New Venture Performance: Does Location Matter?

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ABSTRACT

The link between location and firm performance has been established for various measures of performance. Yet to my knowledge, the link has not been explored utilizing the two most common measures of performance, growth and profitability. The purpose of this study is to provide empirical examination of the link between location, new venture growth and profitability. I explore one research question: "Do new ventures that operate in geographic clusters obtain higher levels of performance than new ventures that operate outside of geographic clusters."

NEW VENTURE PERFORMANCE: DOES LOCATION MATTER?

A commonly held belief among scholars of geographic cluster research is that firms within geographic clusters[2] have higher levels of performance. The link between location and firm performance indeed has been established for various measures of performance including initial public offering (IPO) (Deeds, Decarolis & Coombs, 1997), foreign direct investment survival (FDI) (Shaver & Flyer, 2000), new venture survival (Saxenian, 1990) and innovation (Porter & Stern, 2001; Schoonhoven & Eisenhardt, 1990). However, to my knowledge, the link has not been assessed utilizing the two most common measures of performance, growth and profitability (Murphy, Trailer & Hill, 1996). Furthermore, the assumption of superior performance by cluster firms has been challenged both empirically (Shaver & Flyer, 2000) and theoretically (Pouder & St. John, 1996) in recent years.

The purpose of this study is to extend extant literature by providing empirical examination of whether operating within a geographic cluster significantly affects growth and profitability performance. One simple research question is explored: "Do new ventures that operate in geographic clusters obtain higher levels of performance than new ventures that operate outside of geographic clusters." New ventures were chosen as the sample of interest for three reasons: 1) new ventures are frequently recognized as key players to geographic cluster development (Allen & Hayward, 1990; Audretsch & Fritsch, 2000); 2) they have been reported to have higher levels of survival when operating from geographic clusters (Saxenian, 1990) and 3) they adequately depict the firms described by Shaver & Flyer (2000) that are likely to benefit from agglomerations: firms that have much to learn.

[2] A geographic cluster is a geographic concentration of interconnected firms, specialty suppliers and service providers in related industries that compete yet cooperate (Porter, 2000).

For reasons that will be developed later, the level of industry innovation is utilized as a discriminating variable moderating the relationship between location and new venture performance. The framework for this paper is as follows: first, the theoretical framework to establish the context of the geographic cluster is provided. This section highlights the applicability of institutional theory to geographic cluster research, the reason industry innovation level is likely to be the variable discriminating high from low performing firms in geographic clusters, and the five hypotheses to be tested concerning the relationships between the level of industry innovation and new venture performance. One additional hypothesis is advanced to assess the impact of a key cluster characteristic, heterogeneity, on new venture performance. Second, the methodology testing the hypotheses asserted is summarized, and details of the sample utilized are provided. Results of the study are then presented. Last, we conclude with the discussion reflecting the theoretical contributions, managerial implications and directions for future research on geographic cluster new ventures.

THEORETICAL FRAMEWORK

Geographic cluster research has proliferated in the economics literature since the 1980's, but has only recently begun surfacing in management literature. A significant study in this area was Pouder & St. John's (1996) theoretical exposition on "Hot Spots and Blind Spots." Pouder and St. John argued that "hot spots," (geographic clusters) indeed provided benefits to firms operating within them in terms of enhanced legitimacy, resource costs and access, and competitor awareness, but that eventually cluster maturation would result in resource diseconomies. They also argued that firms operating therein would develop blinded mental modes affecting their ability to successfully compete. The implication of this study is that benefits to clustering do exist, however, they may be short-term in nature.

Shaver and Flyer (2000) argued a related view. In their study on foreign direct investment decisions, they argued that not all firms within geographic clusters would reap benefits. The data supported their argument that "firms with weaker technologies, human capital, training programs, suppliers or distributors will greatly benefit [from locating within an agglomeration] should the agglomeration allow them access to competitors' technologies, human capital, training programs, suppliers or distributors" (Shaver & Flyer, 2000: 1175). The implication of this study is that locating within a geographic cluster benefits some firms more than others. An extremely interesting finding to emerge from the data was that of a greater likelihood for survival of new plants that operated in industries that concentrated geographically. Other scholars have also established this location-survival link for new ventures (Saxenian, 1990).

Links of location with other performance measures have been established in recent years. Deeds et al. (1997) for example, found that location significantly affected the proceeds collected by biotechnology firms executing an IPO. Not only did firms that operated within a recognized biotechnology cluster obtain greater IPO proceeds than firms not operating within biotechnology clusters, firms that operated from Silicon Valley achieved the greatest level of success. The implication of this finding is that even amongst recognized industry clusters, some locations produce greater benefits to firms than others. Hanson (2000) corroborated and extended this argument by adding that the benefits of location are not only particular to certain locations, but industries as well. Specifically he argued that the benefits from clustering would differ depending upon the stage of industry development, with firms in emerging industries, based on their ability to draw ideas from the numerous sources of geographic cluster, benefiting the most.

Drawing upon each of these arguments, the hypotheses for this paper are framed to reflect how locating within a cluster affects new venture performance. In particular, recognizing

the importance of being able to draw upon the ideas generated from within the cluster, this argument centers on the idea that the level of industry innovation activity and not simply the stage of industry development, will moderate the relationship between location, new venture growth and profitability. This thought will be expounded upon in a later section of the paper. But first, the dynamics of the geographic cluster likely to generate the benefits affecting new venture performance must be discussed.

New Venture Performance in Geographic Clusters

To understand why performance differences would accrue to firms located within geographic clusters, one must first understand the context of the geographic cluster. Institutional theory (Dimaggio & Powell, 1983) offers two tenets helpful for this assessment. It is important to note first, however, that by utilizing the terminology "geographic cluster", I am not simply referring to industries that agglomerate for cost or input advantages as advocates of location theory would propose (Marshall, 1920). Geographic cluster firms have been purported to agglomerate as a means of uncertainty reduction for operational activities (Jones, Hesterly & Borgatti, 1997). Agglomerating enables them to capitalize on their proximity to other firms, thereby establishing cooperative relationships with the competitors, suppliers and buyers therein. Use of this term, therefore, highlights those geographic areas containing industries for which there are direct or indirect linkages between firms, and that personify most if not all of the commonly attributed characterizations of geographic clusters: sources of knowledge (Feldman & Florida, 1994; Saxenian, 1990), environments of creativity and idea exchange (Pouder & St. John, 1996) and entrepreneur-friendly environments (Glasmeier, 1988).

The interactions between cluster firms create opportunities enabling the firm and aspiring entrepreneurs to gain insight to information concerning how other similar firms operate (Jones et

al., 1997). With regular exposure to how other firms operate, cluster new ventures are capable of more easily imitating the practices of those organizations. But perhaps of greater importance is that cluster new ventures may also obtain a glimpse of where the industry may be heading. As geographic cluster firms are extraordinarily innovative (Audretsch, 1998; Audretsch & Feldman, 1996; Feldman & Florida, 1994; Porter, 1998; Scott, 1992), they are often on the leading edge of the technological forefront (Saxenian, 1990). For ventures in emerging industries in particular, such insight can be especially critical to their overall success. Tegarden, Hatfield & Echols (1999), for example, found that for the high technology firm that entered the market with the dominant design, or that could switch to it shortly following its emergence, higher odds of survival and greater market share performance were observed.

Another aspect of the geographic cluster context of critical importance to note is that relating to the overall environment. Saxenian (1990) described it as an environment in which technological engineers have greater loyalty toward advancing technology, than to the firms in which they are employed. A spirit of cooperation is perpetuated within cluster firms as engineers and entrepreneurs strive for technological advance. This attitude filters throughout all levels of the organization to become a way of cluster life (Porter, 1998; Porter, 2000). As cluster firms typically draw their employees from the same pool of individuals (Hanson, 2000), who have typically been socialized into the ways of the cluster through employers, trade associations and publications, the entrepreneurial attitude and spirit spreads throughout cluster firms by the workers they employ.

To the extent, therefore, that new ventures operate within a geographic cluster and gain exposure to highly successful firms as geographic cluster firms are presumed to be, isomorphic effects should result, and geographic cluster new ventures should reap tremendous benefits.

Hypothesis 1a: Location will be positively related to venture growth such that new ventures in geographic clusters will have higher growth.

Hypothesis 1b: Location will be positively related to venture profitability such that new ventures in geographic clusters will have higher profitability.

As I previously alluded, however, these benefits are not likely to transfer to all cluster firms. The next few sections will discuss in detail which new ventures are likely to benefit the most.

Industry Innovation, Venture Growth and Location. Geographic clusters enable new ventures to interact with other firms, creating opportunities for entrepreneurs to intersect (Scott, 1992; Van de Ven & Garud, 1989), perceive opportunity gaps for products, services or suppliers (Porter, 1998), and recognize new buyer trends (Lee, Lee & Pennings, 2001). These factors are of great importance to ventures striving for growth. The uncertainty associated with the activities of emerging and growing industries creates technological diversity (Holbrook, Cohen, Hounshell, & Klepper, 2000) where firms operating within it must determine what opportunities would be most advantageous to pursue. For new ventures connected to other firms at the forefront of the technological frontier, information regarding the most fruitful paths to take is obtained (Holbrook, 1995). An awareness of the emerging dominant design positions new ventures to aggressively pursue their share of the market (Tegarden, et al., 1999). Additionally, by interacting with and sharing resources and information with other firms in the local vicinity, cluster new ventures would be able to pursue multiple technological opportunities simultaneously (Saxenian, 1994), thereby broadening the scope of their operations, and positioning themselves to maximize their share of the industry's growth (McDougall, Covin, Robinson & Herron, 1994).

Geographic proximity to either critical buyers or suppliers, therefore, produces a form of enhanced environmental scanning (Pouder & St. John, 1996) that enables high innovation industry new ventures to more easily identify and exploit growth opportunities in the market. Opportunity exploitation, however, requires resources to bring new ideas to fruition. New ventures in geographic clusters again benefit tremendously in this arena by having access to an abundant supply of quality human capital (Arther, 1990; Glaeser, 2000; Hanson, 2000) from both the skilled and unskilled labor markets (Glasmeier, 1988; Malecki, 1985; Scott, 1992), and to venture capital and other sources of information (Porter, 1998). These resources develop as a response to the needs of the industries concentrating within the cluster (Saxenian, 1990). The expectation is that cluster new ventures in innovative industries would be better positioned to pursue growth than same industry ventures located outside of clusters, as they have access to the necessary resources for opportunity exploitation. In accordance with Allen and Hayward (1990, who asserted that variations in firm growth may be the result of variations in the locale, I expect venture growth to differ by location.

For industries in more stable environments, and subsequently what I have termed "low-innovation industries," extant research primarily revolves around understanding the economic reasons for firm agglomeration (Enright, 1993). This literature has typically focused on large, multi-site firms and the factors of location theory, which would affect venture profitability more than growth. Additionally, as extant theory is silent on whether spillover effects are expected to accrue to low-innovation industry firms located within geographic clusters, from high-innovation industry firms also located therein, no differences in rates of growth for firms located in geographic clusters are expected relative to firms not located within clusters.

Hypothesis 2a: Innovation level will moderate the relationship between location and growth such that high innovation industry new ventures in geographic clusters will have higher levels of growth.

Industry Innovation, Venture Profitability and Location. The link between profitable locations and high-technology industry locations has long been established (Eisenger, 1988; Malecki, 1985; Rauch, 1993). There are several possible reasons for this finding. Moran and Ghoshal (1999) theorized that where a free-flow of information exchange exists, efficiency is promoted. Knowledge spillovers empower firms to improve their products and/or processes at minimal costs (Shaver & Flyer, 2000), and enhance the venture's ability to resolve problems that arise (Shapira, 1990). Additionally, the proximity to competitors and other firms in related industries as well as other critical resources available in geographic clusters reduces the search costs new ventures would otherwise encounter for gathering the needed resources for technology and overall operations (Hite & Hesterly, 2001; Tegarden et al., 1999).

New ventures in geographic clusters benefit from cost reductions in other areas as well. Clusters encompass supporting industries, institutions and associations. Thus new ventures operating with a cluster often gain lower cost access to high quality specialized inputs (Porter, 2000) and services (Arther, 1990). They are also able to reduce inventory costs as inputs which typically may be rare or out of stock are often sourced locally and obtained by the venture as needed (Arther, 1990). Cluster ventures also have the benefit of flexibility due to their unbundled resources, which enables them to quickly and cheaply reallocate resources in response to changing demands (Jones et al., 1997). Furthermore, the culture of geographic clusters, which creates a shared value system that firms therein follow, enables trust to be a central ingredient of cluster firm transactions reducing transaction costs between them (Lado, Boyd & Hanlon, 1997), eliminating the need for vertical integration (Williamson, 1965), and allowing cluster firms to

remain lean enough to quickly and effectively adapt to change. New ventures in geographic clusters are also able to obtain employees knowledgeable of the industry and cluster practices, and thus are able to reap the benefits of reduced training costs (Porter, 2000) and greater worker productivity for new hires (Glaeser, Kallal, Scheinkman, & Schleifer, 1992; Shaver & Flyer, 2000).

Although new ventures in geographic clusters benefit from the reduction of some general operating costs, other costs accelerate. In particular, labor (Hanson, 2000; Saxenian, 1990), land and overall cost of living increases (Galbraith, 1985) may deplete the profits of cluster new ventures (Arther, 1990). For a high-technology firm, I maintain that the ability to pursue multiple opportunities ameliorates the growth potential of the firm, which in turn should mitigate any adverse affects on profitability for high innovation industry geographic cluster new ventures. For low innovation industry cluster new ventures, however, these factors are expected to significantly affect their profit potential. The rationale behind this assertion is based on the logic that the growth potential for firms in low-innovation industries is generally lower than for those in high-innovation industries (Covin, Slevin & Covin, 1990; Robinson, 1998; Robinson & McDougall, 1998). As a consequence, firms in low-innovation industries should place greater emphasis upon measures promoting efficiency and cost reduction. Locations that provide benefits relating to traditional factors of location theory should be most beneficial to new ventures in low innovation industries (Porter, 2000). As non-geographic cluster locations are expected to have more cost savings than geographic clusters, the following argument is made:

> Hypothesis 2b: Innovation level will moderate the relationship between location and profitability such that low innovation industry new ventures located outside of geographic clusters will have higher levels of profitability.

Venture Growth, Profitability and Location. To this point, I have discussed how geographic clusters affect growth and profitability prospects for high-innovation and low-innovation industry firms. It should be apparent that it has been asserted that new ventures in high innovation industries that operate within a geographic cluster for their industry will have higher levels of both growth and profitability performance than those that do not operate within geographic clusters. This is attributed primarily to their access to resources such as suppliers (Hanson, 2000; Haug, 1991), venture capitalists (Saxenian, 1990) and financing (Shapero & Sokol, 1998), industry experts (Porter, 2000) and other necessary factors for operations including human capital and inputs (Porter, 2000).

Taken in tandem with the cluster interactions that grant new ventures access to the operations of key customers and suppliers (Yli-Renko, Autio & Sapienza, 2001), the aforementioned resources yield two primary benefits to new ventures. First, they position new ventures to recognize and exploit new opportunities that arise in the market (Carroll, 1993). Consequently, new ventures in geographic clusters are expected to post strong growth results relative to their competitors not operating within geographic clusters. Additionally, the collaboration that occurs between cluster new ventures provides cost and risk sharing for their innovation activities (Saxenian, 1990; Van de Ven, 1993), thereby tremendously affecting the profit potential of the firm. Thus, it was argued that new ventures in geographic clusters should post strong profit results relative to their competitors not operating within geographic clusters.

The second and perhaps more important effect of the resource access cluster new ventures gain is accelerated learning (Glaeser, 2000; Rauch, 1993). Scholars have written of the effect learning has on a firm's overall understanding of operations (Rauch, 1993), capabilities for innovation (Feldman & Florida, 1994), strategy and performance (Henderson & Mitchell, 1997),

and development of social capital (Nahapiet & Ghoshal, 1998). These factors help contribute to the venture's ability to accelerate their product introduction rate (Saxenian, 1994) and foster growth. Similarly, the obtained knowledge could be applied towards enhancing the overall level of efficiency to one that sustains the venture's competitiveness within the cluster and industry (Porter, 1998). While it has been argued that enhanced efficiency decreases the prices for industry products (Holbrook, 1995), thus impacting profit potential of industry firms, we expect that the utilization of high quality low cost inputs and higher levels of worker productivity should exceed the impact of declining prices and preserve the profitability of cluster new ventures.

Collectively, these facts suggest that high innovation industry new ventures that operate in geographic clusters may be capable of attaining growth and profitability objectives simultaneously, a finding which if significant would counter other new venture research suggesting a trade-off between growth and profitability (Robinson & McDougall, 2001; Robinson & McDougall, 1998). This contradiction is tested through the following hypothesis:

> Hypothesis 3: Cluster new ventures in high innovation industries will be significantly more likely to obtain growth and profitability simultaneously than all other ventures.

Cluster Heterogeneity and Venture Performance. Although cluster new ventures benefit from access to superior resources, they compete with other cluster firms for use of those resources. Therefore, it is expected that the more resources that are available to ventures within a geographic cluster, the better off the ventures will be. As research has shown that clusters grow because the resources to sustain it exist within a given area (Glaeser et al., 1992), the presumption is that larger clusters will exist because the resources to support them also exist; thus cluster size should affect the relationships observed. As the geographical area of a geographic cluster oftentimes entails numerous individual industry clusters that collectively

comprise a broader overall cluster (Porter, 1998), cluster size and heterogeneity are expected to correlate highly. As the methodology employed in this study to an extent controls for size of the individual cluster, this section focuses specifically on heterogeneity.

Heterogeneity broadens the horizon for opportunities and creates an environment of product and process innovation. It also allows for the creation of new clusters based on the intersection of industries (Porter, 1998). Homogeneous clusters, on the other hand, constrain the ventures exposure to ideas and more highly concentrate the levels of competition. For ventures in high-innovation industries where the exchange of ideas is critical for opportunity recognition and subsequent exploitation, and also facilitates operational efficiency, heterogeneous clusters should have substantial benefits for venture growth and profitability. For ventures in low innovation industries, heterogeneous clusters should also positively affect growth and performance as it expands the number of local firms to which the venture could sell and reduces many transportation costs associated with servicing those clusters. Furthermore, the level of direct competition for local clientele should be reduced the more heterogeneous the overall cluster, thereby retaining the local base of firms the venture may have begun operations to service.

Hypothesis 4a: Cluster heterogeneity will be positively related to new venture growth.

Hypothesis 4b: Cluster heterogeneity will be positively related to new venture profitability.

METHODOLOGY

Sample

Gimeno, Folta, Cooper & Woo (1997) provided evidence that some entrepreneurs start and sustain ventures for reasons other than performance. As the primary concern of this research is on matters of growth and financial performance, of critical importance to testing these hypotheses was ensuring that the sample consisted of performance-oriented firms. For this

reason new IPO ventures were selected to test the hypotheses. Nineteen hundred and ninety-nine was the year of IPO chosen for two primary reasons. The data by which the cluster classifications were determined were based on data from the U.S. Census Bureau for 1999. By selecting the same year, I could ensure that the resources purported to exist within geographic clusters were available to the firms at the time period under consideration. Additionally, as the U.S. economy began its downturn at the later stages of 2000 and early stages of 2001, it was determined that obtaining performance measures beyond 2000, where many established firms were also suffering tremendously in performance, would unduly bias the results.

Several steps were involved in creating the final sample analyzed. The first was to identify a list of industry SIC codes that reflected firms with varying levels of innovation. This list was compiled from an R&D intensity measure variable generated through Compustat and supplied by Michael B. Heeley of Rice University (see Heeley, King & Covin, 2002). The R&D intensity variable takes the R&D expenditure variable for each industry firm, divides it by the firm's sales, and takes the average of all firms to reflect the average R&D intensity for firms within that industry. Only those four-digit SIC codes that generated the R&D intensity variable from at least 50 firms were utilized so as to provide higher levels of accuracy in depicting the level of innovation. Those 78 SIC-codes were then input into the Edgar-online system, where 296 records were generated. Of these, 292 were extractable from the Compustat database.

The age of the firm at IPO was determined primarily from the SEC.gov database and company websites, and when not available from other of those sources, from Hoovers.com or a search engine secondarily. Only those firms six years of age or less at IPO were retained for analyses. This limited the sample to 163. Eliminating corporate ventures, foreign ventures, and firms with missing data reduced the sample to its final size of 101 records.

Operationalizations

As with the initial sample selection, variable operationalization required numerous steps and the incorporation of data from various sources. For most of the variables, commonly assessed measures were utilized. But for some variables, lack of utilization of that variable in extant research mandated new operationalizations. Additionally, to ensure construct validity of the geographic cluster concept as defined, I deviated from the traditional measures utilized in geographic cluster research, which reflect only statistical concentrations of industries (Audretsch, 1998; Audretsch & Feldman, 1996; Enright, 1993), to one that incorporates qualitative as well as quantitative determination of the geographic cluster. The system utilized is explained in greater detail below.

Independent Variables

Cluster Variables. Cluster identification requires extensive industry knowledge and qualitative judgment for effective assessment. Michael Porter and his colleagues at the Institute for Strategy and Competitiveness have developed a "Cluster Mapping System" (CMS), which combines industry correlational analyses with qualitative supplement. Their work has identified the top 20 U.S. geographic clusters for each of forty-one industry clusters. I relied upon this system to determine whether the location of a venture fell into one of the recognized geographic clusters for the industry. This process required the classification of each record into one of the forty-one clusters identified based on SIC code of the firm. I then had to determine whether the venture's location was one identified through the CMS for that industry.

As the Compustat database provides only the county and not the metropolitan area (MA) of the firm, each record had to be assigned to its respective MA. This was done by comparing the county for the firm to the listing of counties comprising MA's as reported in the Metropolitan

Areas and Components section of the U.S. Census Bureau's website. For each firm it was then determined whether its location fell within one of the top 20 identified by the CMS for that industry. The "rank" for that location was appended to the record with "1" representing the largest geographic cluster for the industry, and a "20" representing the smallest. Any industry venture that operated in a location outside of the top 20 for its industry was assigned a "21".

I operationalized Cluster Heterogeneity by counting the number of industry clusters represented within each metropolitan area (MA). Each record received the number corresponding to the total number of clusters present within the firm's MA. Values for this variable ranged from 0 for ventures operating in locations with none of the identified generic clusters, to 40 for ventures operating in Los Angeles, CA.

Innovation Intensity Level. An industry adjusted R&D intensity variable was calculated for each firm by dividing the R&D expenditure by the total sales. Following Aiken and West (1999), I then subtracted the mean for this variable from each firm's value to center the variable and reduce collinearity with the moderator and Innovation Intensity variable. The industry R&D intensity value was then subtracted from the centered variable to yield an industry adjusted R&D intensity value. This final value was then standardized to minimize the variance for this variable.

Moderator Variable. To test for moderating effects, I created a moderating variable, INN*CLU. This variable is simply the value for the innovation level multiplied by the value for the cluster ranking.

Dummy Variables. For the purpose of testing hypothesis 3, two special dummy variables were created. The first, an innovation-level indicator dummy, was created whereby firms in an industry with an innovation intensity of 1.5 or greater were deemed high innovation industry firms, while firms in an industry innovation intensity less than 1.5 were deemed low

innovation industry firms (Ravenscraft and Scherer, 1987). High innovation industry ventures were marked with a "1" while low innovation industry ventures were marked with a "0".

Additionally, a special geographic cluster indicator dummy was created. Although virtually all locations for this sample of firms could be considered "geographic clusters" as identified through the cluster mapping system (i.e. only 19 firms were in locations not recognized as a geographic cluster for their industry), a comparison of the growth of firms in the top ten versus those outside of clusters and in the bottom ten indeed differed. A one-way ANOVA indicated highly significant differences between the average national share of employment for locations in the top ten locations relative to those in 11-21 ($p=.000$, $F=146.55$). Thus for the purpose of testing the third hypothesis, any venture location within the top 10 for its industry was assigned a "1," while any venture location falling in 11-21 was assigned a "0."

Dependent Variables

Consistent with other studies of new venture performance (McDougall et al., 1994; Robinson, 1998, Robinson & McDougall, 2001; Robinson & McDougall, 1998; Shrader & Simon, 1997), sales growth was utilized as the growth dependent variable, and return on sales (ROS) as the profitability dependent variable. These measures are frequently utilized (Murphy et al., 1996; Brush & Vanderwerf, 1992), and deemed most appropriate given the hypotheses relating to innovation and the linkages between innovation and product introduction (Schoonhoven & Eisenhardt, 1990), and presumably subsequent levels of sales.

To operationalize sales growth, I calculated the absolute measure of growth. While this formula fails to capture the firm's growth rate (Weinzimmer, Nystrom & Freeman, 1998), its utilization was necessary given the fact that some firms in the sample had zero reported sales in 1999. Thus, the ability to operationalize sales growth by the growth rate was restricted by the

sample utilized. However, as firm size, in terms of the number of employees, is accounted for as a control variable, differences in effect based on venture size should be identifiable. For ROS, I calculated an industry adjusted ROS value, where the industry ROS value was subtracted from each firm's ROS value so as to determine how much more or less each firm's profitability was than the average value for firms in the industry. The industry ROS values were obtained from the Compustat database. This step was necessary as many of the firms had negative profitability rates and this process would enable us to determine how much more or less profitable the venture was than other firms in its industry. The adjusted value was then standardized again to minimize variance in the variable.

Additionally, for the testing of hypothesis three, a dichotomous variable called "Both" was operationalized to represent those firms obtaining both growth and profitability. Because the ROS value utilized was adjusted for the average ROS of industry firms for venture's industry, this value actually captures those firms obtaining growth and greater ROS on average than other firms in their industry. A value of "1" is assigned to those records with positive values for sales growth and ROS, and "0" otherwise.

Control Variables

New ventures in the beginning stages of their existence are likely to differ in numerous ways from ventures later in their formation stages. Similarly, new ventures of larger sizes are presumed to have more resources available to them than new ventures of smaller sizes. Thus I controlled for the age and size of the firm in the analyses so as to minimize such potential affects. Age was calculated by subtracting the year of formation, from 1999, so as to reflect the firm's age at IPO. Size is represented by the number of employees at the end of 2000.

Analyses

Prior to conducting the analyses, tests for normalcy of the data were assessed. This step was engaged as other studies of new venture IPOs have had non-normal distributions requiring the use of nonparametric statistics (Robinson, 1998; Robinson & McDougall, 1998; Robinson and McDougall, 2001). Analysis of the histograms and Q-Q plots indeed confirmed non-normalcy. However, as regression with a sample of this size should be robust, we proceeded with the analyses under the objective of assessing the nature of the relationships, with the recognition that the non-normalcy mandates caution generalizing from the results.

Table 1 provides means, standard deviations and correlations for this sample. As should be apparent, several of the variables exhibited high collinearity. In particular, the Innovation Intensity and moderator variables were highly collinear as each incorporated the sales of the firm in the derivation of the calculation. Given the centrality of each of these variables to the hypotheses, it was necessary to proceed with the analyses even despite this collinearity and the resultant instability of the estimates.

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Insert Table 1 About Here

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Hypotheses 1a-2b, and 4a-4b were each tested using multiple regression. A moderated approach was utilized with the control variables Age and Size entering in the first block, direct effect variables (Cluster, Innovation Level and Heterogeneity) entering in the second block, and the moderator variable, INN*CLU entering in the third block. For the sales growth models, the moderating effect model did not contribute significantly over and beyond the direct effect model ($R^2\Delta$=.00, FΔ =.05, P=.82) , therefore betas for the second model only were utilized to determine support for the growth hypotheses. For the profitability models, however, the moderating effect

model did contribute significantly over and beyond that of the direct effect model ($R^2\Delta$=.07, FΔ =45.90, P=.00), therefore betas for the third model were utilized to determine support for the profitability hypotheses. Table 2 provides results for the regression analyses.

For hypothesis 3, a chi-square analysis of cross-tabulations was utilized given the disproportionate number of ventures falling into each of the cells. Those results are reported in Table 3.

Results

Hypothesis 1a asserted that a geographic cluster location would relate positively to venture growth. As Table 2 indicates, the beta coefficient for the cluster variable is negative and significant (β=-.22, t=3.34, p=.00). It is relevant to remind the reader that because the geographic clusters were classified with the largest clusters being represented by the smallest numbers, the negative beta coefficient indicates that the largest growth was associated with the smallest numbers (and largest clusters), thereby lending favorable support toward the impact of a cluster location on venture growth.

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Insert Table 2 About Here

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Hypothesis 1b asserted that a cluster location would impact new venture profitability favorably. In this case the cluster variable is positive albeit not significant (β=.01, t=.13, p=.90), and indicates that there is a slight advantage to operating outside of the cluster rather than within the cluster. Hypothesis 1b therefore is not supported.

Hypotheses 2a and 2b test whether the advantages to clustering benefit only certain ventures. In particular Hypothesis 2a predicts that high innovation new ventures in clusters

would have higher growth, while 2b predicts high innovation new ventures in geographic clusters will have higher profitability. The beta coefficient for the INN*CLU moderator in the growth model is positive but not neither substantial nor significant (β=.05, t=.22, p=.82). Hypothesis 2a is not supported. In the profitability model, the INN*CLU moderator beta is positive, substantial and highly significant (β=.90, t=6.78, p=.00) indicating support for hypothesis 2b.

Table 3 provides the results for hypothesis 3, which asserted that high innovation industry ventures in geographic clusters would be more likely to obtain growth and profitability simultaneously than all other ventures. As the results indicate, high innovation industry ventures in geographic clusters were no more likely than any other venture in this sample to obtain growth and profitability simultaneously. Therefore hypothesis 3 is not supported.

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Insert Table 3 About Here

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Hypotheses 4a and 4b asserted that cluster heterogeneity would relate positively to growth and profitability respectively. The beta coefficients for this variable failed to lend support to this hypothesis under the growth or profitability models. Therefore both hypotheses are rejected.

DISCUSSION

In light of the recent efforts by policy makers to recreate Silicon Valley in other areas around the U.S. and world, the need to understand how such environments affect new venture performance is of grave importance. In this study, I sought to understand how operating within a geographic cluster affects the growth and profitability performance of new ventures. Before

meaningful discussion of the results is undertaken, the limitations of this study will be addressed. First and foremost is the fact that the moderator and innovation intensity variable were highly collinear, thereby making the estimates for these variables unstable. Future studies may want to operationalize the innovation intensity variable through alternative means that include more than one measure. For example, perhaps the percentage of industry patents held by each firm could be added to the R&D intensity variable to create a composite measure of innovation intensity.

Second, such a study may benefit from a sample with more equal representations of each of the respective cells (i.e. high innovation cluster firms, low innovation cluster firms, high innovation non-cluster firms and low innovation non-cluster firms). A more equal sample should yield more consistent results and perhaps eliminate any problems with non-normalcy. A third limitation of this study is that only one indicator was utilized for each variable. Future studies would benefit from multiple operationalizations of the concepts under consideration.

Beyond these limitations, however, the results of this initial study suggest that there are performance differences between firms that operate within geographic clusters versus those that operate outside of geographic clusters. Indeed being in a cluster had a positive and significant affect on new venture growth; however, contrary to my expectations, no differences for growth were observed between high and low innovation ventures. Thus it would appear that whatever benefits are available from geographic clusters appear to be available for all types of ventures.

For profitability, however, the results were the converse. While no significant main effects were observed in the location – profitability model, significant interaction effects were observed with high innovation cluster firms reaching the greatest levels of profitability. Contrary to growth, therefore, profitability performance for high innovation new ventures is enhanced by operating within a geographic cluster. The exchange of ideas occurring within the clusters must

enable new ventures therein to more efficiently organize their processes and technologies so as to more minimize costs and maximize profits on the growth being realized. It is important to note, however, that cluster heterogeneity was neither significant to ROS nor growth, and actually had a negative effect on growth. This suggests that while the diversity of the area may enable new ventures to benefit from the variety of ways of accomplishing similar tasks, it may result in the new venture attempting to offer products and services that meet the needs of too diverse a populations and consequently failing to offer products that effectively meet the needs of any. Interestingly, innovation intensity exhibits a slight positive but non-significant effect on growth, and a negative but significant effect on profitability. While offering new products and/or services can benefit venture growth, it is apparent that the costs of too much innovation weigh negatively on profitability.

It is apparent that geographic clusters new ventures are still plagued by an inability to be profitable through their growth stages. Although this sample of ventures tended to be more profitable on average than other industry firms, many did not have positive profitability figures. Perhaps the energy and attention required towards meeting one objective or the other is still greater than the benefits to clustering previously discussed, thereby continuing to render even those new ventures with so much to gain from operating within a cluster environment from pursuing growth and profitability simultaneously. This is a matter requiring further research.

Directions for Future Research

The results from this study have raised several avenues through which future studies should focus attention. Of primary importance is why location affects new venture growth and profitability performance. Is the reason that cluster new ventures obtain higher growth than other new ventures simply because they have a larger market to which to sell their products, or is it

more because they are more in tune with the needs of the market and thus offer better quality products? Is the reason high innovation new ventures benefit more from their location within a cluster the result of cost reductions for sourcing inputs or servicing clients, or more the result of the idea exchanges that occur enabling efficiency to proliferate throughout operations? If we are ever to truly understand why some ventures succeed while others do not, researchers must begin exploring matters not typically considered. This study demonstrates that location may be one of factors. Further research is needed to better understand why.

Future research in this area should also look to utilize stratified random sampling techniques. It is possible that for this sample of IPO new ventures, many of which were still involved in high technology-related industries, that the businesses of the firm were still very much knowledge-based and thus benefited from the exchange of ideas. With stratified random sampling, samples could be drawn from numerous populations representing ventures both from within and outside of geographic clusters, so as to determine the specific impact of geographic clusters on all venture types.

One final direction for research to mention revolves around the issue of the maturation process of cluster new ventures. The majority of firms in this sample operated in a recognized geographic cluster. It is important to note that age did not exhibit significant effects on either growth or profitability. If new ventures at age six are no different from those at age one, and most were more profitable on average than most firms in their industry, this suggests that cluster new ventures experience a rapid maturation process, which may explain why survival has been found significant to cluster new ventures (Saxenian, 1990; Shaver & Flyer, 2000). Research on the learning process of cluster new ventures would be extremely helpful toward enlightening us on this topic.

CONCLUSION

Location is often overlooked as a variable of consideration in new venture performance research, but as this study has demonstrated, it exerts substantial influence on new venture growth and in some cases profitability. The primary contribution and theoretical implication of this study is that investigations concerning growth and innovation need to seriously consider how location may influence the observed relationships of their models. This suggests that location may need to be utilized as a control variable in studies pertaining to new venture growth as well as innovation.

Additionally, significant effects of location on growth and on profitability for high innovation firms suggests that managers must be more acutely aware of the locations in which they are operating, and may need to evaluate whether the location in which they are operating will be conducive to obtaining the performance objectives desired. More research is needed to better understand the characteristics of location that managers should seek in making this determination. It is my hope that this study stimulates the interest that will give birth to this knowledge.

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Table 1 – Means, Standard Deviations, and Correlations Matrix for Independent Variables

No.	Variables	Means	S.D.	1	2	3	4	5	6
1.	Age	3.46	1.37	1.00					
2.	Size	.58	.85	.05	1.00				
3.	Innovation Intensity (Ind. Adjusted)	-1.58	20.02	.01	-.10	1.00			
4.	Cluster	10.03	7.79	-.02	.00	.08	1.00		
5.	Heterogeneity	14.17	9.54	-.23**	.10	.11	-.26***	1.00	
6.	INN*CLU	.63	15.12	.03	-.09	.95***	.03	.05	1.00

*** = P<.01
** = P<.05

Table 2 – Multiple Regression Models for Venture Growth and Profitability

	Sales Growth		*ROS*	
Variables	Model 2	Model 3	Model 2	Model 3
Age	.00 (-.01)	.00 (-.02)	.03 (.64)	.02 (.56)
Size	.78 (12.27)***	.78 (12.27)***	.00 (-.03)	-.01 (-.34)
Cluster	-.22 (-3.34)***	-.21 (-3.19)***	.01 (.13)	.07 (1.66)
Innovation Intensity	.01 (.10)	-.04 (-.19)	-.88*** (-18.04)	-1.75 (-13.01)***
Heterogeneity	-.06 (-.88)	-.06 (-.81)	-.04 (-.83)	.02 (.39)
INN*CLU		.05 (.22)		.90*** (6.78)
F	33.26	27.45	68.63	91.88
Adjusted R^2	.62	.61	.77	.85
Change in R^2		-.01		.08***

*** = P<.01
** = P<.05
* = P<.10

Table 3 – Cross-Tabulations of Location, Innovation Intensity and Dual Performance Objectives Attainment

Cluster Location?	Innovation Intensity	Growth/Profit Firm?		
		YES	NO	TOTAL
YES	HIGH	10	2	12
	LOW	31	4	35
	TOTAL	41	6	47
X^2 = .23, df=1, P=.63				
NO	HIGH	15	3	18
	LOW	28	8	36
	TOTAL	43	11	54
X^2 = .22, df=1, P=.64				