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Research on Supplier's Absorptive Capacity, Knowledge Creation, Intellectual Capital and Competitive Advantage

공급업체의 흡수능력, 지식창출, 지적자본 및 경쟁우위에 관한 연구

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Abstract : This raises the question of how competitive advantage can be created, prompting firms to enhance their capacity for change. In this context, the role of knowledge creation becomes increasingly vital. This research aims to explore the role of intellectual capital and how to improve knowledge cration ability through absorptive capacity framework. It examines the links among knowledge acquisition, learning of new knowledge, knowledge creation, intellectual capital, and competitive advantage, drawing from both internal and external sources. The study focuses on small and medium-sized supplier firms in Korea, with data collected from 15 industries, totaling 106 responses. The research model employs structural equation modeling (SEM) and utilizes AMOS 22 for analysis. As anticipated, all hypotheses were supported. The study provides robust evidence that absorptive capacity is a pivotal factor in cultivating suppliers' competitive advantage. Furthermore, it posits that intellectual capital should be viewed as a criucial component of suppliers' knowledge stock, significantly enhancing the impact of absorptive capacity on their competitive edge. Future studies should aim to validate the research model in different international settings or across multinational corporations to enhance its generalizability.

keywords : Suppliers, Absorptive Capacity; Knowledge Creation; Intellectual Capital; Competitive Advantage

국문초록 : 변기업은 변화하는 환경 속에서 생존하기 위해 다양한 전략으로 경쟁우위를 창출하고자 한다. 이에, 경쟁우위를 창출하는 방법에 대한 연구도 끊임없이 전개되고 있다. 이러한 상황은 기업의 혁신능력을 강화하도록 촉구하며 또한 지식창출의 변화가 매우 중요한 역할이 되었다는 것을 의미한다. 본 연구는 자원기반 관점을 바탕으로 지적자본과 흡수능력 프레임워크가 경쟁우위에 미치는 영향을 살펴보는 것을 목적으로 한다. 이에, 한국 중소기업의 샘플을 통해 지식흡수능력, 지식 창출, 지적 자본 및 내/외부 소스의 경쟁 우위 사이의 연계를 수행하는지 확인해보고자 한다. 이러한 목적을 검증하기 위해 15개 산업에서 106개의 공급업체의 설문이 수집되었다. 연구 모델은 SEM(구조 방정식 모델링)을 채택하고 AMOS 22를 적용하여 분석하였다. 분석 결과, 모든 가설은 채택되었다. 따라서 본 연구는 흡수 능력이 공급업체의 경쟁 우위를 키우는 데 있어 중요한 요소임을 의미한다. 또한, 지적 자본은 공급업체의 지식 재고의 중요한 구성 요소로 간주되어야 하며, 이것이 경쟁력에 대한 흡수 능력 영향을 크게 강화한다는 것을 제시한다. 향후 연구는 연구 모델을 다양한 국제적 환경이나 다국적 기업에서 검증하여 일반화 가능성을 향상시키는 것을 목표로 할 것이다.

주제어 : 공급업체, 흡수능력, 지식창출, 지적자본 및 경쟁우위

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Ⅰ. Introduction

1.Research Background

The capacity to generate knowledge has become increasingly crucial in contemporary business environments. Presently, even large, innovation-oriented firms cannot solely rely on internal sources for knowledge acquisition. They also need to tap into external sources to enhance their innovation development processes [1]. In addition to focusing on internal R&D, these firms are increasingly seeking external knowledge through strategies such as empowering external research and development, outsourcing, or engaging highly qualified researchers who possess pertinent knowledge. These activities of acquiring knowledge, both internally and externally, occur concurrently at the enterprise level, highlighting the complementarity of these approaches. Furthermore, the ability to absorb and effectively utilize this knowledge in the learning process is vital for knowledge creation and for sustaining a firm's competitive advantage.

To solve these above problems, this research aims to explore the role of intellectual capital and how to improve knowledge cration ability for subsidiary corporation base on the perspective of the resource-based view, which argue that the competitive advantage does not depend on the internal resource of the firm, but also from the capacities of cost-to-imitate that embedded in network interaction[2]. Within this framework, knowledge and absorptive capacity are identified as critical components of these resources and capabilities. Enhancing absorptive capacity, particularly in relation to knowledge creation, is pivotal for a firm in establishing a sustainable competitive advantage. Integrating the resource-based view with the concept of organizational learning capacity, this study redefines the scope of absorptive capacity as a process encompassing the acquisition of knowledge, learning, and creation, further moderated by intellectual capital. In this context, 'acquisition' is conceptualized as the process of identifying and valuing external knowledge, or 'know-what,' aimed at pinpointing the specific knowledge to be acquired by the firm. Learning,' in contrast, is defined as the assimilation and transformation of knowledge. This process involves integrating the acquired knowledge into the firm's existing knowledge base and then transforming it. 'Knowledge creation,' the final term, is characterized by the utilization of assimilated knowledge to refine and update the firm's existing knowledge repository. This process includes the incorporation of improved and transformed knowledge, which is instrumental in fostering innovation and generating new knowledge [3].

This research explored the roles of absorptive capacity and intellectual capital on creating knowledge. Past research in this domain pays more attention on MNCs yet acquire knowledge and create new knowledge to get a sustained competitive advantage is more critical to smaller firms[2]. The accrual of knowledge and continual learning practices significantly contribute to the development and growth of young firms, bolstering their capacity to effectively utilize acquired knowledge[4]. In addition, scholars emphasized the critical of internal knowledge transfers, or focus on external source knowledge, however, research that links both internal and external source of knowledge is very limited[5, 6]. Even the most innovation-centric organizations, regardless of their size, cannot depend exclusively on internal sources for knowledge. They also need to incorporate knowledge from external sources to effectively develop their innovations[1]. Consider these gaps, this research combines internal and external knowledge to conduct a more comprehensive framework with empirical evidence from small and medium suppliers in Korea. Aims to help supplier

firms develop and sustain competitive advantage and keep a long-term relationship with th custom firms, at the meanwhile, can get more opportunities to assess to other potential custom firms.

II. Literature Review

1. Absorptive Capacity

Cohen and Levinthal defined absorptive capacity as an ability conferred by prior knowledge "to recognize the value of new information, assimilate it, and apply it to commercial ends"[7]. Compare to just "a firm's ability", a process perspective from Lane, Koka and Pathak defined it as "a firm's ability to utilize externally held knowledge through three sequential processes: (1) recognizing and understanding potentially valuable new knowledge outside the firm through exploratory learning, (2) assimilating valuable new knowledge through transformative learning, and (3) using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning." Lewin, Massini and Peeters provide a routine-based view on absorptive capacity[8]. Emphasis that absorptive capacity as routine including two elements: internal absorptive capacity which is the ability of managing internal variation, selection, and replication; and external absorptive capacity which is the ability of managing the exploration and assimilation for new knowledge in the external environment[9].

Empirical research in the field of absorptive capacity underscores the critical role of knowledge as a resource. It highlights the importance of inter-firm interactions in enhancing capabilities related to the acquisition, assimilation, and creation of new knowledge, as well as in appraising potential innovations. Galy's research offers empirical support for the positive correlation between absorptive capacity, organizational learning, and organizational performance. According to Galy, absorptive capacity as an antecedent to organizational learning that plays a mediator role between absorptive capacity and performance[10]. Caloghirou's study presents evidence supporting the positive impact of both internal (R&D capabilities and human skills) and external (enhanced absorptive capacity) sources of knowledge on innovative performance [6].

Saba provide the evidence that subsidiary competitive advantage results from knowledge creation capacity through knowledge acquisition and learning from both internal and external sources[5]. Chen et al. argued the network relationship and absorptive capacity positive effect on firm's innovation process, further positively influence competitive advantage[11]. Chang's empirical research demonstrated that absorptive capacity acts as a moderating factor in the relationship between acquired knowledge and performance [12]. Daniel's findings suggest that absorptive capacity should be viewed as a subsidiary construct within the broader context of organizational learning, with its positive influence on positional advantage contributing to enhanced performance [13]. Ahlin provide evidence for that absorptive capacity plays a moderator role between networks relationships and the innovation process[14].

2. Knowledge Creation Capability

Knowledge creation capability has been viewed as the firm's ability that apply the assimilated knowledge to commercial ends[7]. Its emphasis on internalizing the created knowledge for use. It was defined as the capacity that incorporating the transformed knowledge into the firm's operations to create new knowledge and commercial them by exploitation learning[8, 3, 7]. As mentioned above, Nonaka stated knowledge creation process is the interchange and interaction of explicit knowledge

and tacit knowledge with each other. The four modes are socialization- from tacit knowledge to tacit knowledge, externalization- from tacit knowledge to explicit knowledge, combination- from explicit knowledge to explicit knowledge, and internalization- from explicit knowledge to tacit knowledge[15].

Knowledge creation is a critical component in establishing a knowledge-based society within firms, essential for ensuring their long-term survival and fostering sustainable competitive advantage [16]. Achieving a sustainable competitive edge hinges on the development of closely integrated and complementary activities. It also requires a commitment to formulating distinct strategies and delivering unique products to customers. Peters argued that to create a sustained competitive advantage is a critical function of management that require to foster a knowledge-based environment that enables organizations to better develop and develop resources than their rivals and to create enough knowledge to address the success of the industry in the future. Through the process of organizational learning and knowledge creation can explore a new way to continuous improvement of organizational performance[17]. Knowledge within a company is dispersed across its workforce, technology, resources, and processes. This study primarily investigates the replication and application of existing knowledge and its impact on organizational performance. The generation of new knowledge is pivotal in developing new products and catalyzing other innovative outcomes within an organization [18]. Smith and Collins emphasize that the ability to create knowledge is a fundamental prerequisite for the innovation process. In other words, innovation is contingent upon the creation of new knowledge [19]. Kinberly and Evanisko found that higher education led to better innovation through increasing cognitive processing and problem-solving skills. Knowledge creation ability depends on internal communication within the company's expert community[20].

3. Intellectual Capital

Intellectual capital as an intangible asset refers to knowledge, experience, intellectual property, for use to create wealth[21,22] Roos, Roos, Edvinsson, and Dragonetti defined intellectual capital as “the sum of the knowledge of its members and the practical translation of this knowledge.” In this paper, intellectual capital as a beneficial environment moderating organizational learning and knowledge creation, consisting of three elements: human capital, organizational capital and social capital. It was taken a coexistence perspective and examined the three components as a holistic construct[23]. Sadowshi proved that organization capital is long-term utilizable assets, it is a day-to-day operation outcome, and it is based on the individuals' knowledge sharing, conflicts resolving, and attitudes of cooperation[24].

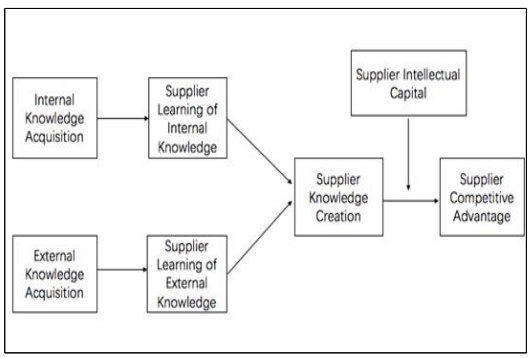
Based on above perspectives, combining the resource-based view of firm and organizational learning perspectives, I redefine absorptive capacity as a dynamic capacity produced by a process of knowledge acquisition, learning, and creation, and moderated by intellectual capital. The term 'acquisition' in this context denotes the process of identifying and valuing external knowledge, or 'know-what.' The primary objective of acquisition is to determine what knowledge should be learned by the firm. 'Learning' refers to the processes of knowledge assimilation and transformation, encompassing the integration of acquired knowledge into the existing knowledge stock and the modification of this assimilated knowledge. The term 'knowledge creation' is defined as the utilization of assimilated knowledge to refine and update existing knowledge, and the fusion of this enhanced and transformed

knowledge to develop and generate new knowledge. It is moderated by intellectual capital- the tangible assets of the firm and absorptive capacity as the intangible ones, the interaction of them could enhance each other to help the firm to gain a sustainable competitive advantage.

Ⅲ. Research framework and hypotheses

1. Research framework

In this study, absorptive capacity serves as the theoretical framework, encompassing knowledge acquisition, supplier learning, and knowledge creation. The research model explores four indirect effects along internal and external pathways: (1) the mediating role of suppliers' internal learning in the relationship between internal knowledge acquisition and knowledge creation; (2) the mediating role of suppliers' external learning in the relationship between external knowledge acquisition and knowledge creation; (3) the mediating effect of knowledge creation on the nexus between suppliers' internal learning and competitive advantage; (4) the mediating effect of knowledge creation on the connection between suppliers' external learning and competitive advantage; and (5) the moderating influence of suppliers' intellectual capital on the relationship between knowledge creation and competitive advantage (refer to Figure 1).



[Figure 1] Research Model

2. Hypothesis

Caloghirou's research provide evidence of both internal source of knowledge (R&D capabilities, and human skills) and external source of knowledge (enhanced absorptive capacity) are positive related to innovative performance[6]. The processes of knowledge acquisition, learning, and knowledge creation are dynamic in nature. This logic is supported by absorptive capacity theory. The absorptive capacity perspective posits that a firm's ability to acquire, assimilate, transform, and apply knowledge from both internal and external sources is critical to its capacity for knowledge creation[3, 7]. To support this point of view, Dermol and Slovenia confirmed that there is strong positive relationship between knowledge acquisition, knowledge interpretation and knowledge creation. The authors concluded that integrating single-loop learning and double-loop learning, grounded in the processes of knowledge acquisition, interpretation, and creation, plays a pivotal role in the development of new products, the enhancement of service quality, the utilization of the latest technologies, and similar areas.[25].

Hypothesis 1: The learning of internal knowledge is proposed to mediate the relationship between the acquisition of internal knowledge and the process of knowledge creation.

Hypothesis 2: The learning of external knowledge is hypothesized to mediate the relationship between the acquisition of external knowledge and the process of knowledge creation.

The fast-paced changes in the business environment, coupled with swift imitation by competitors, necessitate that firms engage in the creation of new knowledge. This process of knowledge creation should not be confined to internal sources within firms. Rather, it is imperative to also monitor external sources, stay abreast of industry trends, and master the latest

technologies to maintain a competitive edge [26].

Cho. proved that knowledge creation-oriented organizational learning process positive influence organizational performance in terms of employees' knowledge gains, new product development and financial performance[27]. Soo's research indicates that realized absorptive capacity is crucial for enhancing performance. The findings imply that merely developing capabilities for knowledge acquisition and assimilation does not significantly improve performance. Instead, firms should concentrate on transforming and exploiting the assimilated new knowledge for tangible benefits [28].

Therefore, based on the absorptive capacity theory and prior research, I suppose that knowledge creation capacity should mediate the relationship of organizational learning process and competitive performance.

Hypothesis 3 : Knowledge creation is posited to mediate the relationship between the acquisition of internal knowledge and the achievement of competitive advantage.

Hypothesis 4: Knowledge creation is hypothesized to mediate the relationship between the acquisition of external knowledge and the attainment of competitive advantage.

An organization itself is not capable of creating knowledge autonomously. Rather, it is the intellectual capital, conceptualized as a repository of tacit knowledge, that amplifies the organization's power. This enhancement aids in knowledge creation and is instrumental in establishing a competitive advantage[29]. Moreover, the three components of intellectual capital are complementary and synergistic, looking any one of them independently most likely results in incompletely, because it is not directly by any one of the three components, but rather by the mutual interaction of them[24, 20, 32]. Therefore, this paper takes a coexistence perspective on intellectual capital, and examines the three components as a holistic construct. Based on these perspectives and empirical research, lead the hypothesis as follow:

Hypothesis 5 : Intellectual capital will as a moderator in the relationship between knowledge creation and competitive advantage.

Ⅳ. Research Methods

1. Sample, Data Collection

Data collection was executed through three methods: face-to-face interviews, email surveys, and mobile questionnaires. In the face-to-face interviews, 26 individuals were approached, yielding 20 responses, resulting in a response rate of 76%. Via email, 332 individuals were contacted, with 28 responses recorded, marking an 8% response rate. For the mobile questionnaire, 167 contacts were made, from which 89 responses were obtained, equating to a response rate of 53%. Overall, 137 cases were initially collected. After excluding cases with missing values, a total of 106 cases remained. These cases predominantly consisted of small-medium supplier firms that do not cater to the final market. Descriptive statistics for the control variables are presented in 〈Table 1〉.

〈Table 1〉. Description of the Sample (N=106)

Variables	Measurement	Frequency	Percent
Industry	Manufacturing	44	0.42
	Service	47	0.44
	Others	15	0.14
Supplier Type	First-tier supplier	66	0.62
	Second-tier supplier	34	0.32
	Third-tier supplier	6	0.06
Age of Firm	1~10	33	0.31
	11~20	39	0.37
	over 21	34	0.32
Size of Firm	1~49	45	0.42
	50~100	19	0.18
	over 100	42	0.40
Sales	below 10 billion	30	0.28
	10~100 billion	38	0.36
	over 100 billion	38	0.36

2. Analysis Methods

To examine these variables, the structural equations method was considered conducted a system of regression equations, examines several equations simultaneously. For the data analysis, SPSS 23.0 and Amos 22.0 was utilized.

The questionnaire comprised a total of 57 items, employing a seven-point Likert scale for measurement, which ranged from (1) 'not at all' to (7) 'very frequently.' Nine items, based on Jansen's [32] research, were included to assess the intensity and direction of knowledge acquisition practices. Of these, five items were dedicated to measuring internal knowledge acquisition, focusing on communication and interaction with key customers. The remaining four items were designed to evaluate external knowledge acquisition, particularly concerning communication and interaction with competitors, other partners, or government institutions. There are nine items was conducted for the operationalization of the learning capacity faced by supplier firms was adopted from Jansen. Assessing both the ability to analysis and understand the new external knowledge and the ability to facilitate recognizing productive opportunities and outcomes of new external knowledge for the existing operations, routines, and strategies[32]. Four items were conducted to measure knowledge creation capacity follows by Andersson's research on managing subsidiary knowledge creation. Five items were developed to measure competitive advantage which combined Chen and Saba's studies include two dimensions: profitability and efficiency. 13 items for the measurement of intellectual capital that assessed by Youndt and Subramaniam's research on intellectual capital profile, three dimensions were consisted of: human capital, organizational capital and social capital. The survey encompassed seven items, which included inquiries about industry type, firm size, number of employees, sales figures, and the firm's classification as a First-tier, Second-tier, or Third-tier supplier. And left ten items for another research. Besides, several elements of the research object that could affect the results of the research were selected as control variables including age, size, of supplier firms, and sales revenue [30,5,33,11].

3 Validity and reliability of variables

To examine the validity of measurement model, confirmatory factor analysis (CFA) was performed.

〈Table 2〉. Validity and reliability Analysis

Variable	Item		Factor loading	CR	AVE	Cronbach's Alpha
Internal knowledge acquisition	IKA-5 IKA-4 IKA-3	3	.75 .65 .65	.725	.480	.720
External knowledge acquisition	EKA-2 EKA-3 EKA-1	3	.69 .61 .60	.668	.463	.673
Internal learning	IL-3 IL-2 IL-1	3	.85 .82 .77	.855	.663	.853
External learning	EL-6 EL-2 EL-5	3	.76 .68 .66	.743	.512	.738
Knowledge creation	KC3 KC4 KC1	3	.85 .84 .76	.858	.669	.853
Competitive advantage	CA-3 CA-4 CA-5	3	.87 .77 .68	.819	.604	.813
Intellectual capacity	IC1-3 IC1-4 IC1-1 IC3-1 IC3-3	5	.83 .79 .78 .77 .63	.874	.582	.872

〈Table 2〉 presents the results of the Confirmatory Factor Analysis (CFA), which was conducted after excluding indicators with factor loadings below .50 and those exhibiting multicollinearity with other indicators or latent

variables. A total of 21 items were retained, featuring a maximum factor loading of .87 and a minimum of .60. The Composite Reliability (CR) values and Cronbach's alpha scores for each variable exceeded .60, and the Average Variance Extracted (AVE) values were at or near .50, lending support to convergent validity and establishing significant reliability.

The three comparative fit indices were all above .90, suggesting an appropriate fit for the model. 〈Table 3〉 indicates that industry dummy 2 (service category) is positively associated with intellectual capital, and supplier type is positively correlated with external knowledge acquisition, external learning, and knowledge creation. As anticipated, knowledge creation showed significant correlations with both internal and external knowledge acquisition, as well as internal and external learning. Furthermore, competitive advantage was positively related to knowledge creation and intellectual capital, providing further validity and reliability evidence for the study model.

V. Results

Structural equation model (SEM) method through AMOS 22.0 was performed to test the validity of the research model, the CFA results of model fit for research model shows in 〈Table 4〉.

Table 4. Structural Model Fit

Model Fit Indices	DF	x^2	x^2 / DF	RMSER	GFI	CFI	NFI	AIC
Measurement model	220	484.046	2.2	0.9	0.91	0.96	0.94	125.511〈 156.000 125.511〈 504.334

According to the results, $x2$=484.046, df=220, normed chi-square value ($x2$/df=2.2, P〈 .001) below 3, indicating a good model fit with the data in the research model design. and RMSEA is 0.9, three comparative fit indices (GFI, CFI, NNFI) were all above .90, in addition, AIC value of default model is 125.511 lower than the value of saturated model (AIC=156.000), and both lower than independence model (AIC=504.334). These indices suggest that the model fit is appropriate.

〈Table 3〉. Mean, Standard Deviations, and Correlation

Variables	Mean	S. D	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Industry dummy1	.4151	.495	1													
2. Industry dummy2	.4434	.499	-.752**	1												
3. Industry dummy3	.1415	.350	-.342**	-.362**	1											
4.Supplier size	1.971	.909	.217*	-.119	-.137	1										
5.Supplier age	1.990	.786	.255**	-.232*	-.030	.585**	1									
6.Supplier type	1.434	.601	.029	-.171	.203*	-.151	-.031	1								
7. Sales	2.028	.844	.063	-.053	-.014	.522**	.287**	-.043	1							
8. .IKA	4.638	1.111	.056	-.074	.027	.056	.130	.109	.126	1						
9. EKA	3.965	1.186	.068	-.119	.073	.081	.122	.195*	.102	.433**	1					
10. Internal learning	4.735	1.049	-.166	.171	-.010	-.081	-.084	.163	.019	.203*	.317**	1				
11. External learning	4.550	.963	-.024	.009	.021	-.054	-.014	.318**	.024	.310**	.493**	.696**	1			
12.Knowledge creation	4.446	1.084	.059	-.111	.074	.010	.180	.289**	.083	.250**	.382**	.579**	.682**	1		
13.Competitive advantage	4.320	1.037	-.039	.048	-.013	-.061	.124	.171	-.003	.183	.410**	.551**	.519**	.608**	1	
14.Intellectual capital	4.588	1.011	-.128	.195*	-.098	-.160	.014	.130	.014	.224*	.364**	.622**	.583**	.553**	.656**	1

N=106 * p〈0.05 ** p〈0.01 IKA: Internal knowledge acquirement EKA: External knowledge acquirement

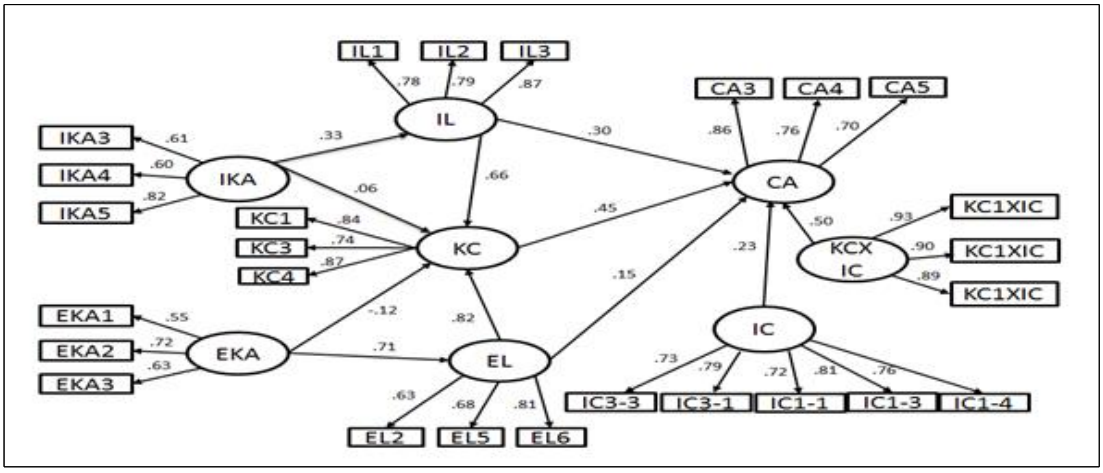
The bias-corrected (BC) bootstrap method was utilized to assess the indirect effects, employing AMOS 22.0 software for analysis. For the bias-corrected bootstrap confidence intervals, a

total of 2,000 bootstrap samples were generated, with the confidence level set at 95% for all output intervals. The criterion for determining mediation effects involves examining the lower and upper bounds of the total, direct, and indirect effects. A partial mediation effect is inferred when all of these effects—total, direct, and indirect—are significant. Conversely, a full mediation effect is established when the direct effect is not significant, but both the total and indirect effects are significant.

[Figure 2] illustrates the path coefficient for the impact of internal knowledge acquisition on knowledge creation, recorded as β = 0.06 (p 〉 .05). The total effect is determined to be 0.247, with a confidence interval ranging from a lower bound of 0.17 to an upper bound of 0.713. The direct effect is measured at 0.053, with the confidence interval extending from a lower bound of −0.136 to an upper bound of 0.486. The indirect effect is quantified at 0.194, with its bounds spanning from 0.056 to 0.396. Notably, both the total and indirect effects are significant, while the direct effect is not. These findings suggest that internal learning functions as a full mediator in the relationship between internal knowledge acquisition and knowledge creation, thereby supporting Hypothesis 1.

The path coefficient for the effect of external knowledge acquisition on knowledge creation is recorded as β = −0.12 (p 〉 .05). The total effect is quantified at 0.545, with confidence intervals extending from a lower bound of 0.202 to an upper bound of 1.135. The direct effect is measured at −0.124, with a range from −1.273 to 0.254 for the lower and upper bounds, respectively. The indirect effect is calculated at 0.669, spanning from a lower bound of 0.318 to an upper bound of 2.669. Notably, while the total and indirect effects are significant, the direct effect is not. These results indicate that external learning serves as a full mediator in the relationship between external knowledge acquisition and knowledge creation. Thus, Hypothesis 2 is substantiated.

The path coefficient for the influence of internal learning on competitive advantage was found to be β = .30 (p 〈 .05). The total effect is calculated at 0.684, with confidence intervals ranging from a lower bound of 0.445 to an upper bound of 0.997.



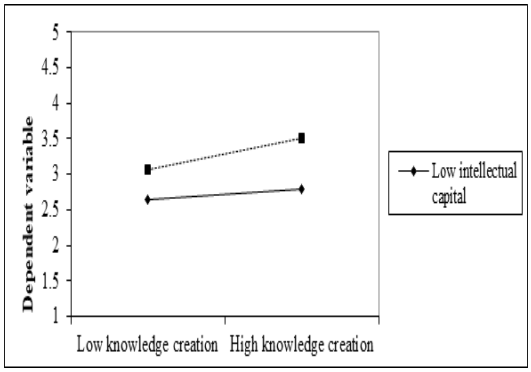
[Figure 2]. Path Analysis of Research Model

The direct effect is measured at 0.318, spanning from a lower bound of −0.041 to an upper bound

of 0.712, and the indirect effect is 0.366, with a range from a lower bound of 0.185 to an upper bound of 0.703. While both the total and indirect effects are significant, and the path coefficient itself is significant, the bootstrap confidence intervals indicate that the direct effect is not significant. These findings suggest that knowledge creation fully mediates the relationship between internal learning and competitive advantage. Consequently, Hypothesis 3 is supported.

The path coefficient for the impact of external knowledge acquisition on knowledge creation was found to be β = 0.15 (p 〉 .05). Regarding the total effect, it was calculated to be 0.652, with a confidence interval ranging from a lower bound of 0.425 to an upper bound of 1.022. The direct effect was determined to be 0.158, with a range from a lower bound of −0.696 to an upper bound of 0.763, while the indirect effect was 0.494 (ranging from a lower bound of 0.184 to an upper bound of 1.565). Given that both the total and indirect effects are significant, while the direct effect is not, these results suggest that knowledge creation acts as a full mediator between external learning and competitive advantage. Thus, Hypothesis 4 receives support

The analysis yielded a standardized regression coefficient (β) of .497 (p 〈 .01) for the interaction between knowledge creation and intellectual capital in relation to competitive advantage. Furthermore, the unstandardized regression coefficient was found to be 0.074 (p 〈 .01), with a confidence interval extending from a lower bound of 0.031 to an upper bound of 0.108. These statistical outcomes indicate that intellectual capital serves a moderating function in the relationship between knowledge creation and competitive advantage.



[Figure 3]. Moderating effect of intellectual capital on knowledge creation and competitive advantage

[Figure 3] delineates the moderating role of intellectual capital in the relationship between knowledge creation and competitive advantage. The illustration reveals that when intellectual capital is low, the correlation between knowledge creation and competitive advantage is positive, albeit weak.

〈Table 5〉. Results of Path Analysis

Paths	Estimate	S.E.	C.R.	Sig.
IKA -〉 IL	0.270	0.104	2.606	**
EKA -〉 EL	0.571	0.145	3.930	***
IL -〉 KC	0.720	0.129	5.562	***
IKA-〉 KC	0.053	0.094	0.561	n.s.
EKA〉 KC	−0.124	0.195	−0.638	n.s.
EL-〉 KC	0.767	0.114	6.743	***
IL-〉 CA	0.318	0.147	2.164	*
KC-〉 CA	0.406	0.162	2.505	**
EL -〉 CA	0.158	0.233	0.677	n.s.
IC-〉 CA	0.283	0.169	2.677	**
KC X IC -〉 CA	0.074	0.016	4.791	***

LKA=Internal knowledge acquisition; EKL = External knowledge acquisition ; IL=Internal learning; EL= External learning; KC=Knowledge creation
CA=Competitive advantage; IC=Intellectual capital

* p〈.05 ** p〈.01 ***p〈.001

Conversely, in the context of high intellectual capital, this relationship is both positive and markedly stronger.

Ⅵ. Discussion and Conclusions

This research expands the scope of the absorptive capacity concept by linking it to organizational learning and knowledge management practices, thereby contributing to the absorptive capacity literature in several dimensions. Firstly, it offers empirical evidence supporting a model that delineates both internal and external pathways through which suppliers can develop sustainable competitive advantage via learning processes and knowledge creation. Secondly, the study provides robust evidence that absorptive capacity is a pivotal factor in cultivating suppliers' competitive advantage. Lastly, it posits that intellectual capital should be viewed as a crucial component of suppliers' knowledge stock, significantly enhancing the impact of absorptive capacity on their competitive edge. According to these evidence, managers could carry out some practical activities. Such as changing the management philosophy, subsidiary firm managers should treat talent empolyee as organizational capital rather than organization cost. Besides, to improve the absorbtive capacity, subsidiary firm should not only pay attention to research and develop employee from internal of the organization, but also communicate with parent company, suppliers, and even customers.

Like all research endeavors, this study is subject to certain limitations that warrant consideration in future research. Firstly, the survey was specifically conducted within the context of the Korean market at the firm level. Future studies should aim to validate the research model in different international settings or across multinational corporations to enhance its generalizability. Secondly, the data collection was limited to a single point in time. Subsequent research should endeavor to gather data at multiple time points to enable a more systematic and reliable comparison of results, thereby bolstering the confidence in the findings. Thirdly, the sample size of this study was relatively small. Future research would benefit from utilizing a larger sample size to provide more robust evidence. Furthermore, it is acknowledged that knowledge creation is not solely driven by either internal or external learning. The interplay between these two learning modes is critical in knowledge creation and commercialization. As such, future research should also investigate the interaction between internal and external learning processes.

Managers are advised to leverage these research findings to foster and sustain a competitive advantage for their firms. Firstly, it is crucial to enhance relationships with key customers and maintain vigilance regarding external entities such as competitors, R&D institutions, and government departments. This approach is informed by the understanding that knowledge spillovers from customer firms positively impact the innovation processes of supplier firms. A robust relationship with key customers facilitates timely feedback on whether products or services meet their demands, which in turn can stimulate knowledge creation within supplier firms. Additionally, monitoring external parties is essential for supplier firms to acquire additional information and knowledge. This practice aids in making informed decisions, clarifying directions for new product development, and succeeding in competitive environments.

Secondly, it is imperative for managers to create more opportunities for learning in order to augment the organization's capacity for knowledge creation. This can be achieved by developing comprehensive learning programs and altering organizational routines to facilitate knowledge

sharing among employees. This strategy is predicated on the understanding that knowledge is not confined to a singular domain but is distributed across the company's workforce, technology, resources, and processes.

Thirdly, managers are advised to augment the firm's intellectual capital through various strategies. These include recruiting employees with higher educational qualifications, employing highly skilled engineers, implementing comprehensive training programs to enhance the employees' knowledge base, and fostering a culture that encourages knowledge sharing and cross-sector interaction within the organization. Such initiatives are crucial for leveraging human resources as a key asset in driving organizational growth and innovation.

Managers need to acknowledge the critical role of knowledge management and capability development in securing sustainable competitive advantage. This understanding is grounded in the knowledge-based and resource-based perspectives of the firm, which emphasize the strategic significance of internal knowledge assets and organizational capabilities in fostering long-term success and competitiveness. Additionally, it is imperative for managers to concentrate on generating intangible value for the organization. This encompasses fostering a culture that values intellectual capital, promotes innovation, and sustains competitive advantage. Furthermore, the importance of continuous learning at the individual, group, and organizational levels cannot be overstated. Learning is the cornerstone of change, creativity, and innovation, and its absence impedes organizational progress and adaptation in a dynamic business environment.

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