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Strategic effects of corporate venture capital investments

Sergey Anokhin^a, Joakim Wincent^{b,c}, Pejvak Oghazi^{d,*}^a Kent State University, P.O. Box 5190, Kent, OH 44242-0001, United States^b Luleå University of Technology, Entrepreneurship & Innovation, SE-971 87 Luleå, Sweden^c Hanken School of Economics, FI-001 01 Helsinki, Finland^d Linnaeus University, SE-351 95 Växjö, Sweden

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ABSTRACT

This paper analyzes the strategic effects of corporate venture capital investments. Specifically, by studying the deals of 163 corporations over a four-year period, it documents the effects of driving, emerging, enabling, and passive investments on the pool of innovative opportunities available to incumbents and the scale efficiency gains they experience as a result of these investments. The study suggests that by making driving and enabling investments, incumbents position themselves in the industry to take advantage of increased pools of innovative opportunities and improve scale efficiency yields. At the same time, emerging and passive investments are detrimental for both of the strategic goals considered in this paper.

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1. Introduction

Strategic objectives incumbents pursue via corporate venture capital programs are abundant. Excepting the proverbial window on technology, strategic objectives include a set of goals such as accessing new markets and stimulating demand for products/services that improve sales and—if done correctly—may bring about scale efficiency gains (Dushnitsky and Lenox, 2005; Ernst and Young, 2002; Gompers and Lerner, 1998). Unexplainably, these other strategic goals of corporate venture capital (CVC) investments remain in empirical research limbo; existing work is conspicuously silent with respect to the alternative outcomes of CVC activity (Anokhin, 2006; Benson and Ziedonis, 2009; Cox et al., 2013; Riyanto and Schwiensbacher, 2005). Moreover, although conceptually the literature (Chesbrough, 2002) distinguishes among four types of CVC investments (driving, emerging, enabling, and passive), the unique impact each has on the strategic outcomes of interest (with exception of patenting) has not been scrutinized empirically. Given that incumbents are likely to make CVC investments of different types, this lack of scholarly attention to their effects is startling. The present paper documents early insights into the effects of the four types of CVC investments.

2. Capturing strategic benefits of CVC investments

Under the resource-based view (RBV) of the firm, obtaining strategic outcomes can be attributed to the improved use of

* Corresponding author.

E-mail addresses: sanokhin@kent.edu (S. Anokhin), joakim.wincent@ltu.se, joakim.wincent@hanken.fi (J. Wincent), pejvak.oghazi@lnu.se (P. Oghazi).

the firm's resources when more is achieved with a comparable resource bundle.¹ Improving the deployment of resources occurs in two ways: by creating a new way to combine resources (that is, advancing technology or innovating) and by increasing efficiency of resource use under existing technologies without innovation per se (through, for example, scale efficiency gains) (Fare et al., 1994; Penrose, 1959; Thursby and Thursby, 2002). The former corresponds to the proclaimed CVC strategic goal of obtaining a window on technology (Anokhin, 2006). By investing in startups, incumbents try to position themselves to increase the pool of innovative opportunities available to them. As patenting-based CVC research shows, firms then take advantage of the opportunities presented. The latter strategy reflects attempts to secure demand for the corporation's products, tap into foreign markets, and so on with the help of the CVC. This may lead to better use of available resources without novel technological advancements.

A technique exists that allows inferring total factor productivity change from publicly available secondary data and decomposing it into technical change that shows an increase in the innovative opportunities pool for incumbents, and efficiency change, from which the firm may further distill scale efficiency gains. The technique is rather involved computationally but has had a long history of use in operations research (Malmquist, 1953). The technique has also recently made its way into the literatures of economics (Fare et al., 1994), innovation (Thursby and Thursby, 2002), strategy (Durand and Vargas, 2003), and entrepreneurship (Anokhin et al., 2011).

The idea behind the technique is as follows. Corporations that belong to the same industry combine homogenous inputs (such as labor and capital) in different ways to produce comparable outputs (represented by sales). Some corporations use less labor than others, some use less capital, whereas yet others use relatively large quantities of labor and capital to produce the same amount of sales. Companies with the best combinations of inputs and outputs define the best available technology at the time; they are said to determine the production frontier (Anokhin, 2006).² Over time, as technology advances, the frontier shifts.

The technique, known as Malmquist Productivity Index decomposition, tracks the relative positions of different companies from year to year and captures the movement of less effective companies toward the frontier. Such shifts do not require grand innovation and suggest that firms are simply becoming more efficient at something they already know how to do (Anokhin, 2006). It also captures shifts of the relevant segment of the frontier itself, which are caused by technical advancement or by some companies introducing in year t by technologies that are superior to those employed in year $(t-1)$. The former component—efficiency change—can be decomposed into scale efficiency change and pure efficiency change. The latter—technical advancement—represents the pool of innovative opportunities available to the incumbent (Anokhin et al., 2011).

3. Data sources

Following the CVC research tradition, two sources are used to construct the pattern of CVC investments by incumbents: VentureXpert by Venture Economics and Corporate Venturing Directory & Yearbook (hereafter, the Yearbook) by Asset Alternatives. Each data source has information on deals that the other database does not provide. By matching the data carefully, we are able to obtain the most accurate information on the corporations' CVC disbursements. We only consider investments committed during 1998–2001, because this period is best covered by both databases. The U.S. Census Bureau's NAICS and Bureau of Economic Analysis' 1998–2004 Annual Input-Output tables are used to classify CVC investments into the four types—driving, emerging, enabling and passive.

After matching the data on CVC deals reported by VentureXpert and the Yearbook, we merge our database with the annual firm-level accounting and financial data from Standard & Poor's Compustat. Because the data reported in Compustat relate to a financial and not a calendar year of the corporation, we do not use annual aggregates reported by VentureXpert directly, but rather look at the exact dates of particular deals to match them to appropriate financial years (Anokhin, 2006). The merger of VentureXpert, the Yearbook, and Compustat yields a sample of 163 corporations that engaged in corporate venture capital investments during years 1998–2001.

4. Measuring strategic benefits of CVC with Compustat data

Data envelopment analysis compares sets of inputs and outputs for different corporations within their subindustries in consecutive time periods. The Malmquist Productivity Index technique infers productivity change from this total factor productivity change. By decomposing it, the technique allows us to estimate changes in the pool of innovative opportunities

¹ The notion of comparability does not imply that resources are truly homogenous. In fact, some heterogeneity always exists. "Comparable" here refers to markets' homogenous pricing of heterogeneous inputs and outputs.

² In the present paper, we work with the piecewise frontier obtained with the help of Data Envelopment Analysis. This ensures that the firms are assessed against the portion of the frontier that is most suitable for their resource endowments and combinations. This way, if CVC investments enable the corporation to position itself such that more innovative opportunities fall within its grasp, the technique will capture such repositioning. For computational details and Data Envelopment Analysis (DEA) and Malmquist productivity index software recommendations, see Fare et al. (1994), Coelli (1996), and Hollingsworth (2004).

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