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## Conference Paper

# Research on open innovation strategy and its performance in Korea smart media industry: Focusing on user innovation strategy

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# **Research on open innovation strategy and its performance in Korea smart media industry**

: Focusing on user innovation strategy

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## Abstract

With the rapid development of ICT, smart society has been arrived. Smart devices also make user's role change and be powerful. In other words, user's power is stronger by smart devices in smart media industry and especially social environment like application market is catalyst for growth of user's role and power. On the other hand, it is hard for a firm to have all abilities and sources in this sudden change. Therefore, firms have to make their strategy considering user's role. For that reason, firms can use networks such as university, researcher, firm and user from the viewpoint of open innovation. I argue that users have some roles as one of the main agents in smart media industry affecting firm's strategy and performance.

*Keywords:* Open innovation, smart media industry, strategy, performance, user's role

## *1. Introduction*

In the past 10 years, the concept of open innovation has received wide attention from academics and practitioners. Chesbrough(2006) argued that open innovation was categorized by inside-out and outside-in. The concept of open innovation has been used as a strategy by enterprises. The reason that a company could not have all abilities to do their businesses and strategies in environment with developing simultaneously many technologies. Therefore, it is important for a company to have good relationship with other actors like companies. In addition, IT has been extremely developed compared to 10 years ago. That means there is a great change of environment surrounded. One of the characteristics of changed environment is technology convergence. That makes convergence of inter-industry as well as fusion of IT. People now can use some devices such as smart phone, smart TV, smart pad and smart watch. These are a surface manifestation of technology convergence. There has also been some changes in users' role through these changed environment.

## *2. Literature Review*

### *2.1 Open Innovation and Corporation Strategy*

Open Innovation is an innovation model which the internal innovation is accelerated by the diversified source-innovation from external idea and technology (Chesbrough, 2006). The internal and external resources of Corporation are technology, human resource and capital, these resources are necessary for innovation. At the view point of Open Innovation, those resources can be developed from the external implements such as M&A, joint venture, transfer and trading of technology, alliance, and direct investment (O'Conner, 2006). Thus, to

achieve the Open Innovation, it is very crucial for the Corporations and organizations to form partnership and collaboration, and Corporation exists as a part of such network (Vanhaverbeke, 2006). The individual parts of the network- Corporation, universities, and institutions –are various, and they make different quantity of values in the network. When the Closed Innovation was the mainstream, the network was not significant to the Corporations which research, develop and present products all by themselves. However, increase of the R&D(research and development) cost and venture capitals, decrease of the technology lifecycle brought the end of the Closed Innovation (Vanhaverbeke, 2006). Change of the economic environment friendly for beginning and growing of Corporations, new born Corporation with superior technology appeared. As a result, to use the new technology, cooperating with the existing Corporations in possession of technology became a significant business growing factor; and it started the age of Open Innovation. For the foregoing reasons, the correlation among various parties in Open Innovation is important, also it urge the significance of the network configuration for innovation (Simard, 2004). This signifies that the market value is not created by a single entity, but rather emphasizes that strategic management of network is necessary.

### *2.1.1 Former Studies of Analysis for Open Innovation*

Chesbrough(2006) emphasized Inside-Out while arguing the paradigm of Open Innovation. Open Innovation is about the creation of a new market by presenting the new technology from inside to the outside and increase the technology. In this case, it exists as licensing, technology trading, spin-off, platform releasing. However, the internet based society is accelerating the Outside-In. The Outside-In system includes technology trading, joint research,

venture investment, R&D, and user innovation. In the strategic frame of Open Innovation, the corporations manages entire process of R&D and commercialization in different subject such as cooperation with industry, cooperation with university, licensing, spin-off , venture investment, and user innovation.

Nieto and Santamaria(2007) studied the effects of the cooperation for R&D on Technology Innovation High-Low among Spanish manufacturing companies. In this study, the objects of cooperation are institute, client, supplier, and competitor. The study shows that in the high innovated cases, the supplier, client, and institute contribute to innovation in order; and competitor had  $-\beta$ , so it has negative correlation with innovation. Moreover, regardless of the high or low innovation, using multiple cooperators affects positive correlation.

### *2.1.2 Importance of Corporation Strategy in the view of Open Innovation*

Inside-out is important for the Corporation performance in terms of using the internal sources for outside. In addition, internet based knowledge society's environmental changes and industry's needs extend the viewpoint of Open Innovation; and it is related with Outside-in. The lifecycle of products and services have been shorten. Hence, it is getting harder for single corporation have whole package of capacity; even single corporation has entire capability for product or service from developing to extending process, taking the uncertainty is more difficult. In rapidly changing and innovating high tech industry, it requires a huge cost to find and hold technical competency. However, because of its high uncertainty, it is challengeable for a corporation controlling the entire process (Cohen & Levinthal, 1990). Thus, at the viewpoint of Outside-in innovation, strategic alliance is one of corporations' options, through the correlation, corporations reduce the cost and uncertainty while gaining

new technology. Strategic alliance is about co-development, share, and exchange of product, technology or service among corporations (Gulati and Singh,, 1998). It shows characteristic of network, and numbers of correlation is related with the result of innovation (Ahuja, 2000). As mentioned above, corporations weight users to supplement the sources and capability for reducing uncertainty as well as existing Outside-in innovation such as inter corporations, corporations with academy, and inter institutes. Users can replace or complement the corporations' sources and capability; so corporations shall understand users' value as the subject of network and use it wisely.

## *2.2 Open Innovation Strategy in Smart Era*

IT technology based Smart era causes other environmental changes beyond the changes early mentioned. First, in the Smart society, existing vertical correlation changes to horizontal correlation by Technology convergence phenomenon. Fransman(2009) mentioned the new ICT environment about Hardware, Contents and Software, Network Corporations, and Customers make industry and those objects rely on each other more closely compare to the other industries of the past. This series of changes brought changes of ordinary people's life style. The smart devices, the fruitage of IT technology's development, is the entrance of Smart Society. Especially smart phone brought change of contents spread method, service improvement, and technology. In other word, combination of device, service, and contents spreads media service and influenced the entire related industries; and there is significant role of the end users who actually use the smart devices. User meant the end user before, but in the Smart Era, user includes person, organization, and each person's social position who get advantages from using products and services. As a result, Smart Era extends users' role and

users play stronger role in Smart Era.

### *2.2.1 User role in the view point of Open Innovation*

Users can use hardware and software easily than ever. As a result, users' strengthened ability makes the innovation by users easier, and developing technology lowers the user's cost of involving into the innovation. Moreover, the internet based communities make sharing of opinion, information, device among personal users possible; and corporations cooperated with it because they understand the value of them. (Bunt and WestlakeStian, 2010). The users of Smart Era, are getting active and taking the main role for innovation. Thus, the user's role are being clearer and wider and making influence since the Smart Era began. Von Hippel(2002) explained the innovation of Information Era as the beginning of new innovation subject by the concept of user innovation. Also, the studies about the users as innovation object have been widen to dynamics of industry, entrepreneurship, innovation community, measurement, and policy. However, user involvement in innovation does not mean that one more factor for innovation is occurred. User innovation means improving or developing the product or service to solve problems and meet the user needs while using the existing product or service. (Von Hippel, 2004).

User has beta tester role to adjust innovation standard before the product released (Morrison et al., 2000). This feedback makes the product or service require the customer's needs and reduce the uncertainty of demand. In that reason, corporation could forecast and stabilize the demand of product or service. Rogers(1995) named this user's role as Early Adopter, and the Early Adopter influence the majority of early and late period. It is strengthened in connectivity and reciprocity are emphasized environment. Corporations fill

the deficiency through convention because they do not have the whole resources and capability from the development stage to diffusion stage of product of service.

In the viewpoint of user innovation, Von Hippel(1998) also claimed another user called Lead User. Users participate not only passively reflecting their needs, but actively reflecting their needs involving in R&D process or ideation process. Corporations use this advantage to build up their resources and capability, and it would be positive impact to the business performance.

### *2.2.2 Open Innovation Strategy and User role*

He and Wong(2004) separated utilizing innovation strategy and explore innovation strategy as part of a strategy affecting business performance. The simultaneous pursuit of utilization and exploration contribute to growing of average sales, and utilizing innovation strategy and explore innovation strategy have positive effects to product innovation intensity. Also, utilizing innovation strategy has positive effects to process innovation intensity. They separated corporations in groups of using both utilizing and explore innovation, using utilizing innovation, using explore innovation, and the others for analysing ANOVA analysis. In the result, the performance differences among the using explore innvation group is higher than the groups of using both innovation and using utilizing innovation. On the other hand, the performance difference of using both innovation group is lower than other groups.

Rothaermel and Deeds(2004) thought the utilization and explore as corporations corelation in Bio industry. They defined the basic and drug research stages as explore process and commercializing stage as utilization and each process as cycle of one product. Then they suggested integrated product process by factor analysis as following, explore innvation first,



product developing, utilization innovation, commercialization.

Yamakawa et al.(2011) studied the how the weight of utilization and explore influence ROA in the viewpoint of alliance portfolio. They considered the age of corporation, strategy choice, growth of industry as controlled variable.

In this research, He and Wong's work is taken to study existing strategies influencing business performance, considering the correlation of the performance with utilization and explore in corporation level as the strategy. Furthermore, considering industrial specificity, reflect the user role as network object and measure how the strengthened and changed user role impact the performance. Likewise, other exogenous variables, which possibly influence the correlation between performance and utilization innovation and explore innovation strategy and user role should be controlled to estimate the effect properly. Therefore, this research studied corporation's internal environment, age of corporation (Yamakawa et al., 2011) and concentration of R&D (Blonigen and Tylor, 2000) and external environment, market structure (Levin et al., 1985).

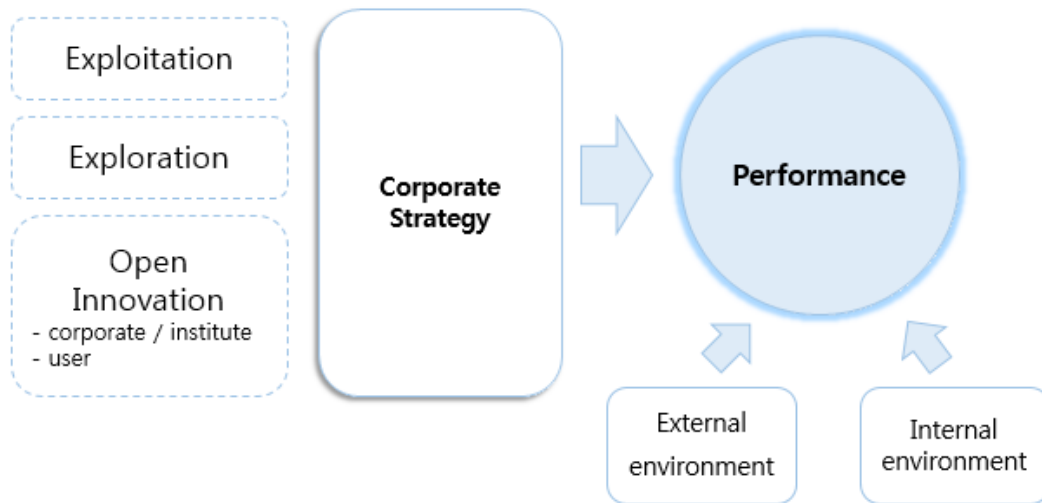
### *3. Research Model and Methodology*

#### *3.1 Research Model*

This research is going to study the influence of each utilization and explore strategy to business performance for analyzing corporation strategy; and the effect of user role to business performance.

For appropriate measuring the effect, other variables from corporation strategy, age of corporation, R&D concentration, and market structure are considered. The Figure 1 is

summary of research model of this research.



[Figure 1] Research Model

### 3.2 Hypothesis

#### 3.2.1 Correlation of performance and Corporation Age

Corporation Age is an important indicator showing the corporation's accumulated resources and capability; therefore, corporation age has significant role in the corporation strategy and performance (Hansen et al., 1983). Startup corporations have not enough resources and capability; and it is accumulated the corporation matured. However, startup corporations can pull the resources and capability, capital, marketing, spread from other corporations (Sørensen and Stuart, 2000). Yamakawa et al.(2011) addressed the correlation between corporation's cooperation of utilization and explore and the corporation age influence the performance.

[Hypothesis 1] As mature as the corporation in Smart Media industry, the performance would get improved.

### *3.2.2 Correlation of performance and Market structure*

Most of research studying the correlation of corporation's oligopoly or monopoly with performance uses market concentration ratio for representative variable of market structure. HHI is a helpful indicator to measure the market concentration ratio and the monopolism of the market. Levin et al.(1985) said that the corporation's innovative activity makes inversed U correlation with market concentration. HHI is an accurate method of measuring market concentration.

[Hypothesis 2] Closer to the monopoly market in Smart Media industry, the performance would get improved.

### *3.2.3 Correlation of performance and R&D*

R&D concentration shows the corporation's R&D status. The value of the total R&D expense divided by sales is R&D concentration ratio (Osborn and Baughn, 1990). This research measured the value with the expense and sales in 3 years. If R&D concentration ratio is high, the possibility of obtaining technology and innovation resource increase and it has positive effect on business performance (Blonigen and Tylor, 2000).

[Hypothesis 3] Higher R&D concentration ratio in Smart Media industry, the performance would get improved.

### *3.2.4 Correlation of performance and Utilization Strategy*

Licensing, improved product or service, marketing cooperation are claimed as utilization

strategy factors in existing studies. Utilization is the subjects having purpose of signing contract for using and increasing efficiency including license agreement and marketing agreement(Koza and Lewin, 1998). Also, He and Wong(2004) categorized improved product and service to utilization strategy and addressed that improved product and service positive correlated with business performance. Effect of marketing convention will be increased by various environment, application market, SNS marketing, and social commerce in Smart Media industry. The first product of market spread rapidly.

[Hypothesis 4-1] With more license sales, the performance would get improved.

[Hypothesis 4-2] With more product or service improvement, the performance would get improved.

[Hypothesis 4-3] With more utilizing of marketing convention, the performance would get improved.

### *3.2.5 Correlation of performance and Explore Strategy*

Patent or copyrights application, the first product or service in market, and R&D agreement are claimed as explore strategy factors in existing studies. Bierly and Daly(2007) addressed that explore is related with new idea as patent and copyrights. On the other hand, the first product or service is categorized as explore strategy(He and Wong, 2004). Koza and Lewin(1998) extended the definition of strategic correlation. They defined the subjects having purpose of searching and developing new technology such as research, R&D agreement, and

technical agreement exploratory. Yamakawa et al.(2011) assumed that if explore ratio is high in fast growing industry, it positively affects on corporation performance. Therefore, corporations can make great performance by sustaining explore strategy because the Smart Media industry is fast growing and the lifecycle of its product is short.

[Hypothesis 5-1] With more applying of patent or copyrights, the performance would get improved.

[Hypothesis 5-2] With more releasing of the first product of the market, the performance would get improved.

[Hypothesis 5-3] With more using of R&D agreement, the performance would get improved.

### *3.2.6 Correlation of performance with User role*

The past researches defined user role extending and creating with the industry environment changes. Lettl(2007) claimed that user plays co-developer's role and this user's role helps the project through studying 5 radical innovation projects in medical technology field. Also, Lettl defined user as beta tester pool of product who gives feedback.

Von Hippel(2003) did a research about efficiency and effectiveness by leading user using innovation. User contributing development process lengthen the product lifetime and increases the sales(Jeppesen and Molin, 2003). User's role of feedback reflect customer's needs before the product and service is released, and it reduces the uncertainty of demands.

In that reason, corporation could forecast and stabilize the demand of product or service.  
(Morrison et al., 2000).

[Hypothesis 6] User role may influence positively to corporation performance.

[Hypothesis 6-1] Leading user role may influence positively to corporation performance.

[Hypothesis 6-2] Early adopter role may influence positively to corporation performance.

[Hypothesis 6-3] Feedback provider role may influence positively to corporation performance.

### *3.3 Methodology*

#### *3.3.1 Data Collection*

This research is based on the data from 2008 to 2010 of Smart Media Convergence Research Policy Center's survey about domestic smart media industry related corporations. The sample corporations are selected from the list of contents, hardware, software, and network service corporations from Korea Creative Content Agency.

118 corporations including 7 network service providers are selected. Network service providers are eliminated because the samples are too small to be representative. Among 111 data, except Missing data, 107 samples are fixed as the final data and use STATA 11.0 package for analysis.

#### *3.3.2 Empirical Modelling*

To measure the study, this research used following model.

Model I .

$$\begin{aligned} \text{ASGR} = & a1 * \text{AGE} + a3 * \text{RDINT} + a3 \text{HHI} + a4 * \text{PC} + a5 * \text{MARF} + a6 * \text{RDAL} \\ & + a7 * \text{LIC} + a8 * \text{IMPS} + a9 * \text{MARAL} \\ & + a10 * \text{USERTT} + \text{Constant} + \text{Error} \end{aligned}$$

Model II.

$$\begin{aligned} \text{ASGR} = & a1 * \text{AGE} + a3 * \text{RDINT} + a3 \text{HHI} + a4 * \text{PC} + a5 * \text{MARF} + a6 * \text{RDAL} \\ & + a7 * \text{LIC} + a8 * \text{IMPS} + a9 * \text{MARAL} \\ & + a10 * \text{USERRD} + a11 * \text{USERFD} + a12 \text{USEREA} + \text{Constant} + \text{Error} \end{aligned}$$

[Figure 2] Empirical Modeling

Two different models are used for analysis in this research. User role is set as one scale with Model I and putted on the survey separately. User role is subdivided with Model II to show how each role contribute to the performance.

### *3.4 Definition of the Variable*

#### *3.4.1 Dependent Variable*

As mentioned above, to study corporation performance, this research uses 3 years' average sales growth as the dependent variable. Survey shows the average time of product or service from ideation stage to production and sales taking less than 3 years in 94.8%. Also, it shows Korean Smart Media industry's short project time period. Therefore, 3 years of average sales

growth is appropriate.

### *3.4.2 Independent Variable*

Utilization and explore are general and broad conception. Therefore, adopting the existing corporation strategies to fix these two conception for utilization strategy and explore strategy. Variables are set through the past researches and studies. First, about the variables of utilization strategy, March(1991) classified license sales and marketing agreement as utilization because license sales is utilizing supplemental knowledge and resource and marketing agreement is signing convention for utilizing. In case of improved product or service, He and Wong(2004) classified quality improvement related to Process Innovation as utilization. To measure these three variables, target corporations were asked quantity of license sales, marketing agreement signing, and improved products or services at the survey.

Koza and Lewin(1998) stated that convention among subjects for new technological R&D such as R&D agreement, technical agreement, and etc. is explore. Bierly and Daly(2007) classified patent and copyrights as explore; also, He and Wong(2004) categorized improved product or service as explore innovation strategy. To measure these three variables, target corporations were asked quantity patent and copyrights, the first product or service at the market, and R&D convention signing at the survey.

User role is defined following the past researches mentioned above. Fransman(2009) claimed strengthened or newly created user role. The first example is user's feedback role. Users react to the certain product or service especially as beta testing user of new products in ICT system. (Morrison et al., 2000). Secondly, users who actively get involved in co-R&D process are contents provider in smart media industry (Fransman, 2007). Von Hippel(1998)



named those users the Leading User. The third user's role is sharing and providing information and knowledge. They are defined early adopters who give information and knowledge to the majority users of early and last period. These roles were explained in the survey and found out whether corporations were using these roles as strategy or were these roles affected on business revenue. Participates could evaluate the user's role by five point from zero to four.

### 3.4.3 Control Variable

Except utilization strategy, explore strategy, and user role, there are other factors influence on corporation performance, age of corporation, R&D concentration, and HHI, the market concentration. This research uses the survey to define the age of corporation from its founding year to the year. R&D concentration is calculated based on the survey about R&D expenses and sales. Furthermore, to calculate the market concentration, market structure research report from Fair Trade Commission Republic of Korea and the trend report from Korea Creative Content Agency are referred. Above variables are followed at Table 1.

Type	Variables		Explanation	Source of variables
Depended variable	Performance	ASGR	Average of growth rate for 3 years	Powell(1995) He and Wong(2004)
Independent variable	Exploitation	LIC	Number of licenses for sale	March(1991)
		MARAL	Number of marketing agreement	March(1991) Kyriakopoulos and Moorman(2004)

	Exploration	IMPS	Improvement of product or product line	He & Wong(2004)
		PC	Number of patent/ copyright	Rene et al.(2010)
		RDAL	Number of R&D agreement	Rothaermel & Deed(2004)
		MARF	Number of market first product/ service	He & Wong(2004)
	User's role (USERTT)	USERRD	Lead user	Von Hippel(2005)
		USEREA	Early adopter	Rogers(1995)
		USERFD	Feedback provider	Von Hippel(1998)
Control variable	Firm age	AGE	Counting the years from its foundation	Paul et al.(2007) Yamakawa et al. (2011)
	R&D activity	RDINT	R&D intensity R&D expenditure/ total sales x 100	Shefer and Frenkel(2004) Blonigen and Tylor (2000)
	Concentration ratio	HHI	Herfindahl-hirschman index	Levin et al.(1985)

[Table 1] Summary of variables

#### 4. Result and Interpretation of Empirical Analysis

##### 4.1 Analysis of Basic statistics and Correlation Coefficient

	Min.	Max	Avg.	Std.	Siz.
ASGR	-48.33	352.12	27.8	55.06	107
RDINT	0	112.53	20.58	24.72	107
AGE	0	41	11.1	6.85	107
HHI	188	7647	2572	1753.93	107

[Table 2] Basic Statistics

[Table2] shows the basic statistics of variables used in this research. The variables of corporation strategy and user role are omitted for basic statistics because the value 0 and 1 shows availability. The average AGE of corporation is 11.1 years and it is younger than other industry's average ages.

The difference between maximum and minimum HHI intends difference of various industry's market concentration at Smart Media industry.

On the other hand, table 3 shows correlation of variables, inferring certain variables have significant correlation. The range of correlation coefficient is from -0.337 to 0.323; and STATA's robust option is used to accurate estimation.

	HHI	RDINT	AGE	RDAL	PC	MARF	LIC	IMPS	MARAL	USERTT	USERRD	USERFD	USEREA
HHI	1												
RDINT	.172	1											
AGE	-.203*	-.337**	1										
RDAL	-.011	-.025	-.112	1									
PC	.043	.114	-.051	.044	1								
MARF	-.072	.191	-.098	.162	.266**	1							
LIC	.109	-.009	.111	.093	.214*	.011	1						
IMPS	-.09	-.083	.305**	.041	-.011	.137	.007	1					
MARAL	-.033	.005	-.066	.160	-.102	.054	.247*	-.05	1				
USERTT	.100	-.008	-.052	.323**	.044	.035	.208*	-.003	.082	1			
USERRD	.020	-.117	.115	.319**	.135	.015	.258**	.055	.224*	.039**	1		
USERFD	-.005	-.07	.033	.326**	-.166	.051	.060	.052	.214*	.122	.272**	1	
USEREA	-.015	.020	.06	.264**	-.008	.138	.035	.016	.17	.485**	.213*	.355**	1

\*p<0.10, \*\*p<0.05

[Table 3] Correlation Analysis

## 4.2 Result of Empirical Analysis

Var	Step I		Step II	
	Coef.	std.err	Coef.	std.err
RDINT	0.508*	0.296	0.472*	0.281
AGE	-0.761	0.661	-0.992	0.653
HHI	-0.011	0.002	-0.017	0.002
RDAL	-0.116	10.003	2.195	9.5
PC	-25.915**	9.448	-33.23***	9.462
MARF	19.399**	6.47	19.594***	5.771
LIC	21.481*	10.394	22.006**	9.667
IMPS	-0.068	0.091	-0.072	0.09
MARAL	-1.831	10.41	-3.804	10.194
USERTT	3.464*	2.025		
USERRD			18.869**	9.466
USERFD			-29.108**	10.14
USEREA			17.177**	8.585
R-squared	0.3746		0.4423	

[Table 4] Regression Analysis result

[Table 4] shows regression analysis result of performance determination factor of Smart Media corporation as set in chapter 3. All target corporations of the survey are set for sample to verify hypothesis by regression analysis according to the using status of utilization strategy, explore strategy and user role.

## 4.3 Verification and Interpretation for Hypothesis

### 4.3.1 Correlation of performance with Inside and Outside Sources

First of all, the external factor, market concentration is confirmed that not having

meaningful correlation with corporation performance; and that overruled the Hypothesis 2. The cause is inferred that Smart Media industry is configured with each layers, hardware, contents, software, and network corporations; so each layers have different market concentration. On the other hand, it is identified that the internal factor does not correlated with corporation performance. However, R&D concentration has positive correlation, valued 0.472, supporting the Hypothesis 3. As the past research claimed, it is proved that R&D concentration improve the technology innovation performance.

#### *4.3.2 Correlation of performance with Corporation Strategy*

[Table 4], Step 2 expresses the correlation of innovation strategy and performance is different with each strategy in Smart Media industry.

In explore strategy, patent and copyrights has negative correlation and first product in market has positive correlation. This result supports the Hypothesis 5-1 and 5-2. License sales, categorized in utilization strategy, is inside-out and open innovation increasing corporation profit through using internal resources to outside. The Analysis value is 22.006, supporting the Hypothesis 4-1 and showing positive correlation with performance. It infers that industry's characteristic, shortened innovation and product cycle, and contents and software are immediately effective in corporation performance. As Chesbrough(2006) claimed first, inside-out innovation is helpful to performance.

#### *4.3.3 Correlation of performance with User role*

As a result of empirical analysis, integrated user role and separated user role have correlation with performance. This result supports Hypothesis 6 and Step2 supports

Hypothesis 6-1 and 6-2. Leading user role improves corporation performance as mentioned earlier. Furthermore, early acceptor influence the majority of early and late period by extending the product and service to the majority and it positively influence to performance.

## *5. Conclusion*

### *5.1 Implication*

In the holistic view point, the user role positively influences corporation performance. However, when separately studying the user role, each role influences the performance differently.

First, the leading user has positive correlation with performance of the corporation. User innovation expanded the diversity in the products by replacing the corporation's role which could not be realized because of limits in the economy. Mass-production emerged to satisfy the diverse and capricious customer's needs, whereas the modern customers expect customized product or service to suit their needs at the cost of extra expenses. Therefore, when user innovation is adopted and extended to customers, the diversity of product would increase without depending solely on corporations. In this regard, leading user role reveals its purpose in the Smart Media industry. The emergence of smart society allows an environment that the users can be directly involved in the development. User toolkit makes user friendly environment which helps individual user to innovate (Thomke and von Hippel, 2003; von Hippel and Katz, 2002) and broadens the freedom of users to perform user innovation. Also, the positive correlation of early adapter's role and corporation performance is confirmed. Contents and software possess characteristics of information; through its usage and evaluation,

the reliability is tested, which leads to the immediate feedback to the product and service.

One of the user's roles, feedback provider, has negative correlation with corporation performance. Since the past, understanding and analyzing customer's need and predicting the demand have been responsibility of corporation; and corporations utilized the responsibility to develop, produce, and sell new products (Shah, 2000). In other word, when corporations reflect user's feedback, corporations must also consider the quality of users. Furthermore, in some cases, products failed to meet customer's needs although customer's needs were reflected at the product planning level because the customer's needs keep changing (Dahan and Hauser, 2001). This is the characteristic of information resource, short product lifecycle, fast developing timeframe making hard to predict the customer's needs and moment of market release.

As discussed above, user's role have influenced corporation's performance; the corporation must understand and utilize the user role in performance of their strategies. The resources and capabilities of the user and corporation are complementary, not competitive (Henkel and Von Hippel, 2005). Therefore, corporations can replace or supplement the deficient resources and capability by utilizing user's role.

On that reason, the first significance of this research is the analysis of effective factors on corporation performance in a newly developed yet unexplored Smart Media industry. Secondly, this research adds in the changing roles of the users in the smart media industry to the analysis, and shows that such changes are used to replace or supplement the company strategies, unlike the existing model of research and innovation which only focused on one role of users. Therefore, the user innovation has potential to replace the development of the product, R&D, and dissemination stage. In the changing environment, the user's role



presents a new perspective to the company strategy by replacing and assisting the resources and abilities.

### *5.2 Limitation and future research*

The limit of this research's analysis is that there are only few former researches in segmented user roles. Also, this research does not collect the accurate sample corporations because the survey barely includes network service providing corporations.

In the future research, technology convergence phenomenon and horizontal changing of layers in Smart Media industry samples will be studied. Furthermore, searching and selecting objective indicator about user role will clearly prove the influence of user role. It will expand the range of this research and make deeper analysis about Smart Media industry.

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