



The double-edged effects of the corporate venture capital unit's structural autonomy on corporate investors' explorative and exploitative innovation



Simon U. Lee^a, Gunno Park^b, Jina Kang^{c,*}

^a Technology Management, Economics, and Policy Program (TEMEP), Seoul National University, Republic of Korea

^b Technology Strategy Group, SK Telecom, Republic of Korea

^c Technology Management, Economics, and Policy Program (TEMEP), Department of Industrial Engineering, Seoul National University, Republic of Korea

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ABSTRACT

Although most prior literature on the strategic value of corporate venture capital (CVC) investments has focused solely on its role as an explorative learning method, in reality, many corporate investors are also using CVC investments for exploitative learning to strengthen their existing business model. In this study, we focus on the operational aspects of CVC investments and discuss how the explorative and exploitative innovation performance of corporate investors is affected by the level of the structural autonomy granted to their CVC dedicated unit. Using 20 years of panel data from 77 corporate investors in U.S. high-tech industries, we find that the structural autonomy of the CVC unit exhibits a positive relationship with the corporate investor's explorative innovation performance, while it is negatively related with exploitative innovation performance.

1. Introduction

In order for incumbent firms to adapt to the modern market environment of rapid and radical shifts of the technological paradigms, dynamic capabilities are required to acquire valuable knowledge from outside the firm and to integrate it with internal knowledge (Teece, Pisano, & Shuen, 1997). Many scholars argue that in order to possess such dynamic capabilities, it is necessary to employ external knowledge sourcing strategies such as strategic mergers, strategic alliances, or joint ventures with other firms that possess useful knowledge as well as to utilize the firm's internal R&D (Schildt, Maula, & Keil, 2005; Van de Vrande & Vanhaverbeke, 2013). In recent years, corporate venture capital (CVC) investment has been recognized as a very useful strategy for incumbent firms to develop dynamic capabilities (Dushnitsky & Lenox, 2005; Lee & Kang, 2015).

CVC investment refers to incumbent firms making small equity investments in start-ups with good technological potential (Gompers & Lerner, 2000). CVC investment conducted by a non-financial firm is different from a general venture capital (independent venture capital, IVC) investment. As CVC investments are conducted by non-financial firms, in addition to any financial objectives, these deals are often conducted for strategic purposes such as finding new business

opportunities or acquiring valuable knowledge from investment target companies (Block & MacMillan, 1993). Specifically, in terms of innovation strategy, CVC investment is characterized by pursuing both exploration and exploitation (Hill & Birkinshaw, 2014): exploration serves to search and acquire unfamiliar and novel technologies and resources and aims to generate variation, while exploitation focuses mainly on the enhancement of the efficiency and productivity of the firm's activities through refinement and extension of existing competencies and technologies (March, 1991).

Until now, the majority of studies on the relationship between CVC investments and corporate investors' innovation performance have focused on explorative innovation performance (Basu, Phelps, & Kotha, 2011; Burgelman, 1983; Dushnitsky & Lenox, 2006; Kanter, 1985; Wadhwa & Kotha, 2006). However, as Hill and Birkinshaw (2014) have shown, many corporate investors pursue exploitative innovations in technological areas that are closely related to their current businesses. Indeed, some survey results such as NIST's (National Institute of Standards and Technology) CVC report¹ and the Ernst & Young Global Corporate Venture Capital Survey² support this argument. According to the survey results, many respondents identified both "providing window on new technology" and "supporting existing business" as the most important strategic objectives of their CVC investments.

* Corresponding author.

E-mail address: profkang@snu.ac.kr (J. Kang).

URL: <http://jinakang.snu.ac.kr> (J. Kang).

¹ MacMillan, I., Roberts E., Livada V., and Wang A. (2008) Corporate Venture Capital (CVC): Seeking Innovation and Strategic Growth. Supported by National Institute of Science and Technology (NIST).

² Dushnitsky, G., Haemmming M., and Tharp. D. (2008). Global Corporate Venture Capital Survey 2008–09: Benchmarking Programs and Practices. Supported by Ernst & Young.

Moreover, some academic studies based on in-depth interviews, e.g., Battistini, Hacklin, and Baschera (2013) and Markham, Gentry, Hume, Ramachandran, and Kingon (2005), also addressed that corporate investors pursue both explorative and exploitative learning purposes. In other words, since the strategic direction of each corporate investor is different, the types of innovation outcome they create through CVC investments can also be different. In order to achieve the desired innovation outcome more efficiently, corporate investors need to choose an appropriate method of operating their investment organization.

In this vein, we examine the relationship between the operational aspects of CVC investments and two different perspectives of innovative performance: exploration and exploitation. In particular, from an organizational standpoint, we focus on the structural autonomy of the CVC unit, which has a significant impact on the operating process of CVC investments (Gompers & Lerner, 2001; Siegel, Siegel, & MacMillan, 1988; Yang, Chen, & Zhang, 2016). The CVC unit's structural autonomy allows the managers to be dedicated to CVC investments and enables them to perform autonomous investments by freeing them from the strategic attention of their parent firm (Yang et al., 2016). Since autonomous CVC units tend to respond aggressively to investment in different opportunities with minimal corporate interferences, they can operate more as a diversified portfolio and take more risks in adventurous investments in unfamiliar technology areas (Siegel et al., 1988). Due to this specificity of the investment process, we argue that the structural autonomy will have different impacts on explorative and exploitative innovation through CVC investments. An autonomous CVC's free investment activities and diverse portfolio can be helpful for exploring new technology areas. On the other hand, in exploitation aiming at enhancing the existing business of the parent company, autonomous CVCs may have a negative impact, as they are disconnected from the expertise of the parent company and its accumulated technological knowledge and network resources. Therefore, we hypothesize that the degree of structural autonomy of the CVC unit will increase the corporate investor's explorative innovation performance, but will have a negative effect on the exploitative innovation performance.

Empirically, we analyzed an unbalanced panel of U.S. high-tech firms that performed CVC investments during the time period of 1990 to 2010. Through this empirical analysis we find an increase in the degree of structural autonomy of the CVC unit is associated with a subsequent increase in the number of newly applied patents and their forward citations in explorative technology areas, while it is negatively related with the number of applied patents and forward citations in exploitative technology areas.

This paper makes contribution to the growing literature on the relationship between CVC investments and the firm's innovation performance. Unlike previous studies, which focused solely on the innovative value of CVC investments as a window on new technologies, we examine both perspectives of innovation, exploration and exploitation. Further, this research contributes to the research on organizational behavior, specifically on the structural autonomy of the CVC unit. Finally, this study provides managerial implications by providing insights into how the CVC unit should be structured and operated in accordance with the corporate investor's strategic objectives.

2. Theory and hypotheses

2.1. Exploration, exploitation, and CVC

Many studies on strategic management and organization theory have employed March's (1991) 'exploration-exploitation framework' to describe organizational learning activities for corporate innovation. According to March (1991, p. 71): "Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution." Specifically in corporate theory, exploration

refers to activities that create knowledge that is new to the firm. A firm seeking exploration attempts to search and acquire unfamiliar and novel technologies and resources, aiming to generate variation. Because of this nature, exploration is characterized by both high uncertainty and slow performance in learning outcomes. However, in the long run, it allows organizations to create more radical innovations (Rosenkopf & Nerkar, 2001). Contrary to this, exploitation refers to activities that create innovations by utilizing the knowledge already held by the firm. It focuses mainly on the enhancement of the efficiency and productivity of the firm's ongoing activities. These properties make exploitation relatively fast, efficient and predictable in terms of performance, however, it tends to be limited to short-term gradual innovation (Duncan, 1976; Eisenhardt & Martin, 2000; Levinthal & March, 1993; March, 1991; Tushman & O'Reilly, 1996).

Since establishment of the concept of exploration and exploitation, research has been actively conducted on what is referred to as ambidexterity strategy, in which firms pursue both short-term survival and long-term growth by combining these two organizational learning activities (He & Wong, 2004; Hoang & Rothaermel, 2010; Lavie, Kang, & Rosenkopf, 2011; Lavie, Stettner, & Tushman, 2010; Raisch & Birkinshaw, 2008; Stettner & Lavie, 2014). To pursue organizational ambidexterity, firms need to balance exploitation and exploration. The most representative balancing methods are organizational and temporal separation. Organizational separation involves creating exploration-oriented units (e.g., an independent research lab or CVC unit) to work separately from the other departments primarily focusing on exploitation-oriented activities (e.g., manufacturing plants or sales forces) (Hill & Birkinshaw, 2014). Temporal separation, on the other hand, refers to firms undertaking exploration and exploitation at different times (Puranam, Singh, & Zollo, 2006).

In general, prior studies on CVC investment consider the CVC unit as a separated department for explorative learning. Although this study also sees the CVC unit as a separated department for the incumbent firm's external searching activities, we argue that the CVC unit's activities are not only limited to exploration, but that it also conducts exploitative learning activities (Campbell, Birkinshaw, Morrison, & van Basten Batenburg, 2003; Hill & Birkinshaw, 2008, 2014; Keil, Maula, Schildt, & Zahra, 2008; Schildt et al., 2005). Indeed, some corporate investors are pursuing both explorative and exploitative innovations through their CVC units. For example, the case of Samsung Electronics, one of the world's largest electronics manufacturers, reveals the tendency of these investment patterns. Samsung Electronics is both investing in start-ups that possess technologies that are not related to Samsung's current business areas, such as food and bio-health care technologies, as well as in companies that possess technologies that can directly contribute to Samsung's core products, such as voice recognition technology that can be used in Samsung smartphones. Moreover, also Intel, a worldwide developer of microprocessors, manages a diversified investment portfolio that includes start-ups in unrelated industries to prepare for future change, while also investing heavily in startups in related industries to improve the performance of their core businesses.

Thus, in order to better understand innovation strategy through CVC investment, it is necessary to consider and analyze both the explorative and exploitative nature of CVC. In particular, this paper examines the role of structural autonomy in terms of the operation of the CVC dedicated unit because the direction of the innovation output resulting from the CVC investment may depend on how firms structure and operate their CVC activities.

2.2. Structural autonomy of the CVC unit and exploration

For corporate investors, one of the main issues in operating CVC is how much autonomy should be given to the CVC dedicated unit. Some CVC units are under tight control from the parent firm when selecting investment targets, while some other CVC units are wholly owned

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