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Factors Affecting Open Innovation Performance of Korean Content Company: Focus on Alliance Strategy and Intellectual Property Management Capacity

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This paper analyzes the factors affecting open innovation performance in the Korean Contents industry, with a focus on alliance strategy and intellectual property (IP) management capacity, by applying multiple regression models with data collected from 89 companies. The results showed that the technological alliance of a content company has a statistically significant impact on its innovation performance. IP management capacity also showed a positive influence on an innovation performance of content companies. This study suggests that content companies need to build up technological alliance with multiple external sources and their IP management capacity in order to maximize their open innovation performance.

Keywords: Open innovation, Alliance strategy, Intellectual property Management capacity, Contents industry

Introduction

The open innovation paradigm promises that companies can achieve large incomes through innovation activities and the resulting intellectual property (IP) management. The paradigm also emphasizes the importance of using multiple sources for the company's innovation activities in order to enhance corporate competitiveness and maximize corporate value. The contents industry is a key example of open innovation, characterized by horizontal relationship between industries through collaborative innovation, and the maximization of innovation values through external alliance. As users are changing from being consumer to prosumer, alliance with users becomes increasingly important to innovation. In addition, innovation outcome management has become an important challenge in enhancing competitiveness and maximizing value. There have been many theoretical discussions on this topic, but only a few researches has ever given a solid proof of the contents industry's innovativeness in relation to open innovation. This paper would thus attempt to analyze the factors affecting open innovation performance in the Korean contents industry, through applying model with data collected from 89 companies. This paper is organized as follows. The second section will introduce.

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Methodology

Galende and Fuente[1] have classified the factors affecting technological innovation into tangible, intangible and strategy. This paper used size and age of company, ratio of R&D investment and market concentration as tangible factor, and size of IP management staff, number of tasks of IP management staff, existence of internal training program, and compensation scheme as intangible factors, and number of alliance with firm, government, university, and user as cooperate strategy.

Alliance strategy

Laursen and Slater[2] showed that more the company searches and exploits external information, greater the effect the company may gain from technological innovation. Hwang *et al.* proposed that the size of the technology alliance and interaction between affiliated companies have positive influence in technological innovation and satisfaction rate of technology alliance. Faems *et al.*[3] distinguished types of alliance as exploitation and exploration and reported that these alliances separately influence product innovation.

Previous studies examining the relationship between alliance targets and innovation performances are divided into universities, companies, governments, and users .

In this study, we propose the following hypothesis in order to prove the relationship between alliance strategy and innovation performance.

Hypothesis 1: The more external alliance the company has, the more innovation performance the company will have.
Hypothesis 1-1: The more alliance with other companies the company has, the more innovation performance the company will have.
Hypothesis 1-2: The more alliance with the government the company has, the more innovation performance the company will have.
Hypothesis 1-3: The more alliance with the universities the company has, the more innovation performance the company will have.
Hypothesis 1-4: The more alliance with the user the company has, the more innovation performance the company will have.

Intangible Factor (IP Management) can be classified into two types: human capital and internal structural capital. Kim *et al*[4]. defined human capital as containing human beings with economically valuable knowledge. They also argue that knowledge can be accumulated through education and training. Chen and Lin[5] argue that human capital is a source of structural capital that can be used as an important tool for generating organizational profits, such as individual knowledge, skills, attitudes and creativity. They also argued that human capital contributes to creating an innovative environment in the new product development process. Lucas[6] suggested that investment in human capital generates externalities for improvement in productivity and overall economic growth. Therefore, companies should pay more attention to the systematic management of human capital and internal structural capital to boost accumulation of intellectual assets and innovation. Therefore, we propose the following hypotheses to test the relationship between an IP management capacity and innovation performance:

Hypothesis 2: The more IP management capacity the company has, the more innovation performance the company will have.
Hypothesis 2-1: The more IP management staff the company has, the more innovation performance the company will have.
Hypothesis 2-2: The more tasks of IP management staff the company has, the more innovation performance the company will have.
Hypothesis 2-3: Company with an internal IP management training program will have better innovation performance.
Hypothesis 2-4: Company with a compensation scheme for IP outcome will have better innovation performance.

In this study, we used four control variables as tangible factors affecting innovation performance based on previous literatures: age of company[7-10], size of company[11, 12], R&D investment ratio[13-16] and market structure.

Data

We received 89 responses to our survey out of the 558 contents company KOCCA (Korea Creative Content Agency), KoDiMA (Korea Digital Media Industry Association), KAOGI (Korea Association of Game Industry), NCIA (Next generation Convergence Contents Industry Association), NIPA (National IT Industry Promotion Agency), and KOSA (Korea Software Industry Association). The questionnaire, based on the Oslo Manual (OECD, 1996), consisted of two parts: the company's current situation and its innovation activity.

Empirical Model

We employed the following multiple regression models to analyze the effect of the independent variables on the innovation performances (i.e., new product and improved product).

$$INNOV_i = exp(a_1*AGE + a_2*SIZE + a_3*R\&D + a_4*HHI + a_6*IP\_SIZE + a_7*IP\_DUTY + a_8*IP\_EDU + a_9*IP\_COMP + a_{10}*ALL\_GOV + a_{11}*ALL\_COMP + a_{12}*ALL\_UNI + a_{13}*ALL\_USER + u_i) \quad \ldots (1)$$

Variables

For dependent variables, we divided innovation outcomes into new and improved product innovation as outlined in the Oslo Manual [16].A total of 14

Table1 ― Summary of variables

Categories	Variables	Descriptions
Dependent variables	[NEW]	Average number of noticeably distinct from existing product
	[IMP]	Average number of noticeably different from existing product
Independent variables	[AGE]	Age of company
	[SIZE]	Average revenue of company
	[R&D]	Average ratio of R&D expenditure relative to the company's total expenditure
	[HHI]	Market concentration ratio
	[IP_TOTAL]	Size of IP management
	[IP_SIZE]	Average number of IP management staff
	[IP_DUTY]	Average number of tasks for IP management staff
	[IP_EDU]	Whether or not the company has an internal IP training program
	[IP_COMP]	Whether the company has an operational compensation scheme or not
	[ALL_TOTAL]	Total average number of the external alliance
	[ALL_GOV]	Average number of alliances with government
	[ALL _COM]	Average number of alliances with company
	[ALL _UNI]	Average number of alliances with university
	[ALL _USER]	Average number of alliances with user

Table2 ― Empirical results

	New product Innovation				Improved product Innovation			
	Model 1		Model 2		Model 1		Model 2	
	Estimate	P value	Estimate	P value	Estimate	P value	Estimate	P value
Alliance var.								
ALL_TOTAL	.112*	0.096			.551*	0.068		
ALL_COM			.887*	0.065			.966*	0.493
ALL_GOV			.096*	0.087			.551	0.780
ALL_UNI			.301	0.424			.145	0.832
ALL_USER			1.128**	0.045			1.247**	0.005
IP var.								
IP_TOTAL			.825*	0.092			.553*	0.065
IP_SIZE	.144	0.370			.045*	0.057		
IP_DUTY	.085*	0.065			.110	0.990		
IP_EDU	.070*	0.080			-.002	0.955		
IP_COMP	.778*	0.665			.755	0.314		
Control var.								
AGE	.352	0.790	.370	0.884	.240	0.320	.175	0.231
SIZE	.112	0.850	.132	0.782	.240*	0.084	.043*	0.072
HHI	1.320	0.488	1.113	0.460	1.380	0.880	1.884	0.728
R&D	.390*	0.077	.330*	0.088	.220*	0.068	.119*	0.075

*0.1 significance; **0.05 significance; *** 0.01 significance

independent variables were used. For AGE, we used the actual age of company in 2015 as a variable by subtracting the year it began from 2015. As we used data collected from January 2013 to December 2015, companies found after 2013 were excluded from our list. For SIZE, we used average revenue of company from 2013 to 2015. R&D was expressed in average ratio of R&D expenditure to the total expenditures of a company from 2013 to 2015. The variable HHI (Herfindahl–Hirschman Index) represents the monopolistic environment of the market. Regarding IP management capability, we used 5 variables. For

IP_SIZE and IP_DUTY, we used average number of IP management staff and average number of tasks for IP management staff from 2013 to 2015. IP_EDU and IP_COMP have a binary value (0 or 1) depending on whether each component exists. IP_SIZE represents the number of IP management components from 0 to 4.The subordinate alliance variables average number of alliance with external alliance partners (government, university, company, and user). ALL_TOTAL represents the total average number of alliance partners. (Table 1).

Results

New Product Innovation

When examining the new product innovation, ALL_TOTAL, IP_TOTAL, and R&D had a proportional relationship with innovation performance, while SIZE, AGE, and HHI were statistically insignificant validating Hypotheses 1, 2. When alliance was further divided into four elements, we found that ALL_COM, ALL_GOV, and ALL_USER had a proportional relationship with new product innovation, validating hypotheses 1-1, 1-2, and 1-4 while ALL_UNI had no statistically meaningful relationship, invalidating hypotheses 1-3.

Improved Product Innovation

When looking at improved product innovation, ALL_TOTAL, IP_TOTAL, and R&D all had a positive effect on innovation performance, validating hypotheses 1, 2. SIZE also was shown to have a statistically significant effect on innovation performance. AGE and HHI, were shown to be insignificant in regard to innovation performance. When considering alliance, ALL_COM and ALL_USER had a proportional effect on improved product, as they did for new product innovation, while other alliances were found to have an insignificant relationship with improved product, validating hypotheses 1-1 and 1-4 but invalidating hypotheses 1-2 and 1-3.

Conclusion

This study of the Korean contents industry has found that external alliance, regardless of innovation type, have a positive effect on innovation performance, a finding consistent with Laursen and Salter[2]. This suggests that external alliance is vital to contents companies' innovation performance and that firms in the Korean contents industry must expedite their innovation by alliance with external partners. While dividing alliances into four different types, alliance with users showed a positive effect on innovation performance in both cases. This, supported by the result of von Hippel[17], reveals the importance of user involvement to innovation performance. ALL_COM had a positive effect on innovation performance, indicating that external alliance is an important factor in a company's innovation performance, along with user alliance. ALL_GOV was shown to have a positive effect on new product innovation, while ALL_UNI had no statistically meaningful effect in both cases. IP_TOTAL had a positive effect on all innovation performance, suggesting that a company with a higher IP_TOTAL has a higher chance of succeeding in its innovation performance. When IP_TOTAL was divided into four categories, it was shown to yield different results: IP_DUTY had a noticeable relationship with new product innovation, confirming that the number of tasks for IP-dedicated staff has an important influence on firm's new product innovation. Additionally, IP_SIZE had a statistically meaningful relationship with improved product innovation. IP_EDU had a statistically significant relationship only with the new product innovation. It means companies with internal IP training programs will have a higher chance of creating new product innovation. Finally, IP_COMP had a positive influence on new product innovation. SIZE showed significant relationship only with improved product innovation, indicating that bigger companies are more likely to create improved product innovation than are smaller companies, supporting the result of the study by Kim *et al.*[12]and Hwang *et al*[15]. Market structure and company age had no relationship with innovation performance, regardless of innovation type, making it difficult to validate the view of Kim *et al.*[7] that the more monopolistic is a market, the more innovation performance a company has. The results of IP management capability also indicate that companies must construct innovation alliance with various external partners and enhance their IP management capability in order to increase their innovation performance. Limitations of the study are as followings. First, we did not differentiate quantity and quality of technological innovation performance for analysis. Second, since we used the survey data, several answers could be subjective such as the concept new and improved product innovation. Future studies should control all the variables relevant to technological innovation and employ a systemic

conception and quantification of the technological innovation of a content company.

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