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Testing an Empirical Model for the Value Network of the Mobile Communication Industry in Korea

Hoon Huh[1], Dohan Song[2] and Sung Hwee Lee[3]

[1,2,3] Bangbae-ro 9-gil, Seocho-gu, Baekseok Arts University, South Korea
samlye@hanmail.net

Abstract

The mobile communication industry evolves into a mobile communication industry ecosystem led by new keystone players (i.e., Apple and Google) and reflects the expansion of overall industrial competitiveness in size through conversion with other businesses. In this study, the modeling was done in a systematic method to derive the answers to the questions such as, which functions in the value chains of mobile communication industry contribute most to profit creation, what is the key resource, and what the new business model is. This study attempts to objectively identify derivation of factors and correlations between the configuration factors for competitiveness expansion for each industry. Specifically, we developed a dynamic model to predict the overall industry movement by theoretically establishing the modelling concept about value networking of the mobile communication industry ecosystem. Using the system dynamics methodology, coupled with professional interviews, this paper empirically tests the value network model that reflects open mobile communication ecosystem. The results show that the ecosystem of the mobile communication industry is evolving into an open form with the surfacing of portals and terminal production companies, suggesting the collapse of the traditional structure (Walled Garden).

Keywords*: System Dynamics, Mobile ecosystem, Mobile Industry*

1. Introduction

For the last 40 years in Korea, in coincidence with high levels of economic development, the IT industry such as semiconductors, displays, and mobile communications had played an important role in leading the economic growth. Specifically, in 2011 the Korean IT industry exports 156.6 billion dollars (NIPA, 2012), comprising about 30% of the entire exports. Also, as of the first half of 2012, the contribution of the IT industry to economic growth ratio was around 15.3%, and the corresponding number for the national economy was 12.2%, which reinforces the view of the IT industry as a power house of Korea (NIPA, 2013).

Such achievement can be seen as the result of research and development in the information and communication industry and government support policies in Korea coupled with a higher level of human resources. Especially, the mobile communication industry is one of the representative IT industries that produces Korean brand premium. After the first ever successful development of CDMA commercial system in the world in 1995, it has seen unprecedented growth, and Korea is able to possess the communication super power with communication service technology development and supply expansion of smart phones. Due to such characteristics of the industry, the research on the value chain of the Korean mobile communication industry has been traditionally conducted under the linear and unidirectional flow. However, as the age of digital convergence, including wired/ wireless convergence and broadcast/communications convergence arrives, the changing dynamics in the value network

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from linear value chain to non-linear form have been discussed (KISDI, 2010). Importantly, this change is closely linked to motives, such as technology evolution to new communication services, wired/wireless convergence, service area expansion due to digital convergence, and sophistication and complex needs of customers (Kim Mungu, *et al.*, 2010).

Previous studies on the overall ecosystems of the mobile communication industries are mainly focused on the value chain for each component that makes up the industry and on the analyses of key influencing factors and the trends within the industry. However, prior studies have limitations in understanding the feedback structure in that the holistic relevance between factors that make up the overall industrial system was addressed. In particular, these studies have hard time figuring out the influence of technology and product changes on the industry system and on other subsystems since it is related to the configuration of the whole mobile communication industry ecosystem. In this respect, it appears to be difficult to model the mobile communication industry as a single, general system.

Based on this understanding, this study attempts to objectively identify derivation of factors and analyzes the correlations among configuration factors for the competitiveness expansion for each factor (industry). The specific purpose is to theoretically establish the modeling concept on the value networking of the mobile communication industry ecosystem by the use of system dynamics methodology and to establish a dynamic model to predict the overall industry movement.

2. Theoretical Review

2.1. Value Chain

The concept of value chain was introduced as a management theory that reflected the 1980's contemporary US background and industrial structure (Porter, 1985). As it was deemed fit for evaluation and establishment of business strategy for traditional production companies where efficient cost structure was an important goal, it has been widely chosen and used in business and management evaluation fields. However, in the case of value chain, there is a limitation that entrepreneurial activity, an important factor in competitive advantage acquisition, is excluded. And such a limitation is shown in depth for more detailed analysis of common tasks for refining each value chain. Although the value chain is useful in evaluating static correlation between participants, it plays a limited role in understanding the industry and related industry dynamics with rapid and incessant changing relationships of value chains. In the case of the mobile communication industry, the series of processes through which various mobile communication services are produced by the producer (service provider) and transferred to the users, the process of processing and value-adding cannot be explained by the value chain theory. However, these approaches have been applied to very complex forms of industry, and schematic form of value chain has become very complex. Thus, this serves as a limitation in accurately showing various forms of relationships or relationships between each node (Lee Sangwon, 2004).

As the IT industry becomes more complex, understanding business environment and survival conditions of a company is considered to be an important factor. In this context, the digital ecosystem theory illustrates that the concept of digital ecosystem reflects the change in the concept of value chain (Son Sangyoung et al., 2007). As the network environment of the mobile communication industry was established, the high value-added information technology industry with expansion of value creation contribution by immaterial production (*i.e.*, internet and mobile communication networks) has been developing. In reality, many companies showed a pattern of establishing cooperative systems by strategical positioning

based on competitive advantage for the purpose of profit creation. And, as the cost competitiveness of a single company was no longer factor contributing to value creation, the limitations that previous value chain faced became more clear (KISDI, 2011).

Also, entry and exit to the communication market is easier, as compared to other industries. Therefore it evolves in the form that is not limited by the traditional closed industry, and in a way the relationship structure is not formed dependently by equipment manufacturers under communication service providers. In such situations the relationships among communication service providers, hardware manufacturers (communication equipment, terminals, *etc.*,), contents providers who are industry participants, OS platform companies, and users have been more dynamic. In fact, Li & Whalley (2002) showed that the previous linear value chain about the industry market structure had been developing into rapidly and complexly evolving value network forms. Peppard & Rylander (2006) pointed out that in a changed communication market environment the value chain analysis method focused on individual companies lack effectiveness, and they suggested the perspective of a value network where various players serve unique roles and contribute to value creation. In the mobile communication ecosystem, it is difficult for a single company to direct the entire value chain alliances, and partnerships between various market participants are important. As they suggested, the cause of this ecosystem change was due to specialization and market expansion from communication technology development.

Also Peppard (2005) suggested a value network analysis for answers to such questions as where and through what cooperative system in the network the value is created, how a company's activity affects it, and how members react to strategies. Value network analysis is defined by networked definition → network component checking/definition → definition of value as each component becomes a member of the network → setting the effect of network. Through these steps the answers to what functions contribute most to profit creation, what is the core resource, what is the core cost, what is the value driver, and what is the new business model can be derived. Because it is difficult to analyze the dynamic relationships between them with previous linear unidirectional value chain, this e study attempts to analyze value network from the dynamic perspective. Value creation in the value network is not through a company's individual and unique activities but through combination of core competencies of firm level activities on the value of network (Applegate et al., 2003).

2.2. The Mobile Communication Industry Ecosystem Change

It can be said that the ecosystem of the traditional communications industry has a horizontal chain form where contents, platform, network, and device between service providers and consumers interact (Jung Wonhee, 2012). Under this tradition, the value chain of a mobile communications industry is configured in a linear value chain (*i.e.,* contents → platform → communications network → terminal → user)

However, due to the change in a mobile communication market paradigm such as the introduction of smart phones and acceleration of the 4G era, a wide range of shifts occur across enterprises and industries. Wirtz (2001) claimed that traditional value chain could be expanded to the industrial units. Similarly, Sabat and Kumar (2002) examined the configuration factors of the value chain main agents and how mobile communication industry itself is configured through a value chain model. Yang (2004) analyzed the value chain about the whole communication services under the FMC (Fixed and Mobile Convergence) environment and categorized changing patterns of value chains by character. Li and Whalley (2002) emphasized that identifying theoretical and actual factors that cause the current communication value chain and structural change in market would help to establish the strategy of participating companies. Although this value network was about identifying the

basic value creation process related to product manufacturing and services with the previous value chain, the concept was slowly expanded until it was suggested that it can be used to describe the whole industry. This concept of value network has begun to attract attention as the new method that reflects on the new flow of the changing communication market, overcomes the limitations of previous value chains, and understands the market characteristics.

In this study, the modeling work was done using a systematic method to derive the answers to the questions such as, which functions in the value chains of the mobile communications industry contribute most to profit creation, what is the key resource, what is the key activity, and what a new business model is. Specifically, in spirit of Peppard's the network value analysis (NVA), this study develops the conceptual model that can be tested on the empirical ground. In this process, the feasibility of the model was obtained using professional group interviews.

Through the range of discussions the model of the value chain proposed in this study with the collapse of the traditional structure (Walled Garden), the mobile communication industry ecosystem is evolving into an open form with the surfacing of portals and terminal production companies that secured contents, platform, marketplace, etc. More importantly, the mobile communications industry evolves into a mobile communications industry ecosystem that is led by new keystone players such as Apple and Google, and it reflects the expansion of overall industrial competitiveness in size through conversion with other businesses. Through value network reflecting the mobile communication ecosystem identified in previous studies and related professionals interviews, the value network model reflecting open mobile communication ecosystem was devolved, as shown in Figure 1.

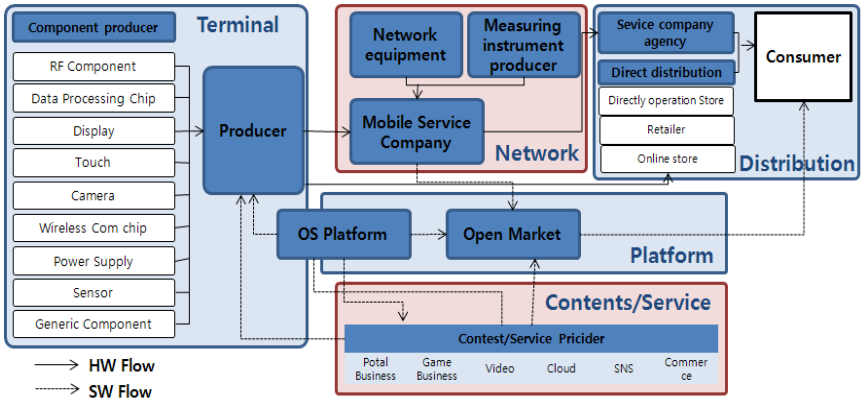

Figure 1. Open Mobile Ecosystem

2.3. Value Network Configuring Factor Identification

As discussed in the preview chapter, an analysis of the value chain of the mobile communication industry must be conducted in the form of the value network rather than in the linear form. Through this, changing roles of each participant of the mobile communication industry and interactions among them can be analyzed. In the value network suggested by this study, the participants were defined in five categories such as mobile communications service provider (network), hardware manufacturer (terminal, parts, equipment, *etc.,*) OS platform, contents provider (including applications), and customer. Since in the analysis of the mobile communication industry from the perspective of the value chains, the market participants have individual core competencies and business purpose, the organic cooperation between

these participants are required. In this respect, research on the value network should be considered to be important (Applegate, *et al.,* 2003). Based on these concepts, according to the value network implemented in the previous chapter, the influencing factors by each node (component) of each value chain was validated, and through structural model the influencing factors of each gene was validated.

It is confirmed in many studies that the method that reflects ecosystem changes in the mobile communication industry that contributes to value networks can solve structural environmental change (Astely & Van de Ven, 1993; Zammuto, 1998, Peppard & Rylander, 2006). In this study, an analysis model was reconfigured based on the system analysis framework by Van de Ven (1997) and a value network analysis methodology by Peppard & Rylander (2006) to fit the domestic situations and the industrial and contemporary situation of the mobile communications within the value chain. This study configures the research model, using the categorizations used by previous researchers mentioned above.

3. Methodologies

3.1 Hypothesis Development

3.1.1. Network Division

In the core success factor associated with the strategic choice that provides customers value, superior resources and an ability to employ exceptional strategies act as the source of competitive advantage (Day, 1997). And, in the mobile communication industries, securing competitive advantage becomes a more important strategy. Bharadwaj, Varadarajan, and Fahy (1993) conceptualized the model of competitive advantage creation that explains the causality creation level between company abilities and competitive strategies. In line with this model, similar studies stated that competitive strategy is a strategic alternative which a company pursues to improve and maintain performance through individual action in a specific market or industry (Barney, 1997).

In a similar context, Wang Baebae, Myung Gwangju (2012) claimed that network performance focused on service properties representing the level of services. Specifically, the communication service speed provided acts as the deciding factor for the competitive level of a service provider of the mobile communication network. Properties represent what customers view the nature of the product or services (*i.e.,* characteristics or description on the products or services). And one can categorize property as product related property and non-product related property by the use of the level of direct association that the function of the service or product has with properties (Wang Baebae, Myung Gwangju 2012). Thus, it is very important to acquire network level with the nature of the services for competitive advantage acquisition in the mobile communication service field through the infrastructure network of voice and data.

H 1: Network division of the mobile industry should be a significant influencing factor in expanding competitiveness of the mobile industry.

3.1.2. Contents Division

When it comes to contents division, Emma, *et al.,* (1998) presented the quality evaluation standard of information and created the valuation indicators, such as selected validity, accuracy, professionalism, uniqueness, and completeness. Similarly, Kapoun (1998) presented accuracy, professionalism, objectivity, and freshness as the evaluation standard for the web page. It can be seen that the above researchers presented a standard for evaluating

user satisfaction from the perspective of "utilization" of mobile contents. As the mobile contents industry is comprised of mobile portal, games, videos, commerce, SNS, *etc.*, (NIPA, 2012), to acquire competitiveness in this mobile contents industry, this study presents the model of six factors: accuracy, professionalism, freshness, safety, uniqueness, and playfulness.

H2: Contents division of the mobile industry should be a significant influencing factor in expanding the competitiveness of the mobile industry.

3.1.3. Terminal Division

Woo & Fock (1999) suggested factors in the mobile communication terminal market that influences customer satisfaction in the order of network quality and coverage, price, employee competency, and customer service. Jeon Sunghyeon (2012) stated that the influencing factors in repurchase intention of the smart device were five factors: user innovativeness, after service, application, device compatibility, and device performance (Rogers, 1995; Lin, 1998). According to the research by Park Jaejin, *et al.,* (2004), innovative users have an open attitude towards new technology and devices while users who are not so have a negative attitude for them. This innovativeness plays a significant role in implementing new technology in the mobile communication terminal field (Jeon Sunghyeon, 2012). Terminal characteristics include innovative characteristics that the smart device has and other various functional factors. This concept is applied to hardware specifications such as displays and memory, battery performance, and multimedia function.

Han Eoksu, Shin Yonghee, and Jung Donghyeon (2008) claimed user interface of high importance because the learning costs for terminal use increase in the process of intellectualization and merchants of the mobile communication terminals. The change in user interface in smart devices is becoming a reason for users to expand their consideration about devices. Technological correlation represents technical combination and compatibility with other products, and in the case of an innovative product, because it has system product characteristics, the compatibility and extensibility between products can be an important purchasing standard (kim Sanghun, 2004). Also according to research by Lee Myungjong (2007), technical correlation and terminal compatibility possibly affect customer satisfaction and purchasing intentions, becoming a factor in accelerating expansion of an innovative product. Bitner (1991) conceptualized that the service quality that customers feel represents a long-term horizon and overall evaluation of the services, while satisfaction is an evaluation of a unique transaction.

H 3: Terminal division of the mobile industry should be a significant influencing factor in expanding the competitiveness of the mobile industry.

3.1.4. OS Platform Division

Recently, the market for the mobile operating system is expanding its area not only to various applications and cloud services combined to tablets and smart users, but also to smart TVs and automobiles. Furthermore, the mobile operating system market is expanding to traditional household products and industrial equipments (Bae Woomi, Jung Sungjae, So Wooyoung, 2012). Therefore, the selecting the OS platform and OS openness (the affinity to an OS more often chosen) are becoming an important evaluation standard in choosing a smart device. Generally, in the mobile communication industry many companies are using platforms as a core tool to expand their ecosystem, and according to the company's values and core competencies, they choose standardization and intellectual property strategies by platform (KIPA, 2009). Apple and Google, the dominant companies on the mobile OS market,

have different strategies regarding this. In the case of Google, they have been using the Android platform strategy on open standards and open source to establish a company focused ecosystem.

On the contrary, Apple has a restrictive openness strategy where A company platform is proprietary and SDK (Software Development Kits) is distributed to its party developers to expand the ecosystem. In this situation, in the mobile OS platform industry, the level entry barrier for the OS platform content developer established by the OS supplier and the revenue distribution adequacy of contents for the specific OS platform is an important factor for choosing the OS platforms for development or usage environment (KIPA, 2009. 2). And the performance, flexibility, expandability, and function of software used on mobile communication devices depend on the OS platform (KCA, 2012). Security represents the level of importance awareness of concern about privacy and data protection (Lee Bonggyu, Kim Kiyeon, Ku Sungwan, 2008), and like wired internet it is likely to act as a variable on mobile Internet that will have significant influence on user satisfaction. This is because mobile Internet is a personal media based on personal terminals, which can always be accessed. Therefore security will act as an important consideration factor in choosing an OS platform that is installed on the device.

H 4: Terminal division of the mobile industry should be a significant influencing factor in expanding the competitiveness of the mobile industry.

3.1.5. User Division

The most representative measurement tools for service quality are SERVQUAL developed by PZB (1988), SERVPERF (only measures performance) which states that only perceived performance is valid, and according to non-difference score method, the difference must be measured rather than deduced (Lee Myungshik, 2010). Because the subjects "users" who use mobile communication services are seen as configuration factors of the mobile communication industry in value network, the influencing factors for improving competitiveness were selected from the SERVQUAL model that evaluates service quality. The SERVQUAL model, developed by PZB (1988), derives the determinants of service quality in five levels, tangibility, reliability, responsiveness, confidence, and sympathy. Each mobile communication service provider works hard to prevent their customers from the leaking into other mobile communication service providers, to maintain the current customer base, and to provide various services by attracting customers of other companies. Some previous studies claimed that among mobile service qualities, communication quality, additional service factor, device satisfaction, and corporate image played important roles in choosing the mobile communication services (Kim Heesoo, 2000; Kim Mungu, *et al.,* 2003).

According to the empirical results from these previous studies, this study suggested a conceptual model with four factors that can explain the mobile communications service competitiveness in the user division; convenience (convenience of using the service and device), responsiveness (rapid responses to customers, rational complaint delivery system *etc.*,) sympathy (immediate processing, understanding about the contents of the processing *etc.*,) and confidence (the awareness that mobile communications service/ device is essential).

H 5: User division of the mobile industry should be a significant influencing factor in expanding the competitiveness of the mobile industry.

3.2. Research Methods and Data Collection

The present study identifies that causality between variables and secures expertise and objectivity in the mobile communication industry ecosystem using professional interviews.

To measure the concept used in the research model, a strand of theoretical and empirical researches were used to create an operational definition. A pilot test was conducted to modify problems and supplement inadequacies to obtain the validity of the questions, and all the measurement items were written using the 5-point Likert scale used in most previous studies. The survey was done in 2013 December. The subjects for this empirical analysis were the experts in the mobile communication industry and corporate pool from National IT Industry Promotion Agency (NIPA). And the questionnaires were sent by electronic mail or distributed via direct interview and then collected. To increase the survey collection rates, this study included a wide range of expert pool, such as experts from companies, research labs, schools, and regulatory agencies within the mobile communication industry ecosystem. Among 529 surveys distributed, the numbers of collected data were 320, which were used in the final analysis.

4. Results

4.1. Model Testing

The confirmatory factor analysis that includes all scales by concept to verify convergent validity of items removed that single dimensionality through configuration concept validation is organized in the table below.

Table 1. R Intensive Feasibility Analysis

	X2	df	p	NFI	RFI	IFI
consistent index	256.432	249	0.000	0.720	0.374	0.613
	TLI	CFI	RMSEA	GFI	AGFI	RMR
consistent index	0.443	0.586	0.154	0.913	0.892	0.014

Looking at the model comparison index, first in the main research model the NFI (Normal Fit Index) is around 52%, showing a satisfactory number compared to the saturated model. However, the other viewpoint about NFI is an index that shows the level of inconsistency of the independent model and the saturated model, and it can be seen that the inconsistency is around 72%. RFI (Relative Fit Index) generally represents better suitability the closer it is to 1. In the case of this research model the number is 0.613, representing that the model is satisfactory. IFI (Incremental Fit Index) as well represents better suitability the closer it is to 1. It can be seen that the model is satisfactory. TLI (Tucker-Lewis Index) as well represents better suitability the closer it is to 1. And it can be seen that this research model is very satisfactory in comparison to the saturated model or the independent model. The results of the suitability index also show that there's no problem in analyzing the structural model, and the standardized loadings of the measured items that make up each factors all have shown significant numbers, representing that it has convergent validity.

4.2. Empirical Results

Looking at the relationships among configuration factors of the model, the results show that the value chain of the mobile communication industry is not a linear, but that it configures value network. In the case of terminal manufacturers, it is designed to influence the OS platform, user, and network industry. In particular, the results indicated that the influencing relation to network industry was dismissed, while it had significant influence on the OS platform and user (Path coefficient = 0.131, P value = 0.013; path coefficient = 0.190 *, P value = 0.001 path coefficient = 0.234, P value = 0.337).

Traditionally the initiatives in the mobile communication industry were focused on network (service provider). But, as the form of industry is changing into value network, a terminal manufacturer is expanding its influence to the OS Platform Company and users. Thus, it can be seen as a significant meaning in that there is no big difference between Network Service providers. Such a trend showed that the users are more and more considering the OS platform or the device itself in choosing the terminal.

The OS platform company is designed to influence contents companies and terminal manufacturers, and in the analysis results, it was shown that it had influence on terminal manufacturers (Path coefficient = 0.211, P value = 0.013). But, the influence relation that it has on content companies were dismissed (Path coefficient = 0.218 *, P value = 0.114). Although there are various OSs used in the mobile communication industry, according to ZDNet, Google Android accounts for 49.3% and Apple iOS accounts for 43.7% (in domestic markets Android 90.1%, iOS 9.6%). With the two OSs accounting for 93% of the mobile OS market (2013.4), it can be explained that they hold an initiative in the relationship with terminal manufacturers. In the relationship with contents providers that are represented by applications, the influence relations were dismissed because the oligopoly contents providers simultaneously provide applications to both parties.

The influencing relationships between network and user of contents providers were all significant (Path coefficient = 0.251 **, P value = 0.006; path coefficient = 0.257, P value = 0.0.000). This can be seen as the reality of the domestic mobile communication industry where network providers are installing app stores to acquire and maintain customers even though App store and Android market exists. The influencing relationship with network user was dismissed (Path coefficient = 0.111, P value = 0.220) and, in the view of users, the influencing relationship with network and contents provider was chosen (Path coefficient = 0.417 **, P value = 0.000; path coefficient = 0.252 *, P value = 0.027).

4.3. Developing Dynamic Model Using System Dynamics

The research process of system dynamics is based on systematic thinking and finds systematic structure between identified factors and draws a casual loop diagram. After, based on this, a dynamic analysis is conducted using simulation. This study also used this structure and flow. To follow this process, flow, and structure, the main variables were derived, a casual loop diagram was drawn, and through surveys and expert interviews, selection process of variables a flowchart was drawn. Using this in simulation a dynamic analysis was conducted. Specifically it was to establish a dynamic model to predict change and future performance that is different for each configuration unit of mobile communication industry value chain, and in this process system dynamics was used.

In this study a dynamic analysis model that has specific goals shown below was established. First, it aims to represent the interaction of reinforcement that supports continuous growth effect of industry according to mobile communication industry ecosystem evolution. Second, it is related to the competency of each company that configures mobile communication industry and it finds out the factor that limits the growth of the company. Third, it aims to reflect factors that limit growth such as market saturation to the feedback structure. Firth, it aims to aid policy decision-making to reflect the dynamic competitive situation of the company on the causal loop diagram for the evaluation of company performance.

For this the mobile communication industry ecosystem that is made of a total of four core value chain areas as suggested in the research model by SutdyII was categorized in the perspective of company and customer to model. Especially it was conducted focusing on figuring out where the weight is focused for acquisition of future competitive advantage and

continuous growth of Korean mobile communication industry. Also because the model had to be made and simulated and must have variables that reflect well the reality to aid in a company′s strategic decision-making, the study tried to obtain validity and credibility of the variables through interviews with related experts and through literature study.

In theory there is top-down method and bottom-up method in system dynamics modeling. In top-down method the flowchart, thus the model is made and then based on this the casual loop diagram is derived. Bottom-up method is where the flowchart is made based on the casual loop diagram that can identify the system through traditional method of SD modelling. The study first made a casual loop diagram using the bottom-up method and based on the advice from experts working in mobile communication industry it went through continuous supplementary processes to make the model. The casual loop diagram in this study was made by selecting mainly quantitative variables so that it could be simulated by past data to identify the objective system that can procure continuous competitiveness in mobile communication industry. Variables that are theoretically important but difficult to collect quantitative or quantifiable data for were excluded to limit intervention of subjective insights of the researchers. In other words the study tried to find out the general feedback structure that derives from mobile communication industry through diverse variables that dynamically change based on past data. The flow diagram configured through the above process is as below.

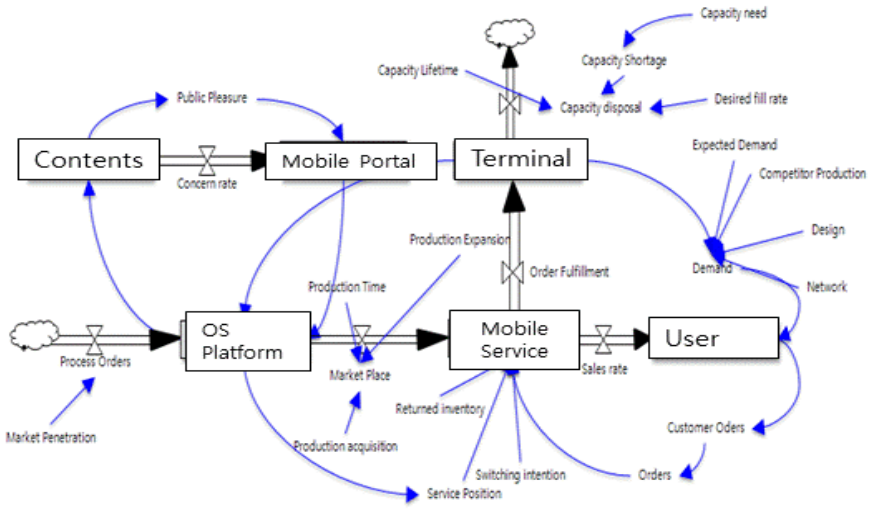

Figure 2. Stock Flow Diagram

The results of the simulation to observe the changes during hundred months based on the flow diagram configured with six level variables inserted in this study and dozens of auxiliary variables are shown in Figure 3.

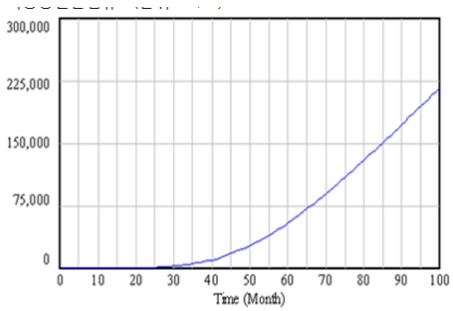

Figure 3. The Basic Model Simulation Result

Looking at it more specifically by configuration factors, it can be seen that mobile service agency or industry competitiveness repeatedly fluctuates and slowly shows a trend of decrease. This is analyzed that although under the traditional mobile communication value chain structure there was a vertical value chain form where the service provider (network operator) was focused (KISDI, 2010), with the increased importance of data focused service with the popularization of smart phones there's a trend of mobile communication industry's initiative is being transferred to platform providers or manufacturers such as Apple or SamSung.

In the case of OS platform represented by Apple's iOS and Google's Android, a relatively fast and continuous industrial growth was predicted. This is seen as the reflection of the phenomenon where the initiative of mobile communications service industry is being dispersed to platform or terminal manufacturing companies from being focused on service providers.

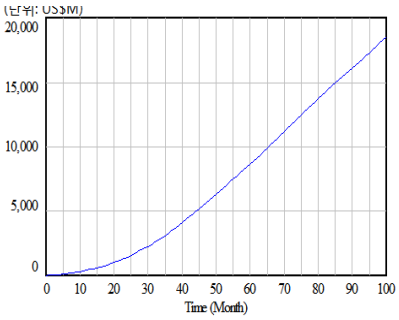

Figure 4. Network Simulation

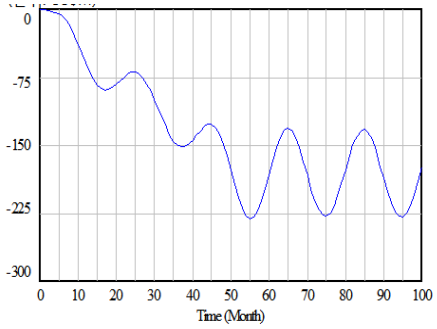

Figure 5. OS Platform Simulation

Terminal manufacturing companies where the phenomenon of industry initiative expansion is emerging with OS platform field currently still showed industry growth potential, but it is seen that when it reaches market saturation, gradually the industry size will converge to a certain level. Lastly, in the case of mobile portals, there was detection of atmosphere within the industry of long-term growth but considering that it hasn't reached the dominant level in wired internet yet, it is seen that there isn't clear direction for securing future competitiveness. However the wireless Internet entry by portal services domination wired Internet market has already begun, and seeing the trend where mobile application service through portals are gradually expanding, it is expected that the influence of mobile portal industry will gradually expand.

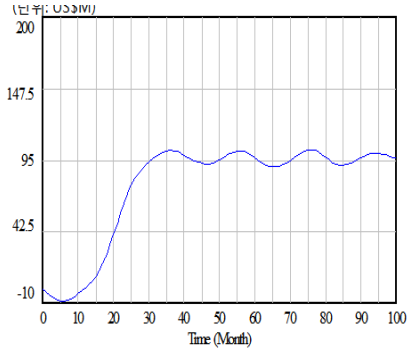

Figure 6. Terminal Simulation

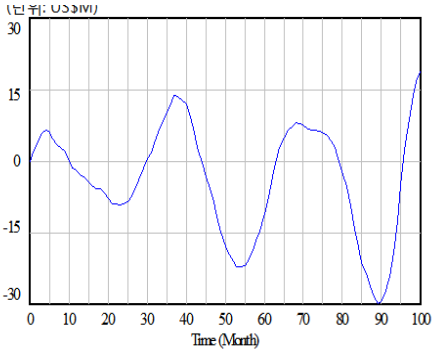

Figure 7. Contents (Mobile Portal) Simulation

5. Conclusion

This study was conducted under the qualitative perspective through surveys and interviews with experts from various participants currently in the mobile communication industry ecosystem, academic and research community, and regulatory authorities (government). Rather than suggesting advice from interviewees, this study employs objective and quantified quantitative data to explore the changing dynamics in the mobile communication industry. In the theoretical level, the importance of this study can be seen as establishing the concept of modeling the value network discussed in the mobile communication industry with an existing single dimension value chain. This study tests the empirical model to analyze the influence factors by each industry, using the regression analysis and path analysis of industrial structure. Especially, there is significance in approach to dividing into the static analysis and the dynamic analysis in that it can derive results with diversity that escapes from uniform methodology.

Looking at it from a methodological point of view, this study provided the empirical evidence for the use of system dynamics in business administration which is an applied science. Through a dynamic analysis of changes in the mobile communication industry ecosystem, the results can be utilized in various ways. Systematic thinking and empirical implementation of models with a new methodology can recover business competitiveness when it spreads to not only business administration but also to overall national policy. And it is expected that the results will serve as the foundations to establishing policies that can acquire competitive advantage.

It is expected that this study can be utilized to support strategies and policy establishment by suggesting future oriented strategic direction to the mobile communication industry or government. An analysis through a model from the perspective of the industry can differ from simulations involved in the individual company level, and there would be better chance in predicting and identifying dynamic change of individual companies if we use actual raw data from the company. Especially, presenting the value chains by global companies that are attracting attention in the mobile communication industry and comparing it to value chain structures of domestic companies or industries will be meaningful work.

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Authors

Hoon Huh, Assistant Professor / Business Administration Department. /Baek Sok Arts University. / Ph.D.

Do Han Song, Adjunct Professor / Global Business Management / HanKuk University of Foreign Studies / Ph.D.

Lee Seonghwi, Institute for Information & Communications Technology Promiton/ Management Support Department/ Deputy Director/ Ph.D.

