

Strategic growth through corporate venture capital activities: investment focus and strategies - empirical evidence

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Abstract:

Well-established corporations relied more and more on open innovation approach such as the corporate venture capital in order to identify new business opportunities outside their boundaries. The pursuit of new business opportunities is an important source of value creation and competitive advantages in terms of technology and market. The main objectives of using such approach are strategic and aim at complementing in-house research and development, developing synergy with existing business units, enabling new value creation from collaborations with emerging venture-backed companies and facilitating corporate changes, future growth and expansion on emerging markets. We identified four main CVC investment focus and strategies: focus on (1) exploring new technologies vs. (2) exploiting existing technologies or on (3) exploring new markets vs. (4) developing existing markets. We additionally analyze the factors that may influence the choice of the above-mentioned CVC investment focus and strategies.

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1. Introduction

Well-established corporations relied more and more on open innovation approach such as the corporate venture capital in order to identify new business opportunities outside their boundaries. The pursuit of new business opportunities is an important source of value creation and competitive advantages in terms of technology and market. The underlying objectives of using such approach are strategic and aim at complementing in-house research and development, developing synergy with existing business units, enabling new value creation from collaborations with emerging venture-backed companies and facilitating corporate changes and future growth.

In this paper, we used a quantitative method in order to analyze and shed more light on the question: What drive large corporations' CVC program to invest in new ventures that are operating in their own business sectors and in their own current markets?

The first part of this paper summarizes the main benefits from CVC activities that have been published in the recent academic literature. The second part of this paper uses a sample of well-established CVC investments and analyses the CVC investment orientations in terms of technology and market. In the third part we discuss the factors that influence the CVC investment focus and strategies. We find out that the performance (e.g. the ROA or the revenue change), the level of diversification, the tenure or the CEO may significantly influence the focus of the CVC investments. Those CVC investments may be focus on (1) exploring new technologies vs. (2) exploiting existing technologies or on (3) exploring new markets vs. (4) developing existing markets.

2. Literature Review

Corporate venture capital investments have been recognized as a powerful tool to explore and exploit new innovative and growth opportunities outside own corporate boundaries, as a means to boost future revenue (Gompers and Lerner, 2000; Birkinshaw, 1997; Block and MacMillan, 1993; Hill, et al., 2009). Many large corporations set up a corporate venture capital (CVC) program and invest in external entrepreneurial ventures in order to source innovative ideas, to have a window on emerging technologies and to save R&D costs and time as well (Alvarez and Barney, 2001; Dushnitsky, 2006; Hill and Birkinshaw, 2008; Hill et al., 2009; Zahra, 1996; Dushnitsky and Lavie, 2010). For well-established corporations, the pursuit of new business opportunities is an important source of value creation and competitive advantages in terms of technology and market. The main objectives of using CVC investments approach are strategic and aim at complementing in-house research and development, developing synergy with existing business units, enabling new value creation from collaborations with emerging venture-backed companies and facilitating corporate changes and future growth (Hellmann, 2001; Gompers, 2002; Bannock Consulting, 1999; Hill, et al., 2009).

2.1 The reasons why corporations invest in corporate venture capital

In the recent scientific literature, we identify two main categories of strategic benefits/objectives: the leveraging benefits and the option building benefits.

Well-established corporations engage in CVC activities in order to **leverage existing technologies, platforms and complementary resources** by stimulating and securing the demand for their current technologies and products (Dushnitsky and Lenox, 2005a, 2005b, 2006; Chesbrough, 2002; Riyanto and Schwenbacher, 2006; Kann, 2000; Maula, 2007). CVC investments give to parent companies an opportunity to support the internal and external use of their patents (Chesbrough, 2002; McKinsey & Co., 1998) and to facilitate the adoption of their technology (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).

Additionally to the leveraging objectives, the CVC activities enable parent corporations to **build new options** since they allow the investing companies to explore and exploit new technologies and markets in order to anticipate and respond faster to market changes. CVC activities may facilitate the corporate diversification activities and expansion on markets different from those in which the corporation currently operates (Sykes, 1986; Kann, 2000; Keil, 2000; Chesbrough, 2002). Investing in corporate venture capital program 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). 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).

This study aims at exploring the factors that influence the CVC investment focus and strategies. We identify four main investment focus or strategies of CVC programs (see table 1).

| | Market exploration vs. market reinforcement strategies <i>(Investments in startups located in own market geographic areas vs. in other new geographic areas)</i> | |
|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Technology exploration vs. technology reinforcement strategies <i>(Investments in own vs. in other new business sectors)</i> | - Focus on own existing technologies (same business sectors) - Focus on own current markets | - Focus on own existing technologies (same business sectors) - Focus on new markets (e.g. emerging markets) |
| | - Focus on new or complementary technologies (other new or complementary business sectors) - Focus on own current markets | - Focus on new or complementary technologies (other new or complementary business sectors) - Focus on new markets (e.g. emerging markets) |

Table 1: Mapping the corporate venture capital investments: CVC investment strategies in terms of technologies and markets

3. Research Hypotheses

In Section 2, we presented various studies examining the strategic motives of large corporations for setting up CVC programs and investing in new promising start-ups. In this section, we identify different factors that may influence the investment focus and strategies of CVC programs and we present several hypotheses that will be tested in the next sections.

The recent CVC literatures have shown that several factors at corporate, new venture or business environment levels may motivate parent corporations to set up a CVC program and to develop a technology or a market diversification or reinforcement strategies for their CVC investments. Firms often engage in corporate entrepreneurship to strengthen performance and secure further growth through both strategic renewal and the creation of new

business opportunities (Guth and Ginsberg, 1990; Lumpkin and Lichtenstein, 2005). The need to engage in CVC activities increase much more as the parent corporation product portfolio matures and the corporate performance turns down or stagnates. This may also motivates the choice of the CVC investment focus and strategies.

Our initial hypotheses are related to the need of corporations to strengthen their performance and boost further growth through their CVC investment activities.

Hypothesis 1a: *The revenue change of the corporation is positively related to the likelihood of CVC investments in the same business sector.*

Hypothesis 1b: *The return on assets of the corporation is positively related to the likelihood of CVC investments in the same business sector.*

Hypothesis 1c: *The revenue change of the corporation is positively related to the likelihood of CVC investments in new venture located in the same market geographic areas.*

Hypothesis 1d: *The return on assets of the corporation is positively related to the likelihood of CVC investments in new venture located in the same market geographic areas.*

Additionally to the financial performances of the parent corporation, the availability of financial resources may also motivate the choice of the CVC investment focus and strategies. Previous studies (Fazzari and Athey, 1987; Fazzari, Hubbard, and Petersen, 1988) have shown that corporate investments in general and internal and external R&D expenditures in particular (e.g. CVC can be viewed as an external R&D investments) are highly sensitive to corporate cash flows (i.e. to the availability of internal funds). Schroth and Szalay (2010) study how firm's financing constraints affect its decision to pursue innovations and particularly how it affects the patenting race. They identify that innovative success depends on how much more cash the firm has relative to its rivals. Furthermore, Souder and Shaver (2010) examine the conditions under which firms make long horizon investments (i.e., investments that take a long period of time to pay off). Capital availability is a function of performance and provides an organization with slack, and high performers are able to use slack search to foster future growth through the development of new businesses (Souder and Shaver, 2010). Souder and Shaver (2010) find a positive and significant effect of relative operating cash flow on long-horizon investments. For incumbent firms, CVC investments due to its strategic orientation may be viewed as long-horizon investments and may be sensitive to the firm's cash flow variation. Additionally, Dushnitsky and Lenox (2005a) have investigated the linkage between the corporate change in cash flow and the CVC investments. They indicated a positive relationship between firm CVC investments and firm internal cash flow.

Hypothesis 2a: *A corporation with significant financial internal resources is more likely to invest through its CVC program in the same business sector.*

Hypothesis 2b: *A corporation with significant financial internal resources is more likely to invest through its CVC program in new venture located in the same market geographic areas.*

In addition to the above mentioned factors at corporate level that influence corporate venture capital activities, other factors being worth mentioning are the level of diversification and the stability of the management which might influence the CVC choices setting. The top management commitment and its stability may have an impact on CVC programs

(Chesbrough, 2002). In particular, investment decisions may be influenced by CEO tenure (e.g., Hambrick and Fukutomi, 1991).

Hypothesis 3a: The level of diversification of the corporation is negatively related to the likelihood of CVC investments in the same business sector.

Hypothesis 3b: The level of diversification of the corporation is positively related to the likelihood of CVC investments in the same market geographic areas.

Hypothesis 4a: The CEO tenure is positively related to the likelihood of CVC investments in the same business sector.

Hypothesis 4b: The CEO tenure is positively related to the likelihood of CVC investments in the same market geographic areas.

4. Data and Variables

In this study, we focus particularly our analysis on the 2008 Fortune Global 500 list of companies. We use the membership directories of the EVCA, the NVCA and other local VC associations of the same year (2008) to identify whether the Global Fortune 500 Companies have set up a CVC unit or not. For those Global Fortune 500 companies not members of these VC associations, we further take into account the corporations that are listed as parent companies in the VentureXpert database and those CVC deals' dates are not earlier than 2006. We identify in the VentureXpert database the CVC investments and deals of the companies that have set up a CVC program. We classify parent corporations' and new ventures' economic activities according to the Industry Classification Benchmark (ICB) used by the Dow Jones and the FTSE Indexes. Multi-business companies have been classified in the industrial sector that represents the greatest volume of their revenues. Finally, we include in all our specifications dummies for the major industry classification to account for differences in opportunities across industries. In order to build our independent variables, we gather additional data at corporate- and industry- and country-levels from several sources (Fortune Magazine, Datastream, Compustat, Damodaran, Eurostat, Businessweek, Business World/INSEAD, Global Entrepreneurship Monitor, etc. databases). The Table 2 describes all dependant and independent variables we use.

(Insert table. 2)

Since our dependent variables are dummy variables "CVC investment in same business sector" (dummy = 1 if the CVC invests in the same business sector) and "CVC investment in the same market geographic areas" (dummy = 1 if the CVC invests in the market geographic areas), we use in all analyses Probit regressions as the method of estimation.

5. Preliminary results and analysis

In this section we use the above-mentioned dataset and probit regressions as method of estimation to investigate what drive large corporations' CVC program to invest in new ventures that are operating in their own business sectors and in their own current markets.

The table 3 presents the statistic summary of our sample.

(Insert table. 3)

The table 4 presents the statistic summary of our sample that shows a mapping of the CVC investment strategies in terms of technologies and markets.

(Insert table. 4)

The table 5 provides the pair-wise correlation values.

(Insert table. 5)

The table 6 summarizes the results of the different regressions we ran. It presents particularly the determinants of CVC investments in the same business sector.

(Insert table. 6)

The table 7 summarizes the results of additional regressions (7) and (8) and presents particularly the determinants of CVC investments in the same current markets.

(Insert table. 7)

In our first regression, we control the new venture's industry and geography. Since the industry and geography variables are dummies, we use the ICT (Computer related) industry and firms located in Europe as based groups. The effect of the energy (renewable/sustainable energy), telecommunication and VC funds sectors is positive and significant at 1%, which means as compared to the ICT sector; those new ventures in these industries will be more likely to invest in the same business line, given the other variables being constant. For instance in the sustainable energy sector and compared to the ICT industry, we will witness approximately 85% more that corporations and new ventures have the same line of business. On the other hand, the investments of corporations in new ventures in industrial goods & services and in consumer goods industries seem to target other business lines as a strategy to explore other business opportunities and to extend their diversification activities. The estimation results do not indicate the geographical impact of new ventures' regions on the CVC investment in same business sector. The coefficients of geography variables are statistically insignificant. According to the corporate financial variables we find a positive relation and significance at 1% for the revenue change, the return on assets and the number of employees. This provides strong support for the hypothesis 1a and 1b and means that the corporate revenue change and return on assets influence positively the likelihood of CVC investments in same business sector.

In our second regression, we take into account the total assets of the parent corporation. The previous results related to the revenue change, the return on assets, the industries and the countries remain the same. We use the economic size (log of total assets) of the parent corporation. We found that it has a positive and significant effect (at 1%) on the likelihood of CVC investments in same business sector, but the effect is marginally decreasing when we include the square of corporations' economic size (total assets). Larger firms will invest more in the same business sector, however, as they move up their expansion scale, the focus strategy does not produce profits as expected and they start to consider the diversification through investing in another business sector (diversification strategy). This regression provides strong support for the importance of the assets (hypothesis 1b) in the CVC investment focus and strategies.

In the third regression, we include as well as corporate, industry/country and new venture factors. We test particularly the effect of the corporate diversification level, the corporate financial resources, the managerial stability, the geography of the corporation, the industry technology potential and opportunities and finally the degree of innovation and entrepreneurial activities at country levels. The results concerning the economic size (total assets) remain robust. The corporate diversification level is significant at 1% and has a negative effect on the likelihood of CVC investments in same business sector. That means well-diversified corporations (hypothesis 3a) that have sufficient total assets, high number of skilled employees, stable management and operate in an innovative environment or an industry with high technology potential will probably invest much more in its own/current business sectors. Surprisingly, they will not invest in new venture located in environment where the entrepreneurial activities are well developed and where the business opportunities are high in the same sector; may be because they want to avoid helping potential future competitors. We could not find any support for hypothesis 2a related to the availability of financial internal resources. The results related to this variable are not significant.

In the regressions (4), we leave aside the ROA, and the industries of the new ventures. The previous results related to the total asset, the corporate diversification level, the management stability, the industry technology potential, the industry opportunity growth, the innovative environment remain significant and consistent.

In the regressions (5) and (6), we leave aside the ROA, and we include all factors related to the new ventures (industries, development stage, and geography). The revenue change becomes a determinant of CVC investments in the same business sector as in the previous regressions (1) and (2). Moreover the previous results remain consistent and additionally we found out that taking in account these variables and in comparison to the investments in the early stage, CVCs will avoid investing during the expansion/growth and the later stage or the other stages of the new ventures. But as we argue in the hypothesis 1c, CVCs are interested in the emerging market and invest in the same business in other countries such as China, South America and other Asia (market expansion strategy). We find a support for hypotheses 1c, 1d, 3b, 4a, and 4b (see regressions (7) and (8)). We do not find a support for the hypothesis 2b.

6. Concluding Remarks

In this paper, we review motives and the benefits of CVC investments and we identify the factors that influence the CVC investment focus and strategies. We focus our attention on the 2008 Fortune Global 500 list of companies and we specifically target the CVC investments and deals of the companies that have set up a CVC program. We study the business characteristics of those large corporations, their business environment and the characteristics of the start-ups they have invested in. We use multiple probit regressions to identify the determinants of CVC investments in the same business sector and in the same markets.

We found out that the revenue change, the return on assets, industries with significant and high industrial R&D intensity (high technology potential), environments with a higher level of innovativeness and new ventures located in emerging countries are positively influencing the decision of CVC investments in the same business sector and in the same market. In contrast, a high level of diversification of the corporation, environments with a higher level of entrepreneurial activity, are negatively influencing the decision of CVC investments in the same business sector but are positively influencing the decision of CVC investments in the same markets. We could not find a support for whether internal financial

resources are determinant for CVC investments in the same business sector or in the same markets, the results shown by this variable are not significant but the coefficients are positive.

To conclude we could say that large corporations invest much more in innovative entrepreneurial ventures and particularly those which businesses are complementary to their core business. Thus, they invest mostly for strategic motives and explore proactively newness or complementary resources in order to build additional competitive capabilities or facilitate a strategic repositioning. They avoid investing in potential future competitors. Moreover, the more the parent corporation is diversified the less the likelihood that it will invest in its own sector. Most CVC programs invest in portfolio companies operating in industry with high technology potential or in portfolio companies located in innovative or emerging countries. This paper stresses on what drives companies to set up CVC programs and to target specific new ventures.

As managerial implications, this study highlights the importance of several factors at corporate, new venture, industrial and country levels. These factors may serve as indicators for the assessment of firms or industry performance, as control lever for the identifications of capabilities needs. The results may help managers to develop an efficient strategy for their CVC investments, to add more value and enable greater strategic benefits from their investment portfolios.

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TABLE 2: Definition of Variables

| Variable | Definition |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Same business sector (Dummy) | Dummy = 1 if the CVC invests in the same business sector |
| same market geographic areas (Dummy) | Dummy = 1 if the CVC invests in the same business sector |
| Corporate Revenue | Annual revenue of the corporation, in USD million for the fiscal year ended Dec. 31, 2007 |
| Corporate Revenue change | Revenue change of the corporation, measured at the fiscal year ended Dec. 31, 2007 |
| Corporate Assets | Total asset value (in accounting value) of the corporation, in USD 1000 billion for the fiscal year ended Dec. 31, 2007; this variable measures the size of the corporation |
| Corporate ROA | "Return On Assets" of the corporation, as measured by the ratio of net income over total assets for the fiscal year ended Dec. 31, 2007 |
| Corporate Financial Resources | Ratio of Net Operating Cash Flows over total assets (Source: Datastream; Compustat) |
| Corporate Nbr. Employees | Number of employees, in thousands for the fiscal year ended Dec. 31, 2007 |
| Corporate Diversification level | Number of business lines that participate to the revenue of the corporation |
| Corporate CEO Tenure | Number of years that the CEO was already in place at the time of the analysis (Source: Businessweek database) |
| Corp. North America (Dummy) | Dummy = 1 if the corporation's headquarters is located in North America (USA and Canada) |
| Corp. Europe (Dummy) | Dummy = 1 if the corporation's headquarters is located in Europe |
| Corp. Other Countries (Dummy) | Dummy = 1 if the corporation's headquarters is located Asia-Pacific and in any other country than those specified above |
| Corporate industry (Dummies) | Dummy = 1 if the corporation is active in a specific industry sector; we use a dummy variable for each of the following industries: Automobiles & parts; Basic materials; Chemicals; Computer related industries (hardware, software, office equipments); Consumer goods; Consumer services & retail; Electronics, electrical components & equipment; Financials (banks, insurance & real estate); Health care equipment & services; Heavy construction & building materials; Industrial engineering & farm machinery; Industrial transportation; Oil & gas; Pharmaceuticals & biotechnology; Telecommunications; Utilities |
| R&D Industry Index | R&D investment expressed as a percentage of net sales for each industry (Source: 2008 EU Industrial R&D Investment Scoreboard database) |
| Industry Market-to-Book Ratio | Value to book ratios by industry group for 2006 (Source: Damodaran's data site) |
| Global Innovation Index | Value of the "Global Innovation Index" (as constructed by Business World/INSEAD) of the country where the corporation's headquarters is located |
| TEA | Value of the 2008 "Early-Stage Entrepreneurial Activity" index (as constructed by the Global Entrepreneurship Monitor) of the country where the corporation's headquarters is located |
| Early-Stage Investments (% GDP) | Venture capital early-stage investments by country, as a percentage of GDP (Source: Eurostat, 2009) |
| Later-Stage Investments (% GDP) | Venture capital expansion-stage and replacement investments by country, as a percentage of GDP (Source: Eurostat, 2009) |
| G 20 membership (Dummy) | Dummy = 1 if the corporation's headquarters is located in a G 20 country |
| New venture North America (Dummy) | Dummy = 1 if the new venture is located in North America (USA and Canada) |
| New venture Europe (Dummy) | Dummy = 1 if the new venture is located in Europe |
| New venture Other Countries (Dummy) | Dummy = 1 if the new venture is located Asia-Pacific and in any other country than those specified above |
| New venture industry (Dummies) | Dummy = 1 if the new venture is active in a specific industry sector; we use a dummy variable for each of the following industries: Energy, Chemicals and materials; Industrial Eng. good & services; Technology (Computer related industries, hardware, software, office equipments, semiconductors); Consumer goods; Financials (funds); Health care (Pharmaceuticals, biotechnology, equipment & services); Telecommunications |
| New venture Development stage (Dummies) | Dummy = 1 if the new venture is in a specific development stage; we use a dummy variable for each of the following stages (Early Stage; Expansion and Growth; Later Stage and others) |

TABLE 3: Summary Statistics

Variables are defined in Table 1.

| Variable | Observations | Full Sample | | | |
|-----------------------------------------|--------------|-------------|--------------------|---------|---------|
| | | Mean | Standard Deviation | Minimum | Maximum |
| Same business sector (Dummy) | 2699 | 0.139 | 0.346 | 0 | 1 |
| Corp. Revenue | 2699 | 73910.43 | 58749.91 | 17037.4 | 210783 |
| Corp. Revenue change | 2699 | 20.148 | 22.949 | -9.9 | 88.6 |
| Corp. ROA | 2699 | 4.986 | 6.558 | -10 | 17 |
| Corp. Assets | 2699 | 228845.6 | 304729.7 | 12879.1 | 1124788 |
| Corp. Financial Resource | 2597 | 0.093 | 0.066 | -0.071 | 0.228 |
| Corp. Nbr. Employees | 2699 | 140808.2 | 107319.4 | 9626 | 390000 |
| Ln (Nbr. Employees) | 2699 | 11.507 | 0.917 | 9.1722 | 12.873 |
| Corp. Diversification level | 2681 | 2.123 | 1.106 | 1 | 7 |
| Corporate CEO Tenure | 2528 | 6.276 | 4.485 | 1 | 32 |
| Corp. Europe (Dummy) | 2699 | 0.256 | 0.436 | 0 | 1 |
| Corp. North America (Dummy) | 2699 | 0.579 | 0.494 | 0 | 1 |
| Corp. Other Countries (Dummy) | 2699 | 0.165 | 0.371 | 0 | 1 |
| R&D Industry Index | 2699 | 3.391 | 4.195 | 0.38 | 15.15 |
| Industry Market-to-Book Ratio | 2551 | 3.686 | 2.534 | 1.49 | 8.36 |
| Global Innovation Index | 2699 | 5.277 | 0.647 | 3.38 | 5.8 |
| TEA | 2699 | 7.379 | 2.683 | 3.2 | 9.6 |
| G 20 membership (Dummy) | 2699 | 0.983 | 0.128 | 0 | 1 |
| Early-Stage Investments (% GDP) | 2253 | 0.029 | 0.007 | 0.011 | 0.055 |
| Later-Stage Investments (% GDP) | 2253 | 0.109 | 0.051 | 0.035 | 0.31 |
| NV North America (Dummy) | 2699 | 0.874 | 0.332 | 0 | 1 |
| Nv Other Countries (Dummy) | 2699 | 0.027 | 0.162 | 0 | 1 |
| NV Europe (Dummy) | 2699 | 0.098 | 0.298 | 0 | 1 |
| NV.Energy ind | 2699 | 0.036 | 0.183 | 0 | 1 |
| NV.Ind Goods & services | 2699 | 0.017 | 0.131 | 0 | 1 |
| NV. Consumer goods | 2699 | 0.025 | 0.156 | 0 | 1 |
| NV. Telecom | 2699 | 0.165 | 0.371 | 0 | 1 |
| VC Funds | 2699 | 0.001 | 0.101 | 0 | 1 |
| NV. Telecom ICT & Computer related Ind. | 2699 | 0.583 | 0.493 | 0 | 1 |
| NV. Health care Ind. | 2699 | 0.157 | 0.364 | 0 | 1 |
| NV. Early stage (Dummy) | 2699 | 0.218 | 0.413 | 0 | 1 |
| NV. Expansion and Growth Stage (Dummy) | 2699 | 0.449 | 0.497 | 0 | 1 |
| NV. Later Stage (Dummy) | 2699 | 0.246 | 0.431 | 0 | 1 |
| NV. Other Stages (Dummy) | 2699 | 0.087 | 0.282 | 0 | 1 |

| TABLE 4: descriptive Statistics | | | | |
|------------------------------------------|---------------------------------|--------------------------------------|--------------------|--------------|
| | | Market exploration strategies | | |
| | | <i>New market</i> | <i>Same market</i> | <i>Total</i> |
| Technology exploration strategies | <i>Other industrial sectors</i> | 959 | 1366 | 2325 |
| | <i>Same industrial sector</i> | 113 | 261 | 374 |
| | <i>Total</i> | 1072 | 1627 | 2699 |

TABLE 5: Correlation Matrix

TABLE 5: Correlation Matrix

Variables are defined in Table 1. Values shown are pairwise correlations

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
|----------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|
| (1) Same business sector (Dummy) | 1.0000 | | | | | | | | | | | |
| (2) Corporate Revenue | 0.1068* | 1.0000 | | | | | | | | | | |
| (3) Corporate Revenue change | 0.1413* | -0.0312 | 1.0000 | | | | | | | | | |
| (4) Corporate Assets | -0.1264* | 0.5074* | -0.2347* | 1.0000 | | | | | | | | |
| (5) Corporate ROA | 0.0793* | 0.0273 | -0.1320* | -0.1884* | 1.0000 | | | | | | | |
| (6) Corporate Financial Resources | 0.1246* | 0.0953* | 0.1041* | -0.3739* | 0.7145* | 1.0000 | | | | | | |
| (7) Corporate Nbr. Employees | 0.1026* | 0.7473* | 0.2431* | 0.5054* | -0.2051* | 0.0072 | 1.0000 | | | | | |
| (8) Corporate Diversification level | -0.1179* | 0.2568* | 0.0094 | 0.0700* | -0.2448* | -0.0025 | 0.2933* | 1.0000 | | | | |
| (9) Corporate CEO Tenure | -0.1649* | -0.0246 | -0.1509* | -0.0198 | 0.1048* | 0.2175* | -0.1025* | 0.2898* | 1.0000 | | | |
| (10) Corp. North America (Dummy) | 0.0704* | 0.4653* | 0.1585* | 0.1679* | 0.3623* | 0.4451* | 0.3750* | 0.4110* | 0.2803* | 1.0000 | | |
| (11) Corp. Europe (Dummy) | 0.0305 | -0.2614* | -0.0367 | -0.2763* | -0.3409* | -0.1054* | -0.0977* | -0.0910* | -0.2059* | -0.6874* | 1.0000 | |
| (12) Corp. Other Countries (Dummy) | -0.1294* | -0.3115* | -0.1676* | 0.1014* | -0.0812* | -0.4615* | -0.3838* | -0.4385* | -0.1358* | -0.5219* | -0.2607* | 1.0000 |
| (13) R&D Industry Index | 0.0498* | -0.2585* | -0.0248 | -0.3433* | 0.5138* | 0.6545* | -0.2176* | -0.1249* | 0.1307* | 0.2313* | -0.0505* | -0.2481* |
| (14) Industry Market-to-Book Ratio | -0.1597* | -0.5048* | 0.1261* | -0.4672* | 0.0049 | 0.2229* | -0.4807* | 0.0779* | 0.5479* | -0.0895* | 0.2465* | -0.2051* |
| (15) Global Innovation Index | 0.0941* | 0.4834* | 0.1236* | 0.1535* | 0.4240* | 0.4928* | 0.4096* | 0.3487* | 0.2126* | 0.9479* | -0.5632* | -0.5985* |
| (16) TEA | 0.0795* | 0.4546* | 0.1027* | 0.1636* | 0.4615* | 0.5194* | 0.3666* | 0.3487* | 0.2552* | 0.9709* | -0.7059** | -0.4616* |
| (17) G 20 membership (Dummy) | -0.1320* | 0.0828* | -0.0007 | 0.0601* | 0.0959* | -0.0080 | 0.0092 | -0.0196 | 0.0556* | 0.1527* | -0.1094* | -0.0745* |
| (18) Early-Stage Investments (% GDP) | -0.0032 | 0.3224* | 0.0142 | 0.2673* | 0.5005* | 0.3917* | 0.1980* | 0.1641* | 0.1185* | 0.8587* | -0.8587* | . |
| (19) Later-Stage Investments (% GDP) | -0.0885* | 0.1099* | -0.0241 | 0.0985* | 0.4715* | 0.4253* | 0.0224 | -0.0066 | -0.0433 | 0.3817* | -0.3817* | . |
| (20) NV Europe (Dummy) | -0.0062 | -0.0002 | -0.1146* | -0.0943* | -0.0308 | 0.0918* | 0.0294 | -0.0458 | -0.0592* | -0.1525* | 0.2433* | -0.0831* |
| (21) NV North America (Dummy) | 0.0036 | 0.0345 | 0.1248* | 0.0878* | 0.0317 | -0.0581* | 0.0149 | 0.0626* | 0.0558* | 0.1671* | -0.1973* | 0.0096 |
| (22) Nv Other Countries (Dummy) | -0.0008 | -0.0753* | -0.0427 | -0.0100 | -0.0087 | -0.0522* | -0.0891* | -0.0456 | -0.0051 | -0.0660* | -0.0401 | 0.1349* |
| (23) NV.Energy ind | 0.1025* | 0.1858* | -0.0667* | 0.0215 | 0.0895* | 0.0634* | -0.0090 | 0.0530* | 0.0648* | 0.0624* | -0.0438 | -0.0316 |
| (24) NV.Ind Goods & services | -0.0288 | -0.0008 | -0.0374 | 0.0489 | -0.0161 | -0.0190 | 0.0308 | 0.0211 | 0.1114* | 0.0102 | -0.0326 | 0.0247 |
| (25) NV. Consumer goods | -0.0502* | 0.1391* | 0.0171 | 0.1373* | -0.0222 | -0.0407 | 0.1708* | 0.0643* | 0.0474 | 0.0878* | -0.0826* | -0.0197 |
| (26) NV. Telecom | 0.2316* | -0.0140 | 0.1352* | -0.0255 | -0.1234* | -0.0292 | 0.0418 | 0.0382 | -0.0320 | -0.0410 | 0.0526* | -0.0073 |
| (27) VC Funds | 0.0542* | -0.0019 | 0.0034 | -0.0204 | 0.0080 | 0.0075 | -0.0004 | 0.0118 | 0.0215 | -0.0238 | 0.0238 | 0.0037 |
| (28) NV. Telecom ICT & Computer related Ind. | -0.0677* | -0.0082 | -0.0164 | -0.0057 | -0.0933* | -0.0414 | 0.0179 | 0.0464 | 0.0885* | -0.0251 | 0.0441 | -0.0184 |
| (29) NV. Health care Ind. | -0.1734* | -0.1255* | -0.0684* | -0.0425 | 0.2266* | 0.0817* | -0.1450* | -0.1650* | -0.1850* | 0.0162 | -0.0482 | 0.0350 |
| (30) NV. Early stage (Dummy) | -0.0064 | 0.0258 | -0.0136 | -0.0150 | -0.0234 | 0.0182 | 0.0278 | 0.0310 | 0.0155 | -0.0009 | 0.0528* | -0.0608* |
| (31) NV. Expansion and Growth Stage (Dummy) | 0.0737* | -0.0220 | -0.0250 | -0.0295 | 0.0111 | 0.0085 | -0.0434 | -0.0443 | -0.0455 | -0.0412 | 0.0280 | 0.0218 |
| (32) NV. Later Stage (Dummy) | -0.0277 | -0.0609* | -0.0185 | -0.0214 | 0.0247 | -0.0345 | -0.0967 | -0.0215 | -0.0445 | 0.0033 | -0.0375 | 0.0396 |
| (33) NV. Other Stages (Dummy) | -0.0782* | 0.0942* | 0.0923* | 0.1067* | -0.0230 | 0.0111 | 0.1837* | 0.0662* | 0.1252* | 0.0690* | -0.0695* | -0.0100 |

| Variable | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|----------------------------------------------|----------|----------|----------|----------|---------|----------|-----------|----------|----------|----------|----------|----------|
| (13) R&D Industry Index | 1.0000 | | | | | | | | | | | |
| (14) Industry Market-to-Book Ratio | 0.4374* | 1.0000 | | | | | | | | | | |
| (15) Global Innovation Index | 0.2539* | -0.1454* | 1.0000 | | | | | | | | | |
| (16) TEA | 0.2631* | -0.1578 | 0.8936* | 1.0000 | | | | | | | | |
| (17) G 20 membership (Dummy) | -0.0367 | 0.030 | 0.2816* | 0.0570* | 1.0000 | | | | | | | |
| (18) Early-Stage Investments (% GDP) | 0.2777* | -0.2194* | 0.8264* | 0.8968* | -0.0393 | 1.0000 | | | | | | |
| (19) Later-Stage Investments (% GDP) | 0.5166* | -0.0157 | 0.3466* | 0.4694* | 0.0126 | 0.6267* | 1.0000 | | | | | |
| (20) NV Europe (Dummy) | -0.0111 | -0.0368 | -0.0701* | -0.1533* | 0.0138 | -0.2490* | -0.2223* | 1.0000 | | | | |
| (21) NV North America (Dummy) | 0.0130 | 0.0274 | 0.0956* | 0.1692* | -0.0146 | 0.2311* | 0.2075* | -0.8691* | 1.0000 | | | |
| (22) NV Other Countries (Dummy) | -0.0077 | 0.016 | -0.0706* | -0.0686* | 0.0039 | 0.0008 | -0.0007 | -0.0550* | -0.4392* | 1.0000 | | |
| (23) NV.Energy ind | -0.0620* | -0.0691* | 0.0691* | 0.0632* | 0.0250 | 0.0448 | 0.0035 | 0.0173 | -0.0055 | -0.0197 | 1.0000 | |
| (24) NV.Ind Goods & services | -0.0055 | -0.0129 | 0.0162 | 0.0087 | 0.0173 | 0.0206 | -0.0101 | -0.0154 | -0.0348 | 0.1000* | -0.0256 | 1.0000 |
| (25) NV. Consumer goods | -0.0655* | -0.0874* | 0.0834* | 0.0848* | 0.0208 | 0.0819* | 0.0321 | -0.0366 | 0.0032 | 0.0615* | -0.0306 | -0.0212 |
| (26) NV. Telecom | -0.0936* | 0.0132 | -0.0627* | -0.0480 | -0.0433 | -0.0989* | -0.0961* | 0.0476 | -0.0295 | -0.0250 | -0.0854* | -0.0592* |
| (27) VC Funds | -0.0129 | -0.0095 | -0.0060 | -0.0250 | 0.0133 | -0.0350 | -0.0499 | 0.0277 | -0.0493 | 0.0506* | -0.0197 | -0.0136 |
| (28) NV. Telecom ICT & Computer related Ind. | -0.0888* | 0.0773* | -0.0329 | -0.0415 | -0.0162 | -0.1027* | -0.2062* | 0.0087 | -0.0062 | -0.0073 | -0.2272* | -0.1575* |
| (29) NV. Health care Ind. | 0.2819* | -0.0373 | 0.0426 | 0.0449 | 0.0563* | 0.1680* | 0.3830* * | -0.0538* | 0.0630 | -0.0282 | -0.0830* | -0.0576* |
| (30) NV. Early stage (Dummy) | -0.0027 | 0.0170 | 0.0024 | -0.0017 | -0.0084 | -0.0452 | -0.0064 * | 0.0732* | -0.0783 | 0.0171 | 0.0343 | -0.0291 |
| (31) NV. Expansion and Growth Stage (Dummy) | 0.0022 | 0.0177 | -0.0340 | -0.0421 | 0.0069 | -0.0296 | -0.0158 | 0.0754* | -0.0684* | 0.0057 | -0.0687* | -0.0461 |
| (32) NV. Later Stage (Dummy) | 0.0076 | 0.0022 | -0.0094 | -0.0005 | -0.0263 | 0.0291 | -0.0034 | -0.1424* | 0.1575* | -0.0582* | 0.0063 | -0.0235 |
| (33) NV. Other Stages (Dummy) | -0.0116 | -0.0599* | 0.0709* | 0.0776* | 0.0402 | 0.0751* | 0.0422 | -0.0224 | -0.0055 | 0.0538* | 0.0613* | 0.1598* |

| Variable | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) | (33) |
|----------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| (25) NV. Consumer goods | 1.0000 | | | | | | | | |
| (26) NV. Telecom | -0.0710* | 1.0000 | | | | | | | |
| (27) VC Funds | -0.0163 | -0.0456 | 1.0000 | | | | | | |
| (28) NV. Telecom ICT & Computer related Ind. | -0.1887* | -0.5263* | -0.1211* | 1.0000 | | | | | |
| (29) NV. Health care Ind. | -0.0690* | -0.1923* | -0.0443 | -0.5114* | 1.0000 | | | | |
| (30) NV. Early stage (Dummy) | 0.0196 | -0.0052 | -0.0363 | -0.0017 | 0.0059 | 1.0000 | | | |
| (31) NV. Expansion and Growth Stage (Dummy) | -0.0482 | 0.0359 | -0.0556* | 0.1009* | -0.0791* | -0.4761* | 1.0000 | | |
| (32) NV. Later Stage (Dummy) | -0.0470 | 0.0234 | -0.0585* | -0.0101 | 0.0361 | -0.3018* | -0.5158* | 1.0000 | |
| (33) NV. Other Stages (Dummy) | 0.1281* | -0.0914* | 0.2407* | -0.1601* | 0.0758* | -0.1630* | -0.2786* | -0.1766* | 1.0000 |

TABLE 6: REGRESSIONS: Determinants of CVC investments in the same business sector

The dependent variable in all the Probit regressions is "Same business sector (Dummy)", a dummy variable equal to one if the corporation or financial institution has invested in the same core business. The method of estimation is the Probit regression. For the interpretation, we report coefficient and standard errors. Significance levels: *** for 1%, ** for 5%, and * for 10%.

| Variables | Full sample | | | | | |
|---------------------------------|---------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Revenue change | 0.006*** (0.001) | 0.008*** (0.001) | 0.004 (0.003) | 0.004 (0.003) | 0.010*** (0.003) | 0.008** (0.004) |
| ROA | 0.052*** (0.006) | 0.029*** (0.005) | | | | |
| Ln (assets) | | 2.987*** (0.687) | 15.438*** (1.780) | 14.212*** (1.695) | 15.154*** (18.39) | 14.782*** (2.031) |
| Ln (assets ²) | | -0.132*** (0.029) | -0.669*** (0.074) | -0.613*** (0.069) | -0.657*** (0.076) | -0.646*** (0.083) |
| Corp. Financial Resources | | | 2.659 (2.603) | 2.038 (2.038) | 0.154 (1.987) | 2.435 (3.113) |
| ln (Nbr. employees) | 0.393*** (0.045) | | -0.278* (0.146) | 0.244* (0.146) | 0.113 (0.16) | 0.271 (0.179) |
| Corporate Diversification level | | | -0.929*** (0.137) | -0.733*** (0.117) | -0.986*** (0.138) | -0.998*** (0.148) |
| CEO Tenure | | | 0.188*** (0.037) | 0.153*** (0.034) | 0.217*** (0.034) | 0.221*** (0.041) |
| Corp. North America | | | -0.910 (3.462) | | | |
| Corp. Other Countries | | | 0.712 (0.686) | | | |
| R&D Industry Index | | | 0.194*** (0.025) | 0.120*** (0.226) | 0.215*** (0.025) | 0.216*** (0.216) |
| Industry Market-to-Book Ratio | | | -0.967*** (0.144) | -0.742*** (0.0134) | -1.015*** (0.137) | -1.067*** (0.157) |
| Global Innovation Index | | | 3.190** (1.363) | 2.272*** (0.640) | 3.757*** (0.511) | 3.992*** (0.776) |
| TEA | | | -0.492 (0.446) | -0.182 (0.131) | -0.454*** (0.094) | -0.472*** (0.157) |
| G 20 membership | | | -6.751*** (0.863) | -4.507*** (1.09) | -7.377*** (0.786) | -7.674*** (1.268) |
| Later-Stage Investments (% GDP) | | | | -2.349 (2.021) | | -0.339 (2.469) |
| NV North America | 0.104 (0.113) | 0.103 (0.112) | 0.224 (0.187) | 0.162 (0.164) | 0.302 (0.189) | 0.378** (0.197) |
| NV. Other Countries | 0.478 (0.226) | 0.177 (0.222) | 1.120*** (0.375) | 0.380 (0.445) | 1.430*** (0.376) | 1.043** (0.488) |
| NV. Energy Ind. | 0.845*** (0.141) | 0.876*** (0.147) | 1.449*** (0.209) | | 1.614*** (0.210) | 1.697*** (0.220) |
| NV. Ind Goods & services | -0.105 (0.281) | -0.138 (0.314) | 0.614* (0.372) | | 0.893** (0.377) | |
| NV. Consumer goods | -0.801 (0.319) | -0.467 (0.333) | 0.043 (0.438) | | 0.166 (0.464) | 0.263 (0.490) |
| NV. Telecom | 0.935*** (0.080) | 0.872*** (0.079) | 1.791*** (0.122) | | 1.756*** (0.125) | 1.972*** (0.134) |
| VC Funds | 0.957*** (0.245) | 0.948*** (0.243) | 2.285*** (0.309) | | 2.752*** (0.356) | 3.047*** (0.391) |
| NV. Expansion and Growth Stage | | | | | 0.145 (0.132) | 0.068 (0.138) |
| NV. Later Stage | | | | | -0.358** (0.154) | -0.410** (0.162) |
| NV. Other Stages | | | | | -0.836*** (0.260) | -1.178*** (0.305) |
| Number of Observations | 2699 | 2699 | 2362 | 2064 | 2362 | 2033 |
| Log Likelihood | -919.17 | -946.67 | -422.81 | -530.17 | -409.07 | -360.92 |
| Pseudo-R squared | 15.36% | 12.83% | 54.87% | 38.79% | 56.34% | 58.09% |
| LR chi2 | 333.60 | 278.59 | 1028.25 | 672.07 | 1055.73 | 1000.54 |
| Prob > chi2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

TABLE 7: REGRESSIONS: Determinants of CVC investments in startups located in own market geographic areas

The dependent variable in all the Probit regressions is "Same business sector (Dummy)", a dummy variable equal to one if the corporation or financial institution has invested in the same core business. The method of estimation is the Probit regression. For the interpretation, we report coefficient and standard errors. Significance levels: *** for 1%, ** for 5%, and * for 10%.

| Variables | Full sample | |
|---------------------------------|----------------------|----------------------|
| | (7) | (8) |
| Revenue change | 0.020*** (0.002) | 0.052*** (0.006) |
| ROA | 0.154*** (0.009) | 0.269*** (0.040) |
| Corp. Financial Resources | | 11.457 (6.018) |
| Corporate Diversification level | | 1.496*** (0.131) |
| CEO Tenure | | 0.521*** (0.046) |
| NV North America | -1.072*** (0.191) | -2.125*** (0.298) |
| NV. Other Countries | 0.419 (0.379) | 2.710*** (0.489) |
| NV.Energy Ind. 0001 | 0.672 (0.305) | 0.548 (0.553) |
| NV.Ind Goods & services 2700 | 0.148 (0.308) | 0.084 (0.456) |
| NV. Consumer goods 3000 | 1.578*** (0.352) | |
| NV. Telecom 6000 | 0.005*** (0.128) | 0.309 (0.184) |
| VC Funds 8000 | -0.135 (0.509) | -0.519 (0.540) |
| Number of Observations | 1056 | 922 |
| Log Likelihood | -462.13 | -190.80 |
| Pseudo-R squared | 35.54% | 69.54% |
| LR chi2 | 509.53 | 871.38 |
| Prob > chi2 | 0.0000 | 0.0000 |