경영학 석사학위논문

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탐색에 관한 연구

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이현정의 석사 학위논문을 인준함

2014 년 2 월

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ABSTRACT

Organizational Status and Exploration in Alliance Formation

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This study examines how the status of the firm influences exploration in networks of alliance. Viewing alliance networks as a source of learning, I focus on collaboration with new partners as a crucial dimension of exploration in alliance. In advancing my argument on how high-status firms explore or exploit in partner selection in alliance formation, I emphasize cooperation and coordination concerns when simultaneously engaging in alliances with large number of new partners – i.e. managing alliance portfolios that largely consist of new partners. I also test how portfolio density, partner status diversity, and firm's absorptive capacity moderate the status effect on exploration by connecting with new partners. Using R&D alliance data in the global

computer industry from 1990-2000, I show that organizational status of firms encourage exploitation in alliance networks, by lowering the ratio of new partners in the alliance portfolio. The interaction of the status with the portfolio density and partner status diversity, respectively, strengthened the status effect by further lowering the ratio of new partners in the alliance portfolio.

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I. INTRODUCTION

Exploration and exploitation are mechanisms that determine search behavior of firms, and organization's growth and survival depends on its ability to balance between the two (March, 1991; Levinthal & March 1993). Following the upsurge of alliances as a source of learning in networks (Powell, Koput, & Smith-Doerr, 1996; Kogut, 2000), a stream of research has attempted to classify how alliance activities relate to exploration in alliance activities (Koza & Lewin, 1998; Lavie & Rosenkopf, 2006). Among others, formation of alliance with new partners is a form of exploration in networks that enable organizations to expand their interorganizational relations and learn about new practices and opportunities (Beckman, 2004; Lavie & Rosenkopf, 2006; Lin, Yang, & Demirkan, 2007).

However, alliance formation with new partners provides benefits as well as challenges to the firm in learning in networks. While new partners are sources of novel information, firms face paucity of information on partners' willingness to coordinate and cooperate in alliances. As asset, information, and status flow through the network(Gnyawali & Madhavan, 2001), firms' decision to ally with

new partners pose challenges on minimizing unwanted spillover of such resources while maximizing the benefits from the relationships with them. To date, with few exceptions (Podolny, 1994, Beckman, 2004), there has been paucity of studies on firm-level antecedents of exploration in alliance partner selection.

In this study, I focus on how organizational status influences the formation of explorative alliances that involve new partners. Thus far, theoretical predictions of status effects in explorative learning in alliance are conflicting. On one hand, high-status of the organization facilitate access to resources in interorganizational relations (Podolny, 2001) and provides control over innovative activities in new technologies(Podolny & Stuart, 1995); thus, organizational status may foster exploration in alliances by allying with new partners. However, as high-status firms avoid unwanted leakage of status in interorganizational relations (Podolny & Phillips, 1996; Podolny, 2005), they may refrain from forming alliances with new partners as the risk of partners' opportunistic behavior is harder to assess in relationships with new partners. Furthermore,

as Weber(1978) argued, status is an end in itself such that it may inhibit further advancement or new search, which lead us to question the existence of high-status organizations' motivation to engage in active exploration.

To clarify the status effect on exploration in alliance formation that is under inconsistent theoretical prediction, I elaborate the argument in the context of managing alliance portfolios. Firms are increasingly facing challenges arising from engaging in multiple alliances simultaneously, and managing alliance portfolios require resources for coordinating various activities with alliance partners. In the process, factors such as the type of alliance portfolio and the absorptive capacity of the firm may influence the status effect on exploring by collaborating with new partners. Drawing on network theory and transaction cost economics view, I focus on portfolio density and partner status diversity as portfolio characteristics that can moderate the status effect on the ratio of new partners among total number of alliance partners. I also examine absorptive capacity of the firm as a moderator relating to firm's internal capabilities.

I test hypotheses with the data on R&D alliance activities in the computer industry from 1990 to 2000. The results from the analysis

show that the status of the firm encourages collaboration with prior partners, resulting in a lower ratio of new partners among total number of alliance partners. Also, the test of interactions suggests that portfolio density and absorptive capacity further drives the firm to exploit rather than explore, by allying with previous partners.

II. THEORY AND HYPOTHESES

As organizations strive to succeed in the market, search for new knowledge is crucial (Levitt and March, 1993). In recent years, how organizations learn by actively engaging in inter-organizational activities has received scholarly attention. Among others, alliance network has been referred to as a crucial source of learning and knowledge. A stream of research has elaborated how alliance activities relate to organizational learning, and specified what activities in alliances constitute exploration or exploitation. Koza and Lewin(1988)argued that alliances can be described as having exploration objectives or exploitation objectives. Lavie and Rosenkopf(2006) further defined domains of exploration in alliances, which include exploration in terms of selecting new partners, or exploration in new technologies.

However, as firms do not have perfect information about partner's capability and motivations, interorganizational learning is uncertain and risky (Williamson, 1975; Pfeffer & Salancik, 1978; Oxley, 1997). As a response to such risk and uncertainty, previous studies suggest that firms strengthen relations with prior partners

(Podolny, 1994; Beckman, 2004); on the other hand, firms' structural positions or aspiration levels can drive firms to take an active response, by connecting with nonlocal or new partners (Beckman, 2004; Baum & Rowley, 2005; Shipilov, Li, & Greve, 2011)

With regard to exploration by selecting new partners in alliance formation, firms can expand knowledge and secure access to resources by connecting with new partners. Yet, collaboration with new partners can be particularly risky as it is difficult to assure partners' intention to cooperate in alliances; as such, firms are required to adapt to change in their relations brought by new partners, which relates to the aforementioned risk and uncertainty in interorganizational learning. These changes in relations are important not only because it relates to change of reservoir of resources and information that the firm can utilize and acquire through their relations, but also because relations can bring changes in their status and legitimacy in interoranizational relations. Organizational networks are not merely "pipes" that convey tangible resources, but also "prisms" where legitimacy and status flow through affiliation with others (Podolny, 2001; Podolny, 2005). Thus, status of the focal firm is determined by with whom it connects. As such, relations with new partners in organizational networks may bring

changes to the focal firms' status; while actors may enhance their status through allying with new partners, their status may also be threatened from such relations. To sum up, relations with new partners can pose risk and uncertainty on firms' status in interorganizational relations.

1. Status

In status-based model of market competition, a market actor's status builds on organizations' past quality as well as the status of its exchange partners (Podolny, 1993; Podolny & Phillips, 1996). Thus, affiliations with new partners in organizational networks can be both beneficial and problematic for high-status organizations. Beyond learning benefits by allying with new partners, high-status organizations are exposed to the risk of unintended transfer of organizational status to new partners (Podolny, 2005). High-status firms would attempt to avoid allying with new partners in alliances when partners' intention to cooperate in collaboration is uncertain; in such cases, relations with new partners would result in transferring the status to the unwanted partner. As such, for high-status firms, the concern on protecting their organizational status becomes the cost of

exploration in alliances by selecting new partners.

These costs of learning benefits illustrate the trade-off between exploration and exploitation in interorganizational learning. Benefits from exploration by selecting new partners are uncertain and risky, especially in safeguarding organizational status in interorganizational relations. Existing partners may not be able to provide novel information, yet the level of their cooperativeness in collaboration is predictable and less uncertain, which is helpful in protecting organizational status in interfirm relations.

For high-status firms, concerns regarding exploration or exploitation alliances are twofold: how to sustain or further augment status, while also facilitating interorganizational learning? Their status is an asset to be protected from partners with insufficient capabilities, or those who behave in opportunistic manner. Well-known phenomenon related to organizational status on alliance formation is firms' preference for partners of similar status (Chung, Singh, & Lee, 2000). Status-homophily suggest that as firms avoid leakage of their status to partners of lower-status, firms end up partnering with those with similar status. Other than partnering with firms of similar status, allying with prior partners can be another way to minimize unwanted

transfer in alliance, especially for high-status firms. As prior collaboration experience provide information on partners' capabilities and willingness to cooperate (Gulati & Gargiulo, 1999), unwanted transfer of status would be less likely to occur when collaborating with prior partners. Following this line of logic, high-status firms are expected to ally with prior partners over new partners.

A stream of research in sociology poses more fundamental question regarding high-status organizations' incentives to engage in exploration. Although status is a positive signal (Podolny 2001), it is also an ultimate end itself (Weber 1978) that may erode motivations to search for new possibilities. Bothner and colleagues (2012) warn that these complacency and self-satisfaction may result in high-status organizations' poor performance. In this regard, high-status firms may not feel a need to ally with new partners in the first place. Such behavior of high-status organizations may lead to myopia in learning (Levinthal & March, 1993), which would ultimately erode their organizational outcomes.

However, generalizing high-status as a barrier to exploration in partner selection is a hasty conclusion. Firms that are high in status have access to fine-grained information about new business

opportunities in networks (Gulati & Gargiulo, 1999). This advantage comes from wide range of trustworthy relations that high-status organizations are connected with. These conditions provide favorable start for high-status organizations to initiate explorative ties so as to realize novel information into actual benefits (Gnyawali & Madhavan, 2001; Gilsing, Nooteboom, & Vanhaverbeke, 2008). Further, benefits from reliable information that high-status actors hold, are intertwined with their bargaining power interfirm relations (Shipilov 2009) ; as such, the concern on partner's opportunistic behaviors can be effectively offset by their power in the network. Recent studies show that high-status actors may choose to engage in explorative ties such as connecting with lower-status actors, as they can benefit from lower-status actors' commitment in relations (Catelluci & Ertug 2010). This suggests that high-status firms can form explorative ties to maximize their superior access to information and resources (Baum, Shipilov, & Rowley, 2003). In this regard, high-status actors' favorable conditions in initiating ties with the new partner may outweigh the cost side of connecting with new partners.

Thus, theories provide conflicting predictions for the effect of organizational status on exploration in selecting new alliance partners.

High-status organizations confront challenges towards protecting their status from the new partner's as well as favorable conditions for initiating relations with the new partner. In order to clarify the problem, I examine how organizational status influence exploration in alliance portfolio level.

2. New Partners and the Cost of Managing Alliance Portfolio

While objectives in alliances can be described as explorative or exploitative(Koza & Lewin 1998), objectives of a single alliance must be considered in terms of alliance portfolio that a firm has. As firms increasingly engage in various types of alliances at different stages of the value chain (Powell et al., 1996), coordinating various alliances at the same time has become crucial in securing better performance(Lavie, 2007; Sarkar, Aulakh, & Madhok, 2009; Wassmer, 2010).

As previously said, collaboration in networks can be uncertain and costly, which calls for efforts to ensure partner's capabilities and reliability. Failure rates or early dissolution of alliances prove that difficulties in alliance partnerships are significantly high in reality (Greve, Baum, Mitsuhashi, & Rowley, 2010; Polidoro, Ahuja, &

Mitchell, 2011). These empirical observations emphasize two types of requirements in alliances: cooperation and coordination with partners. Cooperation and coordination is at times hard to separate, yet coordination is still needed even when interests of the firm and partners are perfectly aligned(Gulati & Singh, 1998; Gulati, Wohlgezogen, & Zhelyazkov, 2012). As firms need resources and ability to deal with challenges on cooperation and coordination, these concerns can be much more important when firms engage in multiple alliances simultaneously. As past researches have mentioned, monitoring partners' behaviors in order to ensure mutual cooperation and minimize appropriation hazards are crucial(Gulati & Singh, 1998). If firms engage in multiple alliances at the same time, such monitoring can cause administrative difficulties. Also, coordinating activities with new partners is another potential pressure for firms, as firms face limits in resources and abilities in their coordination activities that place boundaries in their search activities. As such, communication needed to define division of activities in alliances can cause significant coordination cost in alliances(Bae & Gargiulo, 2004). In this regard, when a set of explorative alliances with new partners that provide learning opportunities require high monitoring and coordination cost,

the learning benefits would be largely offset by the cost incurred. In the worst case scenario, such portfolio may not be beneficial for performance.

To sum up, the effect of organizational status on exploration in alliance formation must be examined in the context of managing alliance portfolio, rather than managing a single alliance. On one hand, high-status firms may refrain from allying with new partners due to the concern on transfer of status to unfavorable partners; yet, they may also be in a favorable condition to initiate ties with partners without prior collaboration experience. However, when coordination and cooperation efforts required in alliance portfolio management is taken into account, preference of high-status organizations become clearer. Although reliable information and bargaining power provide favorable conditions for high-status firms to engage in explorative ties with new partners, alliance portfolio largely consisting of explorative ties would be costly to manage, as boundedly-rational firms have limited resources to monitor partners' behaviors. The cost for managing alliance portfolios with large number of new partners would be higher for firms with high-status, as needs to protect their status by monitoring and coordinating alliance partners are stronger. Thus, it is likely that for high-status firms,

the benefits of exploration by allying with new partners are overruled by the risk of unwanted status leakage and the cost in managing alliance portfolio with many new partners.

In alliance portfolio consisting of large number of exploitative ties –i.e. relations with prior partners, high-status firms face less burden on monitoring and coordinating with partners in the portfolio. They can use prior information to evaluate partners' capabilities and reliability. In addition, the bargaining power and superior information benefits of the high-status firms in interorganizational relations become a preemptive mechanism to seal off potential opportunistic behavior of partners with long collaboration history, in turn further reinforcing tendency to prefer prior partners. As such, high-status organizations are expected to have lower ratio of alliance partners in the alliance portfolio.

H1. The higher the status of the firm, the lower the ratio of the number of new alliance partners among total number of alliance partners.

3. Types of Alliance Portfolio

An alliance portfolio refers to focal firm's egocentric alliance network (Baum, Calabrese, & Silverman, 2000; Rowley, Behrens, & Krackhardt, 2000). Alliance portfolio can be understood of as direct ties with partner firms, and the structure and diversity of portfolio can foster or inhibit firms' willingness to enter into exploration or exploitation alliances. I focus on the portfolio density and partner status diversity.

Portfolio density shows how partners in alliance portfolio are densely-connected or not. In alliance portfolio high in density, alliance partners would have redundant, overlapping relations with each other; on the other hand, in alliance portfolio low in density, the relations among partners would be sparse, with one firm having ties with diverse partners. Two streams of theories provide competing predictions regarding the effect of network structure on firm behaviors or performance outcomes. While Coleman (1988) emphasizes closely-connected networks that ensure shared norms and trustworthiness in building social capital, Burt (1992) underscores open networks that allow brokerage opportunities between disconnected groups. As such,

what these two theories assume in generating rent from networks is also different (Kogut 2000; Reagans & Zuckerman, 2008; Shipilov, 2009). The key to maximizing economic gains in open networks is constructing nonredundant relationships that enable arbitrage opportunities (Burt 1992), whereas the benefits of close networks arise from overlapping, redundant source of information (Reagans & Zuckerman 2008). In alliance portfolios where partners are densely connected, it is not non-redundancy of information but reliability of information which is cross-checked from overlapping relations that benefits the firm. As such, appropriation concerns can be effectively mitigated in portfolios where partners are embedded in dense network structure (Bae & Garguilo, 2004). Thus, portfolio density can influence firms' decision to explore by connecting with new partners.

In alliance portfolios with high density, it is likely that a tradeoff between reliability and nonredundancy of information exist. As information obtained from new partners is likely to overlap with what the firm already knows in such portfolio -which enhances reliability of information-, firms are less likely to gain nonredundant information from new partners. Thus, although firms engage in exploration alliances expecting novel information from new partners, such desired

benefits may not realize when portfolio density is high. For high-status firms, this is a significant factor that further drives them to prefer prior partners over new partners. Ceteris paribus, if acquisition of nonredundant information is not viable regardless of selecting new or prior partners, they are likely to have higher ratio of prior partners in the alliance portfolio, which leads to lower cost of monitoring and coordination in collaboration.

H2a. Portfolio density strengthens the effect of the firm's status in lowering the ratio of the number of new alliance partners among total number of alliance partners.

Transaction cost economics theory (Williamson, 1985) and network theory (Granovetter, 1973; Burt, 1992) focus on different aspects of alliance network diversity. Transaction cost theory focuses on negative sides of network diversity; it underscores the loss of focus and coordination errors in alliance network diversity, ultimately decreasing performance. Network theory emphasizes benefits of diversity in ties; diversity in networks provides access to novel information, which would not be possible when organizations are alone

or in less diverse networks. However, diversity in alliance network above certain level may become liability for the firm, as resources required to manage such diversity outweigh benefits of diverse alliance network (Goerzen & Beamish, 2007).

With regard to our study that aims to examine status effects on explorative alliances, the diversity of partners' status in the alliance portfolio may impact firm's decision to explore or exploit in alliance. What such diversity suggests is that the focal firm's alliance portfolios consist of status-homophilous as well as status-heterophilous ties. While status-heterophilous ties benefit high-status and low-status actors by providing commitment and endorsement in relations, respectively, high-status firms must monitor carefully on any opportunistic behavior of low-status firms in order to safeguard their status. However, the need for monitoring and coordination is also high when allying with new partners; cooperation and coordination concerns would be maximized in such portfolios that consist of new partners with varying status.

If the firm has an alliance portfolio high in partner status diversity, the firm is likely to form ties with past partners in order to decrease monitoring cost and administrative resources in managing alliance portfolios. For high-status firms, this tendency may be stronger

as they may face higher cost for managing alliance portfolios. Thus, the diversity in partner status is another factor that encourages high-status firms to consider prior partners in forming alliances, which lead to alliance portfolio consisting of small number of new partners.

H2b.Partner status diversity strengthens the effect of the firm's status in lowering the ratio of the number of new alliance partners among total number of alliance partners.

4. Absorptive Capacity

Absorptive capacity, defined as firm's ability to recognize, evaluate, acquire and utilize external knowledge is developed through continuous R&D activities over time (Cohen & Levinthal, 1990). As absorptive capacity indicates the level of firms' internal search efforts, it can influence firm's decision to learn through networks by entering into explorative or exploitative ties in alliances.

In alliances, absorptive capacity is understood as a driver of new search through forming alliances (Lavie & Rosenkopf, 2006). However, it is likely that a firms' absorptive capacity is closely related

to what firms search for through the alliance. The literatures on evolutionary economics and organizational theory characterize search as "local" or "problemistic"(Cyert & March, 1963; Nelson & Winter, 1982). As such, new searches start from the outcomes of past searches; search tends to gradually expand to prior-experience-related domains or areas. Especially, prior collaboration experience is an effective means to confirm and strengthen similarity and familiarity with partnering firms in alliances(Lane & Lubatkin 1998); also, firms can reduce transaction cost and develop knowledge-sharing routines from prior collaborations(Gulati, Lavie, & Singh, 2009). Altogether, these favorable conditions that build on prior partnering experience encourage firms to utilize their absorptive capacity in interorganizational learning. Thus, partnering experience maximizes the effect of absorptive capacity on firm's relational capability, which ultimately increases gains from alliances (Dyer & Singh, 1998).

In learning through alliances, absorptive capacity would encourage connecting with past partners rather than with new partners, as prior collaboration experience enables firms to understand partners and seek for further collaboration to leverage firms' absorptive capacity. In this regard, absorptive capacity can also be understood as an

effective tool for screening and selecting most promising partners in the network (Stuart, Hoang, & Hybels, 1999). Although firms with absorptive capacity may use such strength to evaluate new partners, benefits of absorptive capacity in partner selection are maximized when prior alliance history with the partner exists. Firms can leverage their knowledge-base to validate partners' capability and reliability demonstrated in prior relations. Thus, there can be a synergistic effect between firms' absorptive capacity and prior alliance experience in evaluation of partners – which give prior partners priority over new partners in further collaborations.

For high-status firms with high-level of absorptive capacity, goals in alliances include avoiding unwanted leakage of both status and knowledge-base. Selecting partners that ensure cooperation and coordination is the key to attaining such goals. As prior collaboration experience greatly facilitate using absorptive capacity to evaluate prior partners, it is likely that firms seek new possibilities to utilize their internal capabilities with partners they have collaborated with before. Thus, absorptive capacity of the firm would strengthen the status effects on lowering the ratio new partners in the alliance portfolio.

H2c. The firm's absorptive capacity strengthens the effect of focal firms' status on lowering the ratio of new alliance partners among total number of alliance partners.

III. DATA AND METHODS

1. Sample and Data Collection

I use R&D alliance data in the global computer industry from 1990-2000, which can be downloaded from the Securities Data Company (SDC) Platinum database provided by Thompson Financial. The computer industry is a suitable setting to test for the hypotheses in this study, as computer firms actively seek collaboration opportunities with one another that involve various activities including R&D. In these networks of alliances, the firms are treated as nodes, and each alliance event is mapped as undirected network ties between pairs of firms. SDC platinum provides information on participant firms, SIC codes, status, alliance activities. From all alliances occurred in computer industry, I chose alliance events that exclusively involves R&D activities, or jointly with other activities such as marketing, licensing, etc (Sampson 2007).

Among firms that have participated in at least one R&D alliance during the sample period, from 1990-2000, I selected 47 sample firms 1) that are in Computer and Office Equipment (SIC 3571-3579) or

Electronic and Electrical Equipment (SIC 3612-3699), 2) that have financial information in COMPUSTAT, and 3) whose alliance formation events took place for at least two years during the period. These sample firms were involved in 505 R&D alliance events in the whole computer industry. Following prior studies, alliances that involve more than two firms were treated as set of dyadic linkages (Stuart, 1998; Sytch, Tatarynowicz, & Gulati, 2012).

To construct alliance networks, I created adjacency matrix for each year. Each entries in the matrices equal 1 if firm i and firm j participated in the same alliance event and 0 otherwise. As the date of alliance termination is not announced, I assumed four-year duration for each alliance, which has been a common practice in alliance research (Gulati & Gargiulo, 1999; Bae & Gargiulo, 2004). Thus, in each year's adjacency matrix, alliance event of the year and preceding events that took place during preceding three years were taken into account.

2. Variables

Dependent Variable. In this study, the dependent variable is *ratio of the number of new partners among total number of alliance*

partners(Lin, Yang, & Demirkan, 2007). The variable is formally measured by dividing the number of new partners by the total number of partners involved in all alliance events occurring in year t. To derive the dependent variable, I first tracked whether each year's alliance partners have prior collaboration history with the focal firm. In order to do so, I additionally collected data from 1986-1989. Then I divided the number of partners without prior alliance history(i.e. new partners), by the total number of partners involved in given year's alliance events.

Independent Variables. Following prior studies(Chung et al., 2000; Benjamin & Podolny 1999), I used Bonacich(1987) power centrality measure for *firm status*. With beta value of 0.75, I used non-normalized value of Bonacich power instead of normalized value. As I control for network size in the analysisit would lead to misspecification of the model if the normalized value is used(Chandler et al. 2013).

To derive portfolio density, I used "ego-network density" procedure in UCINET(Borgatti et al. 2012). It refers to the ratio between actual and maximum possible number of connections among given number of alliance partners(Bae and Gargiulo, 2004).

For partner status diversity, I used the coefficient of variation, the standard deviation divided by the mean (Chandler et al.2013). I

divided the standard deviation of partners' status in ego-network by its mean. With regard to absorptive capacity, I used annual R&D expense of firms (Rothaermel & Alexandre 2004)[1].

Control Variables. Several control variables are included in the analysis. First, I controlled for *firm size*. I used logged value of firms' total assets to control for firm size. Using the number of employees would have been an alternative option; however, during recent years, outsourcing has been a common trend in management of large corporations, in which case the validity of using the number of employees to control for firm size would be diminished. I also controlled for firm's *network size.* It is measured by counting the number of partners in the given year's alliance portfolio. As the network size tends to be highly skewed, I used the logged value for the analysis. In addition, the performance may influence firms' decision to form alliances with new partners. I controlled for *ROA* in order to control for performances across firms, which is formally derived by dividing the net income by total assets.

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[1] I used R&D expenditures rather than R&D intensity(R&D expenditures divided by revenues) for absorptive capacity. As Rothaermel and Alexandre(2009) note, the use of financial ratios as independent variables - not as dependent variables - poses difficulties regarding the interpretation of the joint effect of the numerator and the denominator. Thus, using a direct measure like R&D expenditures would be a solution to the problem.

3. Analysis

Due to missing financial information or frequent firm-years with no alliance event, data structure is time-series with gap. As such, I used method of generalized estimating equations (GEE), which is suitable in analyzing unbalanced data [2]. GEE estimators are asymptotically normal and consistent when the arbitrarily chosen correlation among observations on a given firm is misspecified (Liang & Zeger, 1986). For GEE models, a link function – a distribution from which the dependent variable is drawn – , and a correlation structure must be specified. I chose an identity link function and exchangeable correlation as a working correlation matrix.

To test hypotheses, I used the *ratio of the number of new partners among total number of alliance partners* as the dependent variable, *firm status, portfolio density, partner status diversity* as independent variables, while controlling for *firm size, network size, and ROA*. All control variables and main variables were lagged one year to investigate their causal effects on the dependent variable.

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[2] In supplementary analysis, I estimated GLS models, and the results were similar to the results reported here.

IV. RESULTS

Table 1 presents the descriptive statistics of the variables included in the analysis. Table 2 reports the results of the GEE models.

To assess multicollinearity problems associated with correlation among variables, I examined variance inflation factor (VIF) for Model 3,4. Mean VIF factors for both model3 and model4 were less than 9, which is smaller than the recommended ceiling of 10 (Kleinbaum et al., 1988). This result supports that the multicollinearity problem is not a serious concern in the estimation.

In Table2, Model1 presents the baseline model with control variables. Among others, network size showed significant and negative effect on the ratio of new partners. Hypothesis1 investigates the effect of the firm status on the ratio of the number of new partners among total number of alliance partners. In Model 2 and 3, I find that status of the firm is significantly and negatively associated with a lower ratio of new partners in the alliance portfolio. Thus, Hypothesis1 received substantial support.

TABLE1
Descriptive statistics and Correlations

No.	Variables	Mean	Std. Dev.	1	2	3	4	5	6	7
1.	Ratio of the number of new partners among total number of alliance partners in year t	0.86	0.25							
2.	Firm size[a]	5.38	2.09	-0.21*						
3.	Network size[a]	0.93	1.12	-0.27*	0.46*					
4.	ROA	-14.37	312.12	-0.08	0.09*	0.01				
5.	Firm status	17.03	31.89	-0.36*	0.42*	0.82*	0.02			
6.	Portfolio density	0.19	0.34	0.03	0.10*	0.39*	0.03	0.20*		
7.	Partner status diversity	0.40	0.50	-0.08	0.35*	0.70*	-0.05	0.38*	0.27*	
8.	Absorptive capacity	155.72	461.74	-0.31*	0.54*	0.35*	0.02	0.38*	-0.03	0.23*

Note: All correlations greater than 0.05 are significant at $p<0.05$.

[a] Logarithm.

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TABLE2
GEE estimates for the ratio of new partners among total number of alliance partners

	Model1		Model2		Model3		Model4	
Step1. Control Variables								
Firm size/10[a]	0.00	(0.02)	0.00	(0.02)	0.01	(0.02)	-0.01	(0.02)
Network size/10[a]	-0.05*	(0.02)	0.01	(0.03)	0.01	(0.05)	-0.01	(0.05)
ROA	-0.03	(0.05)	-0.02	(0.05)	-0.03	(0.05)	-0.02	(0.04)
Step2. Main Variables								
Firm status/10[a]			-0.02**	(0.01)	-0.02*	(0.01)	0.00	(0.03)
Portfolio density					0.03	(0.08)	0.20†	(0.11)
Partner status diversity					0.00	(0.06)	-0.01	(0.07)
Absorptive capacity[b]					-0.11	(0.08)	0.23	(0.15)
Step3. Interactions								
Firm status × Portfolio density							-0.08†	(0.04)
Firm status × Partner status diversity							0.01	(0.03)
Firm status × Absorptive capacity							-0.03*	(0.01)
Constant	0.83**	(0.08)	0.95**	(0.09)	0.91**	(0.12)	0.88**	(0.13)
N	122		122		122		122	
Wald-test[c]					9.82†		13.17*	

Note: ** $p<0.01$, * $p<0.05$, † $p<0.1$

[a] Logarithm.

[b] Divided by 1,000.

[c] The wald test is for joint null hypothesis that the value of coefficients of main variables(Model3) or interactions(Model4) is 0.

Hypothesis 2a and 2b examines the moderating effect of the alliance portfolio type. Hypothesis 2a suggests that high portfolio density further drives firms to exploit rather than explore, resulting in a lower ratio of new partners in alliances compared to firms that have low portfolio density. The argument elaborated in Hypothesis 2a is supported by the significant ($p<0.1$) and negative interaction term of firm status and portfolio density in Model4. Hypothesis 2b suggests that partner status diversity in the alliance portfolio moderates the main effect, making firms to have even lower ratio of new partners. However, the interaction between firm status and partner status diversity in Model4 was not significant. Thus, Hypothesis 2b was not supported.

Hypothesis 2c examines the moderation of the firm's absorptive capacity on the main effect. I argued that high-status firms that have absorptive capacity are likely to have a lower ratio of new partners, compared to similarly high-status firms with lower level of absorptive capacity. In model 4, the interaction term of firm status and the absorptive capacity is significant ($p<0.05$) and negative. Thus, Hypothesis 2c was supported.

In sum, the results of regression analysis suggest a strong support of the negative effect of organizational status on the ratio of

new partners among total number of alliance partners in the alliance portfolio. Although Hypothesis 2b was not supported, the test of moderating effects of portfolio density and absorptive capacity suggest that the type of a firm's alliance portfolio and internal capabilities are factors that further strengthen the main effect of organizational status on exploration in alliance formation.

V. DISCUSSION AND CONCLUSION

Under the framework of exploration and exploitation(March, 1991), this study examines the effect of organizational status as a driver of firms' decision to form ties with prior partners or new partners, while considering a firm's absorptive capacity and characteristics of the alliance portfolio as moderators of the main effect. The findings show that organizational status tends to result in exploitation, which leads to lower ratio of new partners in the alliance portfolio. Also, absorptive capacity of the firm as well as the connectedness among partners plays a role in strengthening high-status firms' above-mentioned partnering patterns.

I find that high-status firms have more exploitative ties(as opposed to explorative ties with new partners) in their alliance portfolio. This suggests that organizational status tend to drive firms to be particularly wary of hard-to-predict behaviors of new partners, in order to sustain their status in alliance networks. High-status firms' efforts to safeguard their status in interfirm relations tend to result in ties with prior partners, which is also a cost-effective way in terms of coordination needs and monitoring burdens in managing alliance

portfolios. However, a point to be emphasized is that high-status should not be necessarily interpreted as barriers to exploration; it is not that high-status firms do not explore at all. Rather, a more realistic interpretation would be that the risks of unwanted leakage of status and cost in managing alliance portfolios can outweigh advantage of high-status firms to initiate explorative ties in having reliable information.

Furthermore, the results also confirm that for firms that have densely-connected alliance portfolios and high-level of absorptive capacity, the effect of organizational status becomes stronger, resulting in lower ratio of new partners in the portfolio. As such, how firms' alliance portfolio adds relationships with prior partners, rather than connecting with new partners, depends on the type of portfolio, as well as firms' internal capabilities that help firms to select out promising partners. Especially, absorptive capacity of the firm offer priority consideration to prior partners rather than new partners in alliance formation, as past collaboration experience enable firms to leverage absorptive capacity of the firm to more accurately assess the level of partners' reliability and how partners' ability relates to the knowledge the firm seeks in alliances.

The study contributes to the literature by systematically

examining organizational status as an antecedent of exploration and/or exploitation. While previous studies have mainly focused on rather exogenous factors such as the level of uncertainty on partner selection on alliance formation (Podolny, 1994; Beckman, 2004), I unveil organizational status as a crucial driver that make firms to exploit by selecting prior partners, rather than exploring by connecting with new partners, which is the key contribution of this study. Although a balance between exploration and exploitation has long been emphasized, empirical studies have argued that such balance may widely vary according to firm attributes or conditions (Yamakawa, Yang, & Lin, 2011). The results from the study suggest that a portfolio consisting of more prior partners can be a result of high-status firms' efforts to safeguard their status in the network. In this vein, a future study on performance ramifications of such portfolio is one promising direction to arrive at nuanced understanding of status effect on finding a balance between exploration and exploitation.

REFERENCES

Bae, J., & Gargiulo, M. 2004. Partner substitutability, alliance network structure, and firm profitability in the telecommunications industry. *Academy of Management Journal*, 47(6): 843–859.

Baum, J., Calabrese, T., & Silverman, B. 2000. Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, 21: 267–294.

Baum, J., Shipilov, A., & Rowley, T. 2003. Where do small worlds come from? *Industrial and Corporate Change*, 12(4): 697–725.

Baum, J., & Rowley, T. 2005. Dancing with strangers: Aspiration performance and the search for underwriting syndicate partners. *Administrative Science Quarterly*, 50(4): 536–575.

Beckman, C. 2004. Friends or strangers? Firm-specific uncertainty, market uncertainty, and network partner selection. *Organization Science*, 15(3): 259–275.

Benjamin, B., & Podolny, J. 1999. Status, quality, and social order in the California wine industry. *Administrative Science Quarterly*, 44(3): 563–589.

Bothner, M. S., Kim, Y.-K., & Smith, E. B. 2012. How Does Status Affect Performance? Status as an Asset vs. Status as a Liability in the PGA and NASCAR. *Organization Science*, 23(2): 416–433.

Bonacich, P. 1987. Power and Centrality: A Family of Measures.

American Journal of Sociology, 92(5): 1170 – 1182.

Borgatti, S., Everett, M., & Freeman, L. 2002. *UCINET for Windows: Software for Social Network Analysis.* Harvard, MA: Oxford University Press.

Burt, R. S. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

Castellucci, F., & Ertug, G. 2010. What's in It for Them? Advantages of Higher-Status Partners in Exchange Relationships. *Academy of Management Journal*, 53(1): 149–166.

Chandler, D., Haunschild, P., Rhee, M., & Beckman, C. 2013. The effects of firm reputation and status on interorganizational network structure. *Strategic Organization*, (0): 1–28.

Chung, S., Singh, H., & Lee, K. 2000. Complementarity, status similarity and social capital as drivers of alliance formation. *Strategic Management Journal*, 21: 1–22.

Cohen, W. M., & Levinthal, D. A. 1990. Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 128-152.

Coleman, J. S. 1988. Social capital in the creation of human capital. *American Journal of Sociology*, S95-S120.

Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*,*23*(4): 660-679.

Gilsing, V., Nooteboom, B., & Vanhaverbeke, W. 2008. Network embeddedness and the exploration of novel technologies: Technological distance, betweenness centrality and density. ***Research Policy***, 37: 1717–1731.

Gnyawali, D. R., & Madhavan, R. (2001). Cooperative networks and competitive dynamics: A structural embeddedness perspective. *Academy of Management Review*,*26*(3): 431-445.

Goerzen, A., & Beamish, P. W. 2005. The effect of alliance network diversity on multinational enterprise performance. ***Strategic Management Journal***, 26(4): 333–354.

Granovetter, M. S. 1973. The Strength of Weak Ties. ***American Journal of Sociology***, 78(6): 1360.

Greve, H., Baum, J., Mitsuhashi, H., & Rowley, T. 2010. Built to last but falling apart: Cohesion, friction, and withdrawal from interfirm alliances. ***Academy of Management Journal***, 53(2): 302–322.

Gulati, R., & Gargiulo, M. 1999. Where do interorganizational networks come from? ***American Journal of Sociology***, 104(5): 1439–1493.

Gulati, R., Lavie, D., & Singh, H. 2009. The nature of partnering experience and the gains from alliances. ***Strategic Management***

Journal, 30: 1213–1233.

Gulati, R., & Singh, H. 1998. The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances. *Administrative Science Quarterly*, 43(4): 781–914.

Gulati, R., Wohlgezogen, F., & Zhelyazkov, P. 2012. The two facets of collaboration: Cooperation and coordination in strategic alliances. *The Academy of Management Annals,* 6(1): 531–583.

Kleinbaum, D. G., Kupper, L. L., & Muller, K. E. 1988. *Applied regression analysis and other multivariate analysis methods*.Boston: PWS-Kent Publishing Company.

Kogut, B. 2000. The network as knowledge: generative rules and the emergence of structure. *Strategic Management Journal*, 21: 405–425.

Koza, M., & Lewin, A. 1998. The co-evolution of strategic alliances. *Organization science*, 9(3): 255–264.

Lane, P., & Lubatkin, M. 1998. Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19: 461–477.

Lavie, D. 2007. Alliance portfolios and firm performance: A study of value creation and appropriation in the U.S. software industry. *Strategic Management Journal*, 28(12): 1187–1212.

Lavie, D., & Rosenkopf, L. 2006. Balancing exploration and exploitation in alliance formation. *Academy of Management Journal*,

49(4): 797–818.

Levinthal, D., & March, J. 1993. The myopia of learning. *Strategic Management Journal*, 14: 95–112.

Levitt, B., & March, J. G. 1988. Organizational Learning. *Annual Review of Sociology*, 14: 319–340.

Li, S., & Rowley, T. 2002. Inertia and evaluation mechanisms in interorganizational partner selection: Syndicate formation among US investment banks. *Academy of Management Journal*, 45(6): 1104–1119.

Liang, K. Y., & Zeger, S. L. 1986. Longitudinal data analysis using generalized linear models. *Biometrika*, *73*(1): 13-22.

Lin, Z. (John), Yang, H., & Demirkan, I. 2007. The Performance Consequences of Ambidexterity in Strategic Alliance Formations: Empirical Investigation and Computational Theorizing. *Management Science*, 53(10): 1645–1658.

March, J. 1991. Exploration and exploitation in organizational learning. *Organization science*, 2(1): 71–87.

Nelson, R. R., & Winter, S. G. 1982. *An evolutionary theory of economic change*. Cambridge, MA: Belknap Press.

Oxley, J. E. 1997. Appropriability Hazards and Governance in Strategic Alliances: A Transaction Cost Approach. *Journal of Law, Economics, and Organization*, 13(2): 387–409.

Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations*. *New York*: 358.

Podolny, J. 1993. A status-based model of market competition. *American Journal of Sociology*, 98: 829–872.

Podolny, J. 1994. Market uncertainty and the social character of economic exchange. *Administrative science quarterly*, 39(3): 458–483.

Podolny, J. 2001. Networks as the Pipes and Prisms of the Market1. *American Journal of Sociology*, 107(1): 33–60.

Podolny, J. *Status Signals: A Sociological Study of Market Competition*. Princeton University Press, 2005.

Podolny, J., & Phillips, D. 1996. The dynamics of organizational status. *Industrial and Corporate Change*.

Polidoro, F., Ahuja, G., & Mitchell, W. 2011. When the social structure overshadows competitive incentives: The effects of network embeddedness on joint venture dissolution. *Academy of Management Journal*, 54(1): 203–223.

Powell, W., Koput, K., & Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1): 116–145.

Reagans, R. E., & Zuckerman, E. W. 2008. Why knowledge does not equal power: the network redundancy trade-off. *Industrial and Corporate Change*, 17: 903–944.

Rothaermel, F., & Alexandre, M. 2009. Ambidexterity in technology sourcing: The moderating role of absorptive capacity. *Organization Science*, 20(4): 759–780.

Rowley, T., Behrens, D., & Krackhardt, D. 2000. Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, 21: 369–386.

Sampson, R. 2007. R&D alliances and firm performance: the impact of technological diversity and alliance organization on innovation. *Academy of Management Journal*, 50(2): 364–386.

Sarkar, M., Aulakh, P., & Madhok, A. 2009. Process capabilities and value generation in alliance portfolios. *Organization Science*, 20(3): 583–600.

Shipilov, A. 2009. Firm scope experience, historic multimarket contact with partners, centrality, and the relationship between structural holes and performance. *Organization Science*, 20(1): 85–106.

Shipilov, A., Li, S., & Greve, H. 2011. The prince and the pauper: Search and brokerage in the initiation of status-heterophilous ties. *Organization Science*, 22(6): 1418–1434.

Stuart, T., Hoang, H., & Hybels, R. 1999. Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*, 44(2): 315–349.

Stuart, T., & Podolny, J. 1996. Local search and the evolution of

technological capabilities. *Strategic Management Journal*, 17: 21–38.

Sytch, M., Tatarynowicz, A., & Gulati, R. 2012. Toward a Theory of Extended Contact: The Incentives and Opportunities for Bridging Across Network Communities. *Organization Science*, 23(6): 1658–1681.

Wassmer, U. 2010. Alliance portfolios: A review and research agenda. *Journal of Management*, 36(1): 141–171.

Weber, M.1978. *Economy and society: An outline of interpretative sociology*. Univ of California Press.

Williamson, O. E. 1975. *Markets and hierarchies: antitrust analysis and implications*.New York: The Free Press.

Yamakawa, Y., Yang, H., & Lin, Z. 2011. Exploration versus exploitation in alliance portfolio: Performance implications of organizational, strategic, and environmental fit. *Research Policy*, 40: 287–296.

국문초록

전략적 제휴 체결에서의 조직 지위와
탐색에 관한 연구

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이 현 정

오늘날의 경영 환경에서 전략적 제휴는 기업들의 사업개발과 확장을 위한 중요한 경영 활동으로서 조직간의 사회적 연결망을 구성한다. 조직 학습 관점에 입각한 경영학 연구에서는 전략적 제휴 체결의 목적을 탐색과 활용으로 나눌 수 있다고 보고 기업간 제휴를 다양한 방식의 탐색적 제휴와 활용적 제휴로 범주화하였다.

본 연구에서는 탐색적 제휴의 형태로 이전에 전략적 제휴를 맺은 적이 없는 새로운 기업과의 전략적 제휴 체결에 주목하였다. 현대의 경영 환경은 기업들로 하여금 동시에 복수의 전략적 제휴를 체결하고 다양한 파트너와의 협력 - 전략적 제휴 포트폴리오 관리 – 하도록 요구하고 있기에, 새로운 전략적 제휴 파트너가 해당 년도의 총 제휴 파트너 중 차지하는 비율을 탐색의 정도로 보았다.

조직의 어떠한 특성이 탐색적 제휴와 활용적 제휴 체결에 영향을 미치는지에 대해서는 기존 연구에서 명확히 밝혀지지 않았다는 점에 기반하여, 본 연구는 전략적 제휴 체결에서의 탐색과 활용의 선행 요인으로서 조직 지위가 해당 조직의 탐색 행위에

미치는 영향을 살펴보았다. 연결망 내의 조직 지위가 탐색과 활용에 미치는 영향에 대해 기존 연구의 결론이 불일치하였기에, 제휴 포트폴리오 내 새로운 파트너의 비율로 나타나는 기업의 탐색행위가 그 지위에 따라 어떤 영향을 받는지를 고찰하는 것이 본 연구의 이론적 기여이다. 나아가 본 연구에서는 조직 지위와 탐색의 관계가 각 기업의 경영 활동 형태 및 특성에 따라 다를 수 있음에 착안하여, 조직 지위의 주 효과가 기업의 전략적 제휴 포트폴리오의 특성-제휴 파트너 간의 연결망 밀도와 제휴 파트너의 지위의 다양성-과 흡수역량에 따라 어떻게 조절되는지를 살펴보았다.

본 연구의 가설들은 SDC Platinum Database 에 공개된 1990 년부터 2000 년까지의 글로벌 컴퓨터 산업 내의 연구 개발 제휴 데이터를 기반으로 검증되었다. 연구 결과 기업의 지위는 제휴 포트폴리오 내 새로운 파트너의 비율과 부(-)적 관계가 있었다. 한편 제휴 파트너 간의 연결망 밀도가 높을수록, 그리고 기업의 흡수역량이 클수록 이러한 부(-)적 관계가 강해지는 것으로 나타났다.

본 연구는 조직이론 및 전략 분야에서 전략적 제휴에 대한 연구들이 많이 진행되었음에도 불구하고 명확히 밝혀지지 않았던 조직 지위의 탐색에 대한 영향을 고찰하는 데 의의가 있다. 본 연구의 결과를 통해 조직 지위가 전략적 제휴를 포함한 경영 활동의 향방을 예측하는 데 중요한 역할을 함이 드러났고, 향후 다양한 산업군 및 기업 환경에서 이러한 역할이 어떻게 유지되거나 달라지는지 살펴보는 데 본 연구가 도움이 될 것이다.

주요어 : 지위, 전략적 제휴 체결, 탐색과 활용, 제휴 포트폴리오
학   번 : 2012-20515