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Corporate venture capital among large corporations: Does the industrial sector matter ?

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CORPORATE VENTURE CAPITAL AMONG LARGE CORPORATIONS: DOES THE INDUSTRIAL SECTOR MATTER?¹

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Abstract

Corporations set up corporate venture capital unit (CVC) and invest in entrepreneurial start-up for reasons including strategic and financial goals. In most industries, CVC activities may be used to stimulate internal and external innovations that are directly relevant to the parent corporation's innovation and development efforts.

This paper is an exploratory study. Firstly, we made a review of the literature on the reexplaining why corporations engage in CVC and on the key factors influencing their decision to invest in CVC.

Secondly, we explore the industrial sectors differences related to CVC activities by analyzing the Fortune 500 firms (2008 issue). We consolidated various database sources in order to explore how sector characteristics affect the prevalence of CVC among large corporations. For this preliminary study, we tested how the R&D intensity affects the prevalence of CVC.

KEYWORDS:

Corporate venture capital, key factors at corporate and industry level, strategic objectives, industrial sectors.

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INTRODUCTION

Innovation has been recognized as the main driver for companies to prosper, grow and sustain a high profitability and a competitive advantage (e.g. Drucker, 1998; Christensen 1997; Thomke, 2001). Previous researches have recognized the important role that research and development play in firm innovation and growth since the liberalization of markets, the strengthening of intellectual property regimes, the growing importance of increasing returns, fast technological change, and the growing levels of corporate entrepreneurship and knowledge assets suggest a different dynamic to competition and competitive advantage (Teece, 2000; OECD, 2001; OECD, 2008). Moreover, previous researches have shown that the internal R&D expenditures alone are often not sufficient to maintain or sustain the firm's innovation rate and growth in such high competitive environment. The ability of established firms to explore and to exploit external innovations, capabilities and business opportunities that have commercial potential and that fit with their development strategies becomes crucial (Weber and Weber, 2007; Laursen and Salter, 2006; Cohen and Levinthal, 1990; Henderson and Cockburn, 1994; Dushnitsky and Lenox, 2005a).

To stay ahead of competition, to perform their innovativeness and to deliver superior value to stakeholders, many established corporations have reconsidered the way they search for new business opportunities and the way they explore and develop new external capabilities by opening their innovation process using various mechanisms and tools that include for instance corporate venture capital, venturing alliances, acquisitions, licensing, joint development, etc. (Keil, 2000; Maula, 2007; Sharma and Christman, 1999). The innovation mechanisms such as alliances, acquisitions, licensing and joint development may facilitate well-established corporations access to other competitors' knowledge (Ahuja, 2000; Hagedoorn and Schakenraad, 1994; Gulati, 1995; Powell, Koput, and Smith-Doerr, 1996) while corporations may have an access to new ventures' breakthrough or complementary knowledge through their corporate venture capital investments (Maula, 2007; Hellmann, 2001; Dushnitsky and Lenox, 2005a). Thus, the external corporate venture capital (CVC) has emerged as a useful and strategic tool which corporations are using to stimulate and accelerate the exploration and exploitation of internal as well as external innovations.

Corporate venture capital refers to corporate entrepreneurial activities and particularly to corporate external venturing activities. In other words, CVC reflects "equity or equity-linked investments in young, privately held companies, where the investor is a financial intermediary of a non-financial corporation" (Maula, 2007). CVC activities may reside at

various corporate levels, and the investments are made directly in external start-up companies or through independent venture capital (VC) funds as limited partners (Chesbrough, 2002). The external corporate venture capital provides to established firms a potential gateway into technologies emerging from start-ups. It has been described as an effective innovation support mechanism that helps corporations to better respond to technology and market changes (Benson and Ziedonis, 2008).

Similar to independent venture capitalists, CVC investors often seek financial returns through exit events such as initial public offerings and sales of portfolio companies to third parties (Gompers and Lerner 2000). However, the motivation of the majority of corporate investors is not only financial but much more strategic (Gompers and Lerner, 1998; Hellmann, 2001; Maula and Murray, 2002; Dushnitsky and Lenox, 2005a, 2006; Keil et al., 2003; Schildt et al., 2005). Moreover, ex-ante scientific researches have demonstrated that the corporate venture capital is, in many cases, less efficient than an independent venture capital due to its focus on the strategic objectives (Gompers and Lerner, 1998; Hellmann, 2001). Given the low performance of CVC units, several attempts have been made to identify the key determinants of CVC success (Block and MacMillan, 1993; Siegel, et al., 1988) and have highlighted significant challenges for the management of corporate venture capital units. Researchers have suggested for instance, the transferability of the so-called VC model to the corporate context (Hill et al. 2009; Brody and Ehrlich, 1998; Chesbrough, 2000; Donahoe, Schefter, and Harding, 2001; Hamel, 1999). But the institutional objectives and constraints on a CVC unit are often different from those on a VC. Usually, VC firms are concerned exclusively with maximizing their financial performance (i.e., capital gain) while in contrast, CVC units typically have to accommodate both financial and strategic objectives for a heterogeneous range of stakeholders (Keil, 2002, 2004; Maula, 2007; Hill et al., 2009). Moreover, the CVC strategies have to be frequently adjusted according to the nature and the dynamic of industrial sectors. Therefore, there is a necessity to manage a CVC unit in line with corporate financial and strategic objectives and particularly in line with the characteristics of the industries. Prior studies have less examined systematically the variation in the management of CVC across industries.

This paper is an exploratory study. It aims firstly at making a review of the recent research on CVC. This review will focus particularly on the reasons why corporations set up a CVC and on the key factors at industry and corporate levels that may influence the decision of

corporations to invest in CVC. Secondly, this study will explore how the characteristics of industrial sectors affect the prevalence of CVC among large corporations.

For this preliminary analysis, we will use R&D intensity by industry as indicator to examine the prevalence of CVC among well-established corporations. Our motivation is to understand the link between CVC activities, characteristics of the parent corporation and characteristics of the industries. We will analyze the variations among the Fortune 500 firms (2008 issue) and their industries. Using the membership directory databases of different VC associations like the EVCA, the NVCA and various local VC associations, we will identify whether corporations have set up a CVC unit or not. We will classify parent corporations on the basis of the Industry Classification Benchmark (ICB) codes for the analysis at industry level. Finally, we will summarize our findings and will discuss their implications for our future research.

1. LITERATURE REVIEW ON CORPORATE VENTURE CAPITAL

This review of the literature will explain firstly the motives why corporations invest in CVC. We will emphasize particularly on the strategic objectives that tend to be much more important for corporations. This will be followed by a description of the various key factors at corporate and industry levels that influence the prevalence of CVC among well-established corporations.

1.1 The reasons why corporations invest in corporate venture capital

Corporate investors invest in and partner with entrepreneurial ventures and/or other venture capitalists for the purpose of developing new business opportunities to gain high financial returns (e.g. through exit events such as initial public offerings and sales of portfolio companies to third parties) and/or to gain strategic benefits (Gompers and Lerner, 2000; Birkinshaw, 1997; Block and MacMillan, 1993; Hill, et al., 2009). For well-established corporations, the general claim for their engagement in CVC is principally to gain strategic benefits (Hellmann, 2001; Gompers, 2002; Bannock Consulting, 1999; Hill, et al., 2009). From the recent scientific literature, we identify three main categories of strategic benefits/objectives: the leveraging objectives, the option building objectives and the learning objectives. These strategic objectives which will be detailed hereafter may influence

considerably the choice of a CVC management approach by a parent corporation and particularly the decision to invest or not in new ventures or VC funds.

1.1.1 The leveraging objectives

The leveraging objectives are related to investments in new ventures that may help to develop the investing company's current operational capabilities, resources and processes and support its own business growing. There are two types of leveraging objectives: the leveraging of own technologies and platforms and the leveraging of own complementary resources.

To leverage existing technologies and platforms, the parent corporations may invest in new venture to stimulate and secure the demand for their current technologies and products (Dushnitsky and Lenox, 2005a, 2005b, 2006; Chesbrough, 2002; Riyanto and Schwienbacher, 2006; Kann, 2000; Maula, 2007). Investing in start-ups gives the corporate investor an opportunity to support the use of its latent patents, to develop and commercialize unused or non-strategic technologies (Chesbrough, 2002; McKinsey & Co., 1998).

Established firms invest in new ventures in order to shape markets proactively and to steer the promotion and the adoption of their own technology as a standard (Chesbrough, 2002; Kann, 2000; Maula, 2007).

Investing in high promising new ventures, particularly those which develop complementary products and services, helps corporation to *leverage its own complementary resources* by adding new products to existing distribution channels (Skyes, 1990; Maula, 2007) and by enabling the use of excess plant space, time and people (Silver, 1993).

1.1.2 The option building objectives

The option building objectives refer to the opportunity for the parent corporation to explore and exploit potential new market opportunities. The CVC activities may help corporation in identifying emerging markets and new technology platforms that may facilitate diversification and accelerate the expansion to new markets different from those in which the corporation currently operates (Skyes, 1986a, 1986b; Kann, 2000; Keil, 2000; Chesbrough, 2002). Investing in corporate venturing may help corporation in identifying, screening and assessing potential acquisition targets and to develop new business relationships (Siegel et al., 1988; Sykes, 1990; Maula, 2007; Benson, 2008; Benson and Ziedonis, 2005, 2008).

The CVC activities enable corporation to better understand and respond to customer's needs by increasing the pace of innovation. On the other hand, the CVC facilitates the anticipation and quicker response to market changes in order to become a pioneer and/or one of the major actors in markets that emerge.

1.1.3 The learning objectives

The CVC activities may facilitate corporate business units learning from entrepreneurial ventures. Corporations may use CVC as scouting tool and may learn from its CVC activities how to proceed with the identification and the monitoring of new opportunities. CVC provides a window on new technologies, markets, business models and practices to corporations (Dushnitsky and Lenox, 2006; Keil, 2000; Maula 2007; Siegel et al., 1988; Sykes, 1990).

Some corporations set up a CVC unit in order to pursue external innovations and to learn at the same time how to increase the internal efficiency of their R&D (Sykes, 1990; Kann, 2000; Maula, 2007). As internal R&D could be limited in capacity or because of different internal or external barriers, not all innovations can be generated internally. In practice, corporate R&D personnel or team might be involved in the venture capital process to gauge a venture's technical feasibility and to determine business and market risks. As result, the R&D team might gain an insight into future technologies and products (Chesbrough, 2002).

Moreover in some industries (e.g. the biotech industry) where new ventures are very active in developing and patenting new technologies, corporations (e.g. in the pharmaceutical industry) that set up a CVC and that build tight relationships with new ventures may have access to new or complementary external knowledge. "The greater the stock of entrepreneurial knowledge a firm has accessed, the greater the subsequent innovation output" (Dushnitsky and Lenox, 2005b). This stock of entrepreneurial knowledge may lead to novel possible configurations of existing corporate knowledge and capabilities and increase the ability to use additional external knowledge. CVC activities help corporation to encourage the entrepreneurial culture within the corporation and support internal venturing process (Keil, 2000; Maula, 2007) in order to retain those employees who are willing to start their own business. CVC activities contribute to training of junior management, to expose middle management to entrepreneurship (Silver, 1993), to identify and exploit synergies across the corporation and its ventures (Hellmann, 2001; Chesbrough, 2002).

Corporations take advantage of what they learn from their portfolio companies, develop their own competencies, technologies and manufacturing processes (Siegel et al., 1988; Sykes, 1990; Schildt et al., 2005; Maula, 2007) and increase their stock of entrepreneurial knowledge (Dushnitsky and Lenox, 2005a, 2005b).

In the next sub-section, we will review the key factors that influence the investment in CVC and its management approach.

1.2 The factors influencing the investments in CVC

Various key factors at corporate and industry levels may influence the decision of a corporation to invest in CVC and particularly the CVC management approach used by the corporation to invest in new ventures and venture capital funds.

At the *corporate level*, the corporate financial performances, the capacity to innovate rapidly through its internal R&D and the size of corporate patent stock might have an impact on the performance of the CVC unit (Dushnitsky and Lenox, 2005a). Previous studies (Fazzari and Athey, 1987; Fazzari, Hubbard, and Petersen, 1988) have shown that corporate investments in general and particularly internal R&D expenditures are highly sensitive to the corporate cash flow (i.e. to the availability of internal funds). Dushnitsky and Lenox (2005a) have made a linkage between the corporate change in cash flow and the CVC investments. They observed a positive relationship between firm CVC investments and firm internal cash flow but additionally, they found that “CVC investment does not seem to compete with internal R&D funds”; both are in fact complementary rather than substitutes (Cassiman and Veugelers, 2006; Dushnitsky and Lenox, 2005a; Gompers and Lerner 2001a, 2001b; Sahaym, et al., 2009). Additionally to the above mentioned factors that influence corporate venture capital activities other factors such as, the choice of the primary strategic objectives, the investment modes based on the existing typology of CVC (i.e. direct or indirect, self-managed, pooled or dedicated funds, see Keil, 2000; Kann, 2000; Maula, 2007), the number of investors (i.e. syndication of investments, see Brander, et al., 2002; Lerner, 1994; Lockett and Wright, 2001; Wilson, 1968), the quality of the CVC management team (i.e. team with strong venture capitalists or entrepreneurial background), the compensation systems used (Birkinshaw and Hill, 2005; Chesbrough, 2000), and the characteristics of the portfolio company (e.g. the development stages of the new venture: i.e. early stage, expansion, later stage; see for instance

Metrick, 2007) might influence the management approach and the performance of the CVC (Sykes, 1990).

At the *industry level*, Sahaym, et al. (2009) empirical study regarding CVC has explored in the same manner the relationship between R&D expenditures and CVC investments in various industries. This study has found that the use of CVC deals is higher in industries where R&D expenditures are higher (Sahaym, et al, 2009). But the authors have stressed on the limitations of their analysis and have recommended for future research on this topic, a deep analysis that may take in account other key factors at corporate as well as at industry levels. Dushnitsky and Lenox (2005a) have examined the degree to which industry and technology characteristics may drive the decision to invest in new ventures. Their studies have shown that parent corporations are more likely to invest in industries where there are greater technological opportunities. But this result is not sufficient to identify the directions and the magnitude of CVC investments (i.e. which industries receive the CVC investments and which receive more/less investments). Additionally, their analysis have shown that the industries with weak intellectual property protection and where complementary capabilities are better distributed are more likely to receive CVC investments, and the parent corporations are able to better appropriate the returns on innovation and on their CVC investments. Indeed, the less new ventures protect their innovations from imitation through legal mechanisms such as patents, the greater the corporation benefits from its CVC investments. For instance, in strong IP environment (e.g. in biotech industries), new ventures often patent their technology and license it to other companies (e.g. pharmaceutical firms) (Dushnitsky and Lenox, 2005a). In such environment, corporate investors do not gain a privilege to exploit this strategic technical knowledge to leverage their complementary capabilities. In contrast, in weak intellectual property protection environment, corporations that build good relationships with new ventures during the early stage may have a privilege of exclusivity to use this new or complementary knowledge.

Moreover, Strebel (1987) has shown in his study that firms must adapt their organizational strategies towards innovation with the four phases of the industry life cycle: emergence / development (1), growth / diffusion (2), differentiation / maturity (3) and decline/ rejuvenation (4). During these phases, corporations may stimulate their innovation through internal and external entrepreneurial activities by adopting “open innovation” strategies (Strebel, 1987). The “open innovation” strategies (e.g. the external CVC) are commonly associated with the phases (1) and (2) of the industry life cycle while the “closed innovation”

strategies are associated with the phases (3) and (4) (Strebel, 1987). Previous studies on industry life cycle and firm innovation have demonstrated that the innovation rate of firm (e.g. measure with the patenting rate) is high during the emergent phase of industries but that it decreases over as industries mature and decline (Abernathy and Utterback, 1978; Porter, 1983; Clark 1983; Anderson and Tushman, 1990). The corporate venture capital may help the corporation for instance to have a window on breakthrough technologies and to learn from new ventures during the emergent and growth phases. During the maturity or the decline phases, corporation may be able through its venturing activities to have access to complementary knowledge and capabilities from new ventures or from competitors in order to sustain its core business and to expand its market.

After reviewing the factors at corporate and industry level that influence CVC activities in general and particularly the management of CVC, we will specify the preliminary empirical study we would like to make in this paper. The paper should be considered as an exploratory study and as a part of a research project that seeks to better understand the key factors particularly at industry and corporate level that may influence the decision of a corporation to invest in CVC and particularly to understand which corporate venture capital management approach better fit with a given corporate environment.

2. RESEARCH QUESTION AND HYPOTHESIS

Based on the literature review outlined above, we want to explore how sector characteristics are affecting the prevalence of CVC among large corporations and within those sectors. For this study we have limited our preliminary test to how the R&D intensity that can be used as a metric for the assessment of innovative activity is affecting the prevalence of CVC among large corporations. The R&D intensity is the ratio between the R&D investments and the revenues (net sales) of a given company or group of companies in a specified year (European Commission, 2007, 2008; Chao and Kavadias, 2009). The R&D intensity may be used as indicators to predict the arrival of technological opportunities that are anticipated by economic actors in an industry (Kortum and Lerner, 2000). Kortum and Lerner (2000) have observed that there is a robust relationship between patenting, R&D and venture capital and argue that independent VC activities in general, have shown a positive and significant impact on patenting patterns (i.e. the innovation rates) across industries. For the context of CVC, our

hypothesis is as follows: the industrial sector with higher CVC prevalence will be more likely to demonstrate higher R&D intensity.

3. METHODOLOGY

The empirical test is based on a combination of secondary data collected from various sources including the “Global Fortune 500” website, different VC associations’ membership directories, the VentureXpert, the Datastream and the Compustat databases. We used these sources to collect financial data, industry data and data on CVC activities for the corporations listed in the fortune 500 ranking from the July 21, 2008 issue. We used the “Global Fortune 500” corporations as sample because they are well-established firms operating in various industrial sectors. Our analysis aims to understand why some large corporations set up CVC units while others did not. The analysis of the collected data sheds more light on the relation between characteristics of the industrial sectors, characteristics of the parent corporation, and characteristics of their CVC activities.

Using the membership directories of various VC associations, we identified firstly the “Global Fortune 500” firms that are members of the EVCA, NVCA or other local VC associations and we considered that they are involved in CVC activities, or had set up a CVC unit. We identified in the same way the name of their CVC units. We also took in account those corporations listed in the VentureXpert database and which CVC deals’ round date are not older than 2006. The Figure 1 shows this identification process.

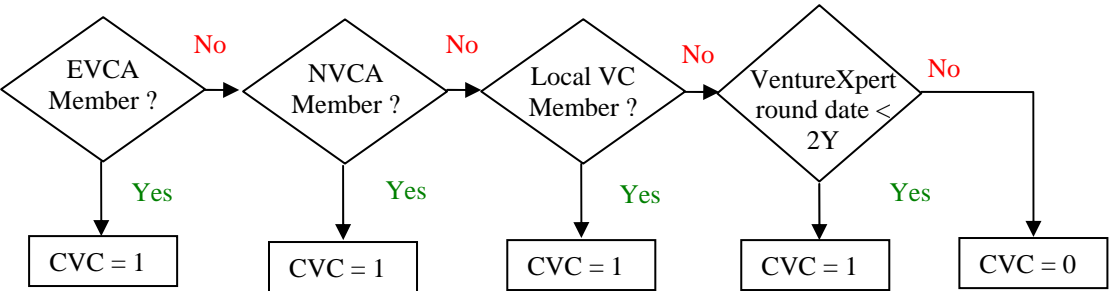


Figure1: Identification of Fortune 500 firms that set up a CVC unit

Additionally, we made a classification of the industrial sectors on the basis of the Industry Classification Benchmark (ICB) used by the Dow Jones and the FTSE Indexes. Multi-

business companies have been included in the industry that represents the greatest volume of their revenues. The R&D intensity by industrial sector is calculated by using the above-mentioned industry classification, the firms' R&D investment and revenue in 2007.

4. STATISTICAL RESULTS AND DISCUSSION

As the Figure 2 shows, we observed that around 20,2 % of the Fortune 500 firms have set up a CVC unit.

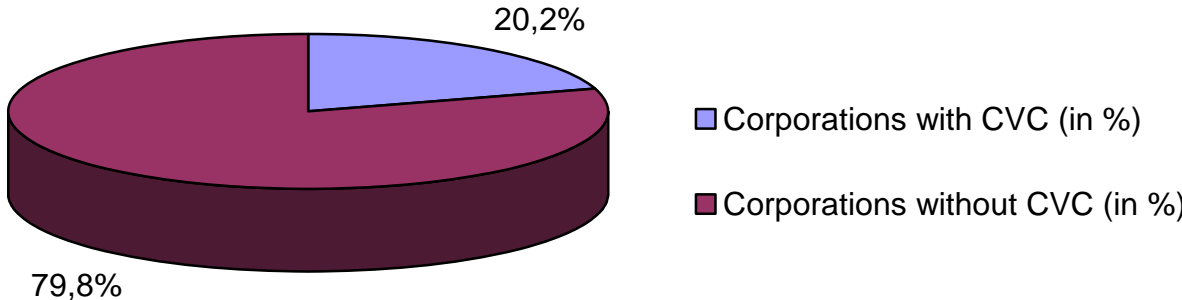


Figure2: Share of Fortune 500 firms that set up a CVC unit

The Table 1 shows the number of large corporations, the prevalence of CVC within each industrial sector and the R&D intensity of those industries.

As can be seen in Table 2, those industrial sectors with a high prevalence of CVC (i.e. pharmaceutical & biotechnology and computer related industries) have shown as expected higher R&D intensity, except for the telecommunication area. The medium R&D intensity by the telecommunication area can be explained by the fact that the majority of firms included in this category are fix and mobile telecommunication service providers. Their internal R&D is more focused on services development and they generally develop their technologies with (or acquire their technologies from) other complementary industries like for instance the electronic and electrical equipments industry or the computer related industry.

For the industries where the prevalence of CVC is medium, the R&D industry is as expected equivalently medium. The industries with a lower prevalence of CVC and a lower R&D intensity have shown likewise the proposed hypothesis.

As possible interpretation for those observations, we could say that the decision of large corporations to set up and invest in CVC may be influenced as well by factors specific to the corporation and by factors characterizing the industrial sectors such as the R&D intensity. The

R&D intensity at industry level is a predictor for the arrival of technological opportunities in an industry. This could explain why the prevalence of CVC is high among industries that show a high R&D intensity. But in general and as explained above, a corporation is often interested in breakthrough innovations and/or complementary knowledge and capabilities as its industry is emergent or become mature. These interests and the amount the corporation will invest in each CVC deals may depend on the corporate strategic orientation and on these various key characteristics at corporate and industry levels. There is a need to complete this benchmark of CVC activities at industry level and to deepen the understanding of the link between these different key factors.

Industries	N	Share of corporations with CVC (in %)	R&D intensity (in %)
Pharmaceutical and biotechnology	12	66,7	15,80
Telecommunications	25	44	2,62
Computer related industries (Hardware, software, Office Equipments)	21	42,9	6,38
Financials (Banks & Insurance)	128	29,7	2,40
Chemicals	12	25	3,62
Industrial Goods & Services (Electronics and Electrical Equipments)	19	21,1	3,29
Health care equipments & services	5	20	4,55
Automotive	33	15,2	2,92
Consumer goods and services	94	13,8	0,51
Oil & gas	46	8,7	0,24
Basic materials and mining	23	8,7	0,62
Utilities (energy, electricity, Gas, Water)	25	8	0,35
Transportation industry	31	3,2	3,45
Construction & heavy engineering industries	26	0	1,17

Table 1: The prevalence of CVC within the Fortune 500 firms classified by industry and the industrial R&D intensity

		Industry classification according to the share (in %) of firm with CVC		
		Low (< 15)	Medium (≥15 and <40)	High (≥40)
Industry classification according to the R&D intensity (in %)	High (≥5)			<ul style="list-style-type: none"> ➤ Pharmaceutical and biotechnology ➤ Computer related industries
	Medium (≥2 and <5)	<ul style="list-style-type: none"> ➤ Transportation industry 	<ul style="list-style-type: none"> ➤ Financials ➤ Chemicals ➤ Industrial Goods & Services (Electronics and Electrical Equipments) ➤ Health care equipments & services ➤ Automotive 	<ul style="list-style-type: none"> ➤ Telecommunications
	Low (< 2)	<ul style="list-style-type: none"> ➤ Oil & gas ➤ Consumer goods and services ➤ Basic materials and mining ➤ Utilities ➤ Construction & heavy engineering industries 		

Table 2: Industry differences regarding the CVC activities and the industrial R&D intensity

CONCLUSION

In this paper, we made an exploratory study. We explained first how the exploration and exploitation of internal as well as external innovations and business opportunities are complementary and vital for corporations to prosper and to sustain a high profitability and a competitive advantage. We highlighted the important role “open innovation” tools can play in general and particularly the role the corporate venture capital can play in corporate innovation process. We explained the motives why corporations invest in CVC and we emphasized particularly the strategic objectives that tend to be much more important for corporations. Based on ex-ante scientific researches we emphasized the fact that CVCs are in many cases less efficient than an independent venture capital, due to its focus on the strategic objectives and the specificities or constraints related to its organizational environment. We emphasized on the importance of managing a CVC in line with the corporate strategic objectives, the characteristics of the corporate investors and the characteristics of the industry.

This paper identified various key factors at corporate and industry level that may influence the decision of a corporation to engage in CVC activities. We describe these factors and we tested as illustration how the characteristics of the industries influence the prevalence of CVC among well-established corporations. To make this preliminary test, we consolidated various database sources and we classified the large corporation sample we used by industrial sector. After identifying whether those corporations had set up a CVC unit or not, we examined the prevalence of CVC within the industries. We computed the industrial R&D intensity and we compared this with the prevalence of CVC in each industrial sector. We found out that the industrial sectors with a higher CVC prevalence have demonstrated a higher R&D intensity. The R&D intensity has been used to predict the arrival of technological opportunities within an industry. But this indicator can not help to predict direct implications for the management of a CVC (e.g. for the identification of the directions or the magnitude of CVC investments). In order to better understand the link between the CVC activities, the characteristics of the parent corporation and the characteristics of the industries, we proposed to operationalize in our future research various key factors we identified at corporate and industry levels and to complete our benchmark of CVC activities. Our objective is to identify the CVC configurations or management approaches that better fit with a given corporate industrial environments.

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