profits with the contents providers and application developers (Lin

and ye, 2009).

Kenney and Pon (2011) suggest the “stack” framework to describe the smartphone ecosystem. <Figure 2> shows the responsive relationship between the “stack” framework and a representative smartphone company. The bottom of the stack is the handset and the specialized components that deliver its functionality, including the CPU, graphics chip, cellular/Wi-Fi chips, Bluetooth, GPS, and camera. On top of the hardware is the operating system, which contains pre-installed native applications. With Internet access, smartphones also run online applications such as email, geo-aware mapping, search engines, productivity software, games, social networking, and more (Kenney and Pon, 2011). Furthermore, it is possible to receive various online Web services through the Web access provided by a network provider.

### III. Features of the Korean Smartphone Industry

Since such factors as the geographical features



<Figure 2> The Stack Framework

<Table 1> The Top Five Smartphone Vendors, and Market Share Third Quarter 2011  
(Units in Millions)

Vendor	3Q 2011 Unit Shipments	3Q 2011 Market Share	3Q 2010 Unit Shipments	3Q 2010 Market Share	Year-over-Year Change
Samsung	23.6	20.0%	7.3	8.8%	223.3%
Apple	17.1	14.5%	14.1	17.0%	21.3%
Nokia	16.8	14.2%	26.5	32.0%	-36.6%
HTC	12.7	10.8%	5.9	7.1%	115.3%
RIM	11.8	10.0%	12.4	15.0%	-4.8%
Others	36.1	30.6%	16.6	20.0%	117.5%
Total	118.1	100.0%	82.8	100.0%	42.6%

Note) Vendor Shipments are branded shipments and exclude OEM sales for all vendors.

Source: IDC Worldwide Quarterly Mobile Phone Tracker, November 3, 2011.<sup>1)</sup>

and the population density of Korea are quite beneficial for the development of mobile communication, Korea started to experience the fast development of mobile communications earlier than others. In case of the smartphone, the number of users increased extremely quickly, and as a result, there is a well-developed smartphone ecosystem. However, in the Korean smartphone ecosystem, there are some unique features that have not appeared in other countries.

### 3.1 Top Smartphone Market Share Company, Samsung Electronics of Korea

Samsung Electronics, which has the biggest market share for smartphones in the global market, is a Korean corporation (see <Table 1>). In Korea, Samsung Electronics has long been recognized as a

manufacturer of household appliances with a good warranty plan. Such recognition has increased the level of consumer loyalty towards the company and its products. There is a close relationship between such a situation and the fact that the Galaxy series (Galaxy A, Galaxy S, Galaxy S2, Galaxy Tab, Galaxy Note) is manufactured by Samsung Electronics, making the sales figure go beyond 10 million units. Even if the iPhone series sold by Apple have a better UI, UX, and application market (i.e. App Store) than the Galaxy series, many Korean consumers tend to choose the Galaxy series because it is made by Samsung Electronics. According to 2012 survey conducted by Korea Information Society Development Institute (KISDI), the 33% of consumers consider the smartphone brand in advance when buying the smartphone. This suggests a reason that Galaxy series become popular in Korea, because Samsung has the top brand loyalty.

### 3.2 Handset Security Policy-Whitelist Policy

The handset security policy is largely divided into the Whitelist Policy and Blacklist Policy. The handset distribution method depends on the type of

1) [http://www.idc.com/tracker/showproductinfo.jsp?prod\\_id=37](http://www.idc.com/tracker/showproductinfo.jsp?prod_id=37). This data provides the detailed information on the total mobile phone and smartphone markets for handset vendors, software developers, service providers, component suppliers, and investors. This data includes the statistics about existing phone type (feature phone and smartphone), operating systems, and over 150 vendors.

handset security policy applied in each country (See <Figure 3>).

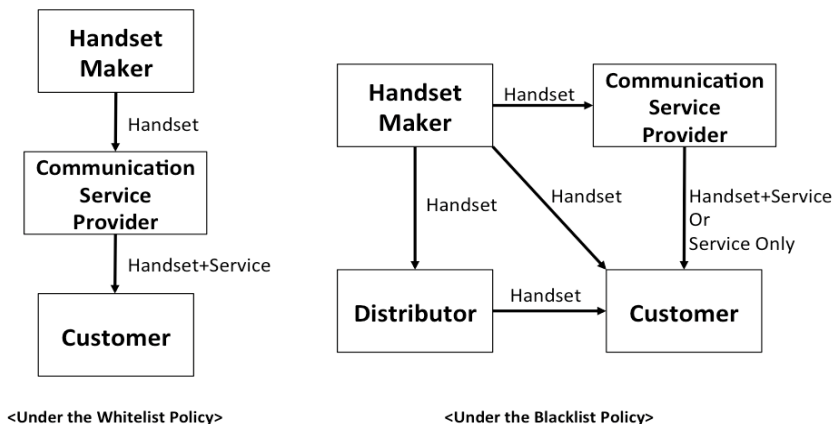
For the Whitelist Policy, it is possible to maintain security by enabling only the handsets registered on the International Mobile Equipment Identity (IMEI) list, which includes each handset sold by mobile communication service providers, to be permitted to communicate. For such a purpose, the handset makers directly provide the mobile communication service providers with devices. Then, the identification number of each device is inserted by the service provider. On the other hand, for the Blacklist Policy, each mobile communication service provider uses a list of identification numbers for each handset expected to be used for illegal communication in order to block the communication service used by such handsets. Therefore, there is no need to distribute handsets through the channels of the mobile communication service providers, making it possible for handset makers to sell handsets to consumers either directly or through distributors. Just like in Turkey, Korea is one of the few countries to implement a Whitelist Policy. Even if Korea plans to accept the Blacklist Policy in May, 2012, the country is still maintaining its smartphone

ecosystem under the Whitelist Policy.

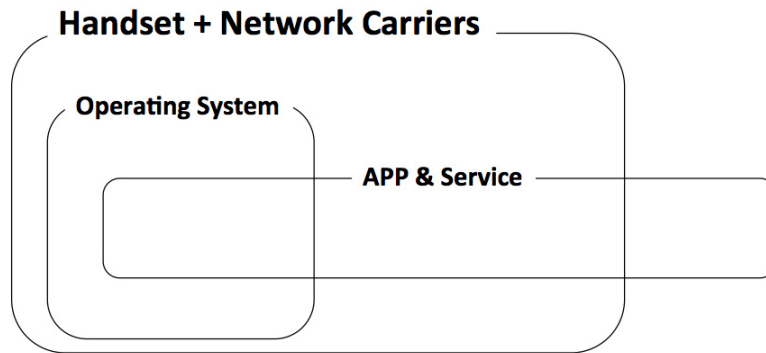
#### IV. The Korean Smartphone Ecosystem and Its Growth Mechanism

By considering such features, the smartphone ecosystem model which has been suggested by (Lin and Ye, 2009) and (Kenney and Pon, 2011), could become different in Korea. The handset distribution system that is different from those of other countries and the existence of the domestic brand Samsung Electronics could change the “stack” framework into the one shown in <Figure 4>.

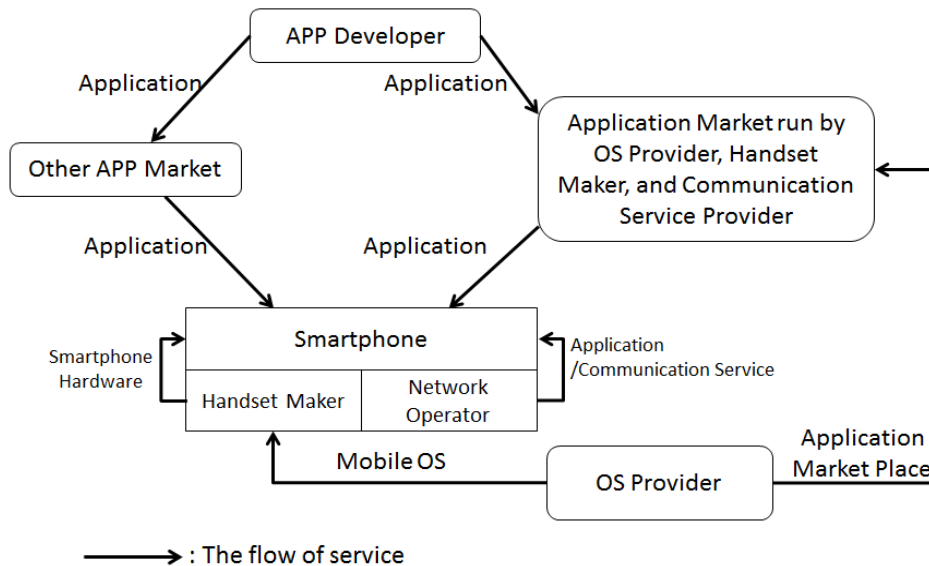
In the newly-transformed smartphone industry “stack” framework, the handset makers and network carriers are combined for the common consumers (Whitelist Policy). Rather than the competition shown between handset makers or network carriers, it is possible to see the two subjects being combined and competing with one another. In case of applications and various online services, it is possible to have three different types based on the mobile OS, the handset maker or mobile communication service provider, or a separate distribution



<Figure 3> The Handset Distribution System Based on Whitelist/Blacklist Policies



<Figure 4> Newly-Transformed Stack Framework in Korea



<Figure 5> Smartphone Service Flow

channel. The growth mechanism shown by the newly-transformed smartphone ecosystem can be explained through the smartphone service flow shown in <Figure 5>.

The mobile OS provider supplies the OS to the handset maker, which is used as the platform for each handset. During such a process, the handset maker is able to optimize the OS for its handset. In case of Apple, the company plays the roles of both the OS provider and the handset maker. The hand-

sets with a built-in OS are sold to consumers through the distribution channels of the network providers. The smartphones sold to consumers through such a process maximize the consumers' level of satisfaction with the applications and services provided through various routes. Applications can be provided to consumers through various ways. First of all, applications can be distributed through the application markets operated by the OS providers. The OS providers seek to distribute a variety of

useful applications through their platforms because most successful markets with network externalities can be characterized by the presence of two distinct sides whose ultimate benefit stems from interacting through a common platform (Rochet and Tirole, 2003). For the same reason, the communication service providers hope to maximize the consumers' level of satisfaction by actively distributing various applications through their own markets. In case of the handset makers, by distributing various applications that are specialized for their own handsets through their own application markets, the handset makers can have a competitive advantage over the competition.

The application market can increase the market efficiency with the help of various application developers. The application developers are then able to see profits. Because of such a definite incentive, a lot of individual developers put their applications on the market. In Korea, the Web service companies are maximizing the consumer utility by distributing various services and applications. Such large-sized portal companies as Naver and Daum are currently distributing applications on the market, while providing such useful services as Mobile Cloud for consumers. Since the number of people accessing the Web through mobile devices is dramatically increasing, portal companies are trying to secure their consumer bases by providing such applications and services.

In case of Web service, it has been very important for the traditional Web-based portal companies to maintain a number of users in order to stay successful in the mobile Web-based environment, since the mobile Web services are an additional venue for advertising, just like the traditional Web services; thereby securing their primary source of profit.

It can be said that the growth of the smartphone

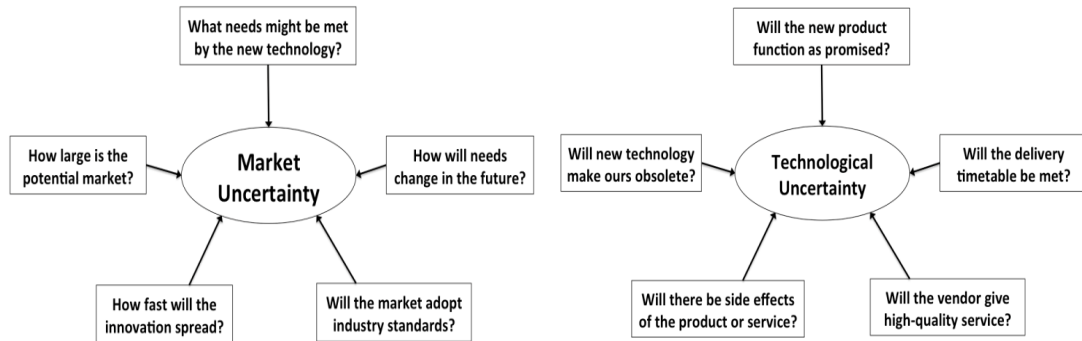
ecosystem has been even further accelerated by Samsung Electronics, which has made great contributions to the industry. Currently, Samsung Electronics is dominating more than 50% of the domestic smartphone market, instantly responding to consumer needs. By providing various new product lines quickly, the company is speeding up the level of consumption for smartphones.

## V. The Korean Smartphone Industry under the Blacklist Policy

In May 2012, Korea transformed its certification method for handset security into the Blacklist Policy. Such a movement will not only be regarded as a simple change of the current policy, but will definitely cause a structural change in the Korean smartphone industry. Compared to the current situation in which consumers are forced to purchase mobile devices only through the mobile communication service providers, it will be possible to buy new handsets through various channels.

The way handsets are sold in the smartphone market will be quite influential since the market has already reached the mature stage. It is necessary to have high levels of market uncertainty and technology uncertainty for the state of general high-tech marketing. However, by looking at the two factors of uncertainty discussed by Moriarty and Kosnik (1989) as shown in <Figure 6>, it seems that the smartphone market has entered the stage of an extremely low level of uncertainty.

In case of market uncertainty, it can be said that such a state has been already settled since many members of the ecosystem are currently showing fierce competition. Even though the handset market has reached the maturity stage, the size and range



<Figure 6> Factors Affecting Market Uncertainty and Technological Uncertainty (Moriarty and Kosnik, 1989)

of the potential market are still increasing. The industry standard is being determined naturally through competition. In case of smartphones, the level of technological uncertainty is also extremely low. The feature phones from the past have been almost entirely replaced by smartphones, and the level of technological completion is very high. In addition, companies such as Apple and Samsung Electronics are offering technologies and services that evolve faster than the consumers' needs.

By considering such a fact, it can be said that the smartphone industry has already moved out of the uncertainty stage. If technological uncertainty is high, a high-tech marketing situation will come. However, this type of uncertain has already been resolved in the smartphone industry, a low-tech marketing condition should become (Moriarty and Kosnik, 1989). In such a case, the well-established needs shown by consumers can be satisfied by companies. Not only will the technologies shown by each company be standardized, but also the traditional ways of competition including those one related to pricing will be observed.

In such a situation, handset makers will be able to sell handsets independently in the Korean smartphone industry, and will enter into competition with

the network providers (refer to the right side of <Figure 3>).

When that happens, handset makers will not only distribute their own handset through more various channels but also have a greater level of bargaining power compared to the time when network providers had all rights related to sales. Even if handset makers could sell handsets to network providers or other sellers at the same prices there is likely to be price competition among retail stores. In other words, such sellers of handsets as the distributors of network providers, retail stores for general home appliances and the retailers of handset makers are likely to compete with one another. Through such competition, customers will be able to receive the maximum benefit. In the past, the only way customers could purchase a mobile device was to use the retail stores of network providers. However, under the Blacklist Policy, customers will be able to purchase handsets through general electronic goods retailers. Consumers will look for the store with the lowest price among various sellers before purchasing their new handsets.

This situation will result in major damage to the network providers which have provided mobile communication services and sold the related hand-



<Table 2> Worldwide Smartphone Sales to End Users by Third Quarter Operating System in 2011<sup>2)</sup>

(Thousands of Units)

Operating System	3Q 2011 Market Share		3Q 2010 Market Share
	Units	Percentage(%)	Percentage(%)
Android	60,490.4	52.5	25.3
Symbian	19,500.1	16.9	36.3
iOS	17,295.3	15.0	16.6
Research In Motion	12,707.1	11.0	15.4
Bada	2,478.5	2.2	1.1
Microsoft	1,701.9	1.5	2.7
Others	1,018.1	0.9	2.5
Total	115,185.4	100	100

Source: Gartner, November 2012.

sets for such services at the same time in the past. However, due to the new policy, some customers will seek to purchase only services. As a result, the network providers will inevitably suffer some losses of profit from the sales of handsets. In order to compensate for such losses, they will diversify their strategies of selling services.

## VI. Strategies for the Sustainable Growth of the Smartphone Ecosystem

The smartphone ecosystem has grown up to the current level with proper functions based on the great contributions made by mobile OS providers, the activation of various application markets, and the manufacturing of high-quality handsets. If the smartphone ecosystem, which has been developed considerably until now and is about to face a new systematic state, is to experience constant develop-

ment, it will be necessary to think about the kind of effort required by each subject group. Besides, cooperation strategies among subject groups should also be properly taken into account.

### 6.1 Mobile Operating System Developers

For operating system developers, the effort to expand their user base in the smartphone industry will lead to the maximization of their profit. In case of Google (Android), which currently has the biggest market share in the smartphone market <Table 2>, the company takes some of the charges applied to paid applications distributed in their own market as their profit, while profiting through the advertisement of free applications at the same time. As a result, it is very important for Google to secure a large user base to maximize profit. In case of Apple, the company plays the roles of OS provider and handset maker at the same time. For the company, a great level of dominance for OS will lead to a greater number of handsets sold.

However, such competition could cause various problems, which could be brought up by the domi-

2) Additional information can be found in the Gartner report, "Market Share: Mobile Phones by Region and Country, 3Q12", The report is available on Gartner's website at <http://www.gartner.com/resId=2236115>.

nance of Android in the market. As shown in <Table 2>, Android showed enormous growth within one year, which was more than double compared to the one shown by third quarter in 2010. In the market, it is highly expected that such growth will be maintained for some time. However, when one OS dominates the platform market, it will be difficult to expect the improvement of functions or service quality through the competition among different OS providers. By considering such a point, it is necessary to secure the competitive power of other companies by benchmarking the expansion strategy applied by Android in order to secure stable competition in the OS market.

Google has been able to exponentially increase its market dominance for Android through active strategic partnerships with handset makers, such as Samsung, LG, and HTC, which have installed Android on most of the new smartphones they have manufactured recently. Due to such an active strategic partnerships, not only handsets but also GPS navigation systems and multimedia players in Korea now come installed with the Android OS.

Currently, the Android OS has more than 50% market share and thus show its market dominance. If other companies such as Symbian, Research in Motion, and Apple do not show some progress, it is likely that the market will become monopolized by Android. However, other OS providers show a fundamental limit since they are not platform-specialized like Google. In addition to operating systems, they also carry out their production lines for handsets at the same time. In case of Symbian, their OS is only installed on the smartphones manufactured by Nokia. It seems that the installation of operating systems beyond the limit of different handsets is not occurring. Since the sales of handsets will lead to the dominance of the operating

system, there seems to be a relative limit in terms of the expansion of market dominance for operating systems. In particular, if a certain handset maker shows a relatively high level of market dominance, like in Korea, it will be very hard for minor operating systems to enter the domestic market.

Therefore, it will be necessary for companies to increase the dominance of operating systems and handsets based on various methods separately. In particular, it will be required for companies to secure competitive power by improving the functions of their operating systems and handsets separately in order to make a greater contribution.

## 6.2 Handset Makers

Until now, the handset makers have focused on function-oriented competition. It is true that they have competed with one another in order to make handsets with better functions. However, in Korea, it is also true that the bars for price range and functions of smartphones have been set too high. Furthermore, since the domestic security policy for smartphones in Korea will change to the Blacklist Policy, the prices of handsets can be set differently for the same products compared to the past. Therefore, it will be necessary for handset makers to introduce products with various prices in the market in order to satisfy various needs shown by consumers. In case of the smartphone users in Korea, it has been found that they consider such factors as design, size, screen size and quality, and price before they purchase a smartphone (Zhu *et al.*, 2011); thereby showing that consumers consider not only the functional aspects of a handset, but also the economic feasibility of such a purchase (see <Table 3>).

Furthermore, it will be necessary for handset

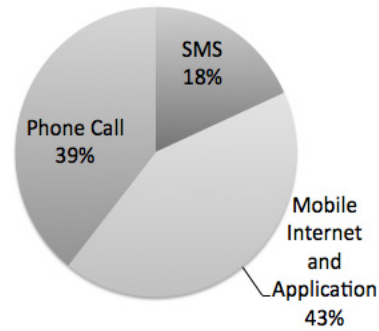
<Table 3> Factors Affecting the Purchase of Smartphone Handset (Percentage, Multiple Response, N = 4,000, Age Range: 12~59)

Design and Size	53.9
Screen Size and Resolution	46.8
Price of Handset	43.9
Network Operator	37.9
Handset Maker	37.2
Operation System	37.2
Convenience	34.2
Additional Function(DMB, Memory)	21.9
Application Store	19.9
A/S	17.7

Source: Korean Internet Security Agency and Korea Communications Commission, November 2011.

makers to meet various functions as terminals for their handsets in order to make consumers recognize smartphones as real connected devices. Smartphones have received attention as futuristic devices because they are recognized as terminals that connect both the wired and wireless networks. In fact, such a point can be found by looking at the patterns shown by smartphone users in Korea. Based on the survey carried out for the usage of smartphones regarding each function, it can be found that more people use wireless Internet and mobile applications compared to those who use the devices as phones as illustrated in <Figure 7>.

In particular, since Wi-Fi hotspots are well-established in Korea, in addition to the comprehensive 4G wireless communication network, it is easy to use a smartphone as a terminal for wireless communications. Moreover, many Web-service companies are providing various services based on compatibility between the desktop and mobile environments. Therefore, handset makers need to develop new products in order to facilitate the smartphone's



Source: Korean Internet Security Agency and Korea Communications Commission, November 2011.

<Figure 7> Smartphone Usage Pattern in Korea

function as a network convergence device. At the same time, the potential needs of the consumer must be predicted and satisfied in such a context.

The handset makers also need to diversify their products so as to meet new demand for low-end phone. Under the Blacklist Policy, consumer can buy a handset through any distribution channel and activate the service just by inserting a USIM chip. With the distribution channel for handsets getting more diversified, consumers would have more choices while the overall phone prices are lowered gradually. In addition, people who feel the functional fatigue from the high-end smartphone would be likely to make new demand for low-end smartphone. The elderly also still want to buy low-end phone because they cannot fully utilize the functions high-end handset offers. Considering this potential needs for cheap handset, the handset makers prepare for the strategy to meet this new demand.

### 6.3 Network Providers

The most intense competition in the smartphone industry of Korea is that of the network providers.

Even prior to the introduction of smartphones, such companies as SK Telecom, KT, and LG U+ competed with one another fiercely. Their level of competition has changed due to the movement into a new generation of communication. In case of the initial wireless communication market in Korea, the level of customer loyalty towards mobile communication providers was extremely high, making the competition for market share quite meaningless. However, as smartphones are now being widely used, there seem to be new factors of competition to be considered in terms of the network providers.

First of all, the services provided by network providers to their customers have become more various compared to the time for feature phones. In case of feature phones, main service is limited to phone calls and SMS. However, in case of smartphones, the handsets are a platform for various services. Therefore, mobile communication providers can expand their customer base by providing differentiated services. Even at this moment, each mobile communication provider is carrying out its strategy for differentiation by providing mobile VoIP services, high-quality video call services, and Cloud services. In the future, it will be necessary for companies to provide their customers with various and differentiated services that cannot be copied by others in order to secure their competitive power.

The functions shown by smartphones will evolve quickly in the future; however, if the fast evolving speed shown by the functions of smartphones is not met by the proper capability of the network, the improvement of the functions of smartphones will become meaningless. By considering such a point, it can be said that the subject group with a core key for the constant development of the smartphone ecosystem is the one of network providers. In order to provide various services through smartphones, it

will be necessary to have a network which enables fast wireless communication. A number of Wi-Fi hotspots created by network providers could be considered in the same context. However, as the communication method has evolved from 3G into 4G, it will be absolutely necessary to have exponential development for the capability of wireless communication. Currently, in 2012, the 4G Long Term Evolution (LTE) services are being executed in Korea. At the moment, not all the mobile communication providers are providing 4G services to cover the entire nation. However, it is likely that the network coverage will be expanded to the entire nation. In the end, network providers need to expand their next-generation communication networks through their own capital investments. Only through such investments will it be possible to establish more profitable value chains.

However, the important point is that smartphones are mobile phones. In other words, even if various services can be experienced through data communication, the fundamental purpose of such devices is to make phone calls. In Korea, due to the focus on data transmission, the level of customer satisfaction for the quality of phone calls has been decreasing greatly. Such a point must also be considered by network providers.

## 6.4 Application Developers

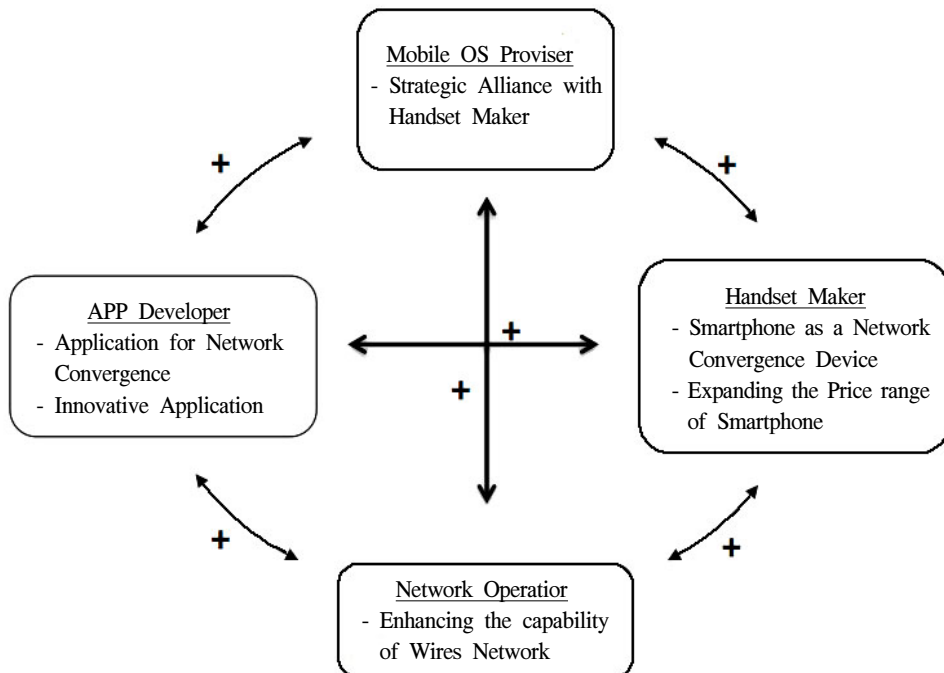
The role of supplying contents to the application market is played by application developers, which can be divided into two categories: individual developers and mobile Web-service companies. For mobile applications with simple functions, it is possible for individual developers to personally make such applications and update them in the market. As a result, a number of individual developers are

contributing to the diversification of market contents.

The point which must be considered in the Korean APP market is the entrance of the traditional Internet portal service companies in the APP market. Naver and Daum, which used to be the leaders of the traditional portal market, are currently distributing various applications in order to provide services that were used to be offered in the traditional desktop environment to the mobile environment. They are providing not only search engine applications, but also Cloud applications for the combination of wired and wireless communication, increasing the level of utilization for smartphones. The active entrance shown by such Web-service companies in the mobile market is playing a great role for the activation of the smartphone ecosystem. While increasing the level of satisfaction for smart-

phone users, these companies are also securing their service bases by inducing customers in the mobile Web environment. In order to contribute to the constant development of the smartphone ecosystem, they must bring more contents from the wired into the wireless environment. By providing more applications, which can not only be used to search or store data but also become useful in regard to the establishment of a combined environment between wired and wireless networks, to the ecosystem, it will be possible to develop the related industries even further.

The roles played by individual developers are different from those played by the application providers at a corporate level. While the process of converting the functions enabled by the previous services from the wired network is done by the application providers at a corporate level, the in-



〈Figure 8〉 Sustainable Growth Chain of Korean Smartphone Ecosystem

dividual application developers must play the role of exponentially increasing the level of usefulness for smartphones by providing more innovative applications to the market. Various applications specialized in the wireless environment have already played an extremely important role in maturing the application market. In case of the innovative features verified in the market, many individual developers have established companies that are experiencing enormous profits. The active participation of individual developers with various ideas in the application market will lead to the creation of the soundest smartphone value chain in the end. The effort of each subject group for the sustainable growth of the smartphone ecosystem can be put into a diagram as shown in <Figure 8>.

### 6.5 Cooperation Strategy in Smartphone Ecosystem

For the sustainable growth of Korean smartphone

ecosystem, cooperation strategies among ecosystem members are also very critical. <Figure 9> shows the matrix for cooperation strategy among ecosystem members. It represents the way to increase the competitive edge of each member through the cooperation.

One of the best ways that both handset makers and mobile OS providers can secure market competitiveness is that they can develop good quality reference phones continuously through cooperation. The reference phone refers to a handset that can be utilized as a standard for a particular mobile OS. In case of Android OS, the reference phone is the Nexus series. The reference phone plays an important role in proving the excellence of OS provided by OS providers from their position. Moreover, the reference phone is usually priced at a lower level than the similar non-reference phones and so handset maker, in addition to high-end smart phones, can secure product families, which were priced at a lower level even with the high quality.

Mobile OS Provider				
Handset Maker	Quality improvement of reference phones through cooperation			
Network Operator	Provision of Mobile OS suitable for the characteristic of each network operator	Securing of the competitiveness through exclusive handset supply agreement between network operator and handset maker		
APP Developer	Activation of the APP market through efficient compensation system	Maximization of customer satisfaction through the development of various APPs differentiated for a particular handset or handset maker	Preparation of the activation plans for APP market provided by a network operator	
	Mobile OS Provider	Handset Maker	Network Operator	APP Developer

<Figure 9> Matrix for Cooperation Strategy among Ecosystem Members

As the demand for low-priced smartphones is expected to appear in the market after conversion to black-list policy, the reference phone will be an opportunity for both handset maker and mobile OS provider to secure competitiveness.

Network operators and mobile OS providers had never done any notable cooperation so far. In Korea where people's preference for a particular network operator is relatively distinct, various ways of cooperation between the two actors can be taken into account. One way of cooperation is that you can devise many functions and services differentiated for a particular operator and mount these on the OS.

APP developers and mobile OS providers can be said as the actors having the closest win-win structure. The size and diversity of application market is one of the customer's important OS selection criteria. Therefore, mobile OS providers will need a strategy to induce APP developer's participation in various ways.

One of the best ways that network operators and handset makers can be competitive at the same time is to make an exclusive supply agreement between a particular handset and network operator. The typical example is that in the past, iPhone Generation 1 advanced in the market by making an exclusive supply agreement with KT.

Generally, application markets include markets provided by handset makers or network operators in addition to by OS providers. However, there are less sufficient contents quantitatively and qualitatively in the market provided by handset makers or network operators than in the market provided by OS providers. So, to be more competitive than competitors, network providers and handset makers should make various attractions so that more APP developers can provide application markets where each can provide quality contents.

## VII. The Future of the Korean Smartphone Ecosystem

Korea shows various factors which are good for the activation of the smartphone market. Even before the introduction of smartphones, the Korean wireless communication market showed rapid growth compared to other countries. Korea has shown a great level of market flexibility in terms of IT, and has emerged as one of the current IT powers. Korea is also the home of Samsung Electronics, which is the world leader among handset makers. In such a situation, the Korean smartphone industry faces changes as the Blacklist Policy is implemented. In particular, as mentioned before, the bargaining power of handset makers will become relatively stronger while consumers will have various ways to purchase handsets at more reasonable prices.

It's been six months since Blacklist Policy have taken effect.<sup>3)</sup> Blacklist policy has allowed consumers to buy a handset through any distribution channel. In fact, most consumers still cannot yet feel any great change in mobile phone market. Especially, people who prefer to use high-end smartphones such as Samsung's Galaxy phones or Apple's iPhone would see neither apparent advantage nor disadvantage.

However, though the domestic phone market is largely dominated by high-end smartphones, that doesn't necessarily indicate that there is no demand for cheaper and low-end phones. With Samsung and LG having no immediate plan to launch low-end models, global companies like China's Huawei and ZTE entered Korea in partnership with major retailers. Though some analysts say that the effect of new policy will be very marginal, considerable

3) This article was written in December 2012.

changes are already happening in Korean smartphone industry. If Korea didn't adopt the Blacklist Policy, foreign handset maker cannot target Korea's low-end phone market.

The appearance of various purchase channels and price categories with the implementation of Blacklist policy will benefit consumers. However, unless there is a fair competition among competitors within the smartphone ecosystem, the healthy growth of the ecosystem would be difficult. Three telecommunications companies have been forced to close in order from January to March in 2013. Korea Communications Commission made this decision to punish them for their over-heated subsidy competition. The decision of closing network providers due to the over-heated competition will affect companies as well as consumers. Therefore, network providers will have to participate in fair competition based on the reasonable and effective measures to attract consumers instead of simple means like subsidy. Simply providing subsidies to new subscribers is to attract consumers in the short term, but does not do any good to increase consumer's royalty.

This over-heated subsidy competition has been pointed out as a troublesome problem in the Korean smartphone industry. This is not just network providers' own problem. Due to the smartphone which has been priced too high, it was difficult to attract consumers to buy smartphones without offering subsidies. For this reason, network providers have continued such a kind of fierce competition. Therefore, handset makers will also have to try to make the price of smartphones more reasonable. Moreover, with the implementation of Blacklist policy, a new door has been opened so that we could buy cell phones at various price ranges through various channels. In line with this, handset makers will

contribute to the healthy growth of the smartphone ecosystem through reasonable pricing.

In this rapidly-changing environment, the Korean smartphone ecosystem has already achieved a considerable level of growth. Not only has a platform which dominates the industry been created, but also the application market has been extremely activated. Due to the effect of Blacklist Policy, consumers have more option to buy their handset. However, in order to change such maturity into constant growth, as shown by the market, it is necessary for the main subject groups of the ecosystem to put forth continuous efforts and innovative movements. Considering the radical changes in communication market such as "all IP communication",<sup>4)</sup> the main subject groups of smartphone ecosystem should always cope with change and try to innovate themselves. Only when such a thing happens will smartphones truly be the fulcrum that combines the wired and wireless networks.

## References

- Abowd, G. D., L. Iftode, H. Mitchell, G. Tech, "The Smart Phone: A First Platform for Pervasive Computing", *IEEE Pervasive Computing*, Vol.4, 2005, pp. 18-19.
- Anderson, P. and A. Blackwood, *Mobile and PDA technologies and their future use in education*, JISC Technology and Standards Watch, Bristol, UK., 2004.
- Ballagas, R., J. Borchers, M. Rohs, and J. G. Sheridan, "The Smart Phone: A Ubiquitous Input Device", *IEEE Pervasive Computing*, Vol.5, 2006, pp. 70-77.
- Jo, N. and S. Oh, "Structural Changes of Business
- 
- 4) 'all IP communication' enables all object to communicate each other using their own IP address.



- Ecosystem caused by Digital Transformation: Analysis of Film Industry Ecosystem in Korea”, *Information Systems Review*, Vol.13, No.2, August 2011, pp. 55-72.
- Kenny, M. and B. Pon, “Structuring the Smartphone Industry: Is the Mobile Internet OS Platform the Key?”, Keskusteluaiheita Discussion Papers (The Research Institute of the Finnish Economy), Article #1238, 2011.
- Lin, F. and W. Ye, “Operating System Battle in the Ecosystem of Smartphone Industry”, *International Symposium on Information Engineering and Electronic Commerce*, 2009, pp. 617-621.
- Marcus, A. and E. Chen, “Designing the PDA of the future”, *Interactions ACM*, Vol.9, 2002, pp. 34-44.
- Moriarty, R. T. and T. J. Kosnik, “High-Tech Marketing: Concepts, Continuity, and Change”, *Sloan Management Review*, Vol.30, No.4, 1989, pp. 7-17.
- Moore, J. F., “Predators and Prey: A New Ecology of Competition”, *Harvard Business Review*, May-June 1993, pp. 75-86.
- Rochet, J.-C. and J. Tirole, “Platform Competition in Two-Sided Markets”, *Journal of the European Economic Association*, Vol.1, 2003, pp. 990-1029.
- Zhu, bo, Taewon Kim, and Sangwook Kim, “A Study on Formulating the Classification Model for Smartphone’s Satisfaction Factors”, *Information Systems Review*, Vol.13, No.3, December 2011, pp. 47-63.

## The Ecosystem of the Smartphone Industry in Korea: Perspective on Sustainable Growth

Jinsoo Park\* · Youngseok Choi\*\*

### Abstract

The Korean Smartphone industry has advanced rapidly. There seems to have a considerable change in Korea smartphone industry as the security policy related to wireless devices is changed from Whitelist Policy to Blacklist Policy. In regard to such a change, this paper analyzes the smartphone market in terms of the Business Ecosystem Model suggested by Moore. This study examines how Korean Smartphone Ecosystem has been formed and how any shifts in policy will have an effect on the ecosystem. In line with this policy shift, this study also suggests the ways how these ecosystem members should establish a strategy for the continuous development of this smartphone ecosystem. Furthermore, this study presents cooperation directions among ecosystem members based on the organic connections in the ecosystem as well as each individual's corresponding measures. In addition, based on this analysis, this study puts forward Korean smartphone ecosystem's current problems, improvement, and its future.

*Keywords: Smartphone Industry, Smartphone Ecosystem, Korea Smartphone Market*

---

\* Graduate School of Business, Seoul National University

\*\* College of Business, Seoul National University

## ◎ 저 자 소 개 ◎



**박진수 (jinsoo@snu.ac.kr)**

The University of Arizona에서 경영정보시스템을 전공하여 경영학 박사를 취득했으며, University of Minnesota의 Carlson School of Management에서 조교수, 고려대학교 경영대학에서 조교수를 역임했다. 현재 서울대학교 경영전문대학원/경영대학에 부교수로 재직 중이다. Journal of Database Management, International Journal of Principles and Applications in Information Science and Technology의 편집위원이며, 그의 논문은 MIS Quarterly, IEEE Transactions on Knowledge and Data Engineering (TKDE), IEEE Computer, ACM Transactions on Information Systems (TOIS), Data and Knowledge Engineering, Journal of Database Management, Expert Systems With Applications, Information Systems Frontiers, Communications of the AIS, Journal of Global Information Technology Management (JGITM), International Journal of Electronic Business, Asian Case Research Journal, Asia Pacific Journal of Information Systems, Information Systems Review, 지능정보연구의 다수의 저널에 게재되었다. 주요 연구분야는 정보시스템 통합, 지식 경영, 온톨로지, 시맨틱 웹 기반 혁신 기술이다.



**최영석 (aquinas9@snu.ac.kr)**

서울대학교 전기공학부를 졸업하였으며, 현재 서울대학교 경영대학에서 경영정보시스템 전공 박사과정에 재학 중이다. 주요 관심분야는 정보시스템 통합, 온톨로지, 시맨틱 웹, 정보통신 산업 및 정책 등이 있다.

논문접수일 : 2012년 12월 06일

게재확정일 : 2013년 04월 08일

1차 수정일 : 2013년 01월 22일