

Small-Business Incubators and the Entrepreneurial Environment

Robert E. Bernier
University of Nebraska at Omaha

Abstract

Public support of small-business incubators continues to grow. Nearly 90 percent of the 700 small-business incubators in North America publicly supported, mostly by state or local governments. Previous research on the effectiveness of small-business incubators as tools of economic development have been limited to the self-reported data of incubators on businesses “graduated” and the jobs they created. A comparison of neighborhoods, defined by geographic zip code, with and without small-business incubators indicates that small-business incubators are associated with neighborhoods that have a favorable entrepreneurial environment.

Introduction

Approximately 700 small-business incubators had been established in North America by 2000. Though the earliest small-business incubators were private, most small-business incubators have been established with public subsidy. Studies of the effectiveness of small-business incubators have focused on the businesses graduated by small-business incubators and measures of the job creation attributed to graduates. This study focuses on changes in the entrepreneurial environment of neighborhoods with incubators through measures of change in manufacturing firms and total employment.

Small-Business Incubators

A small-business incubator is an attempt to influence the entrepreneurial environment by providing an entrepreneurial subculture, access to capital, flexible and low cost space, sharing of overhead expenses, and management and technical assistance. Small-business incubators began their growth as an economic development tool through the efforts of City Venture Corporation, a subsidiary of Control Data Corporation. When Control Data went through bankruptcy reorganization in the late 1980s all of City Venture Corporation’s small-business incubators were sold or closed. In 1985, however, the National Business Incubation Association (NBIA) was formed and promotion of the business incubator concept continued.

A succinct definition of a small business incubator is offered by Oliver Brooks, Jr. (1986):

A multi-tenant facility which provides entrepreneurs with: (1) flexible leases on small amounts of inexpensive space; (2) a pool of shared support services to reduce overhead costs; (3) some form of professional and managerial assistance; and (4) access to or assistance in acquiring seed capital.

The Economic Development Administration (EDA) has been the most active federal agency in the support of small-business incubators. However, funds for the creation of small-business incubators come from a variety of federal, state and local sources. Although the earliest incubators were begun by private initiative there has almost always been public funds involved (including in the creation of City Venture

incubators). Private incubators today account for only 12 percent of the approximately 700 small-business incubators in operation.

The NBIA has supported a series of studies on small business incubators designed to demonstrate their value in economic development policy. The most extensive of these studies was conducted by the University of Michigan with financial support of NBIA and EDA. In the study (Molnar et al., 1997) 50 incubators were selected as representative in location and type. These incubators were surveyed and self-reported an average of 21 business created with an average of 13 jobs per business. Using a job multiplier, the study attributed an average creation of 702 jobs per incubator in a seven-year period at a public cost of \$1,109 per job.

The University of Michigan study and other studies of small-business incubators have focused on the survival rates of business supported by small-business incubators and the attributed job creation of surviving firms. Similar studies have been criticized on the grounds that small business assistance programs may be taking credit for business formation and job creation that would have occurred anyway in the economy or for businesses that succeeded because they drove out existing businesses because they had the advantage of public subsidy. (Wood, 1994)

The criticism of the use of public subsidy to support small business development is grounded in neo-classical economic theory. That is, it is assumed that business formation and growth is bounded by Adam Smith's rules of supply and demand. If such rules apply, public subsidy distorts the free market by giving subsidized businesses cost advantages over unsubsidized businesses. Further, support of small businesses is justified only on social grounds because it protects those businesses from the economic power of large business that are presumably able to reduce costs through production efficiency.

Entrepreneurial Environment

Joseph Schumpeter, in his *Theory of Economic Development* (1936) and later books, maintained that the market equilibrium seen by neoclassic economists is an illusion caused by a failure to look at economics in an historical context. The growth of economies, Schumpeter theorized, is caused when entrepreneurial firms cause disequilibrium in the market place through innovation. Entrepreneurial firms, Schumpeter asserted, appear periodically and in clusters but he did not offer a theory about how they appear.

Interest in Schumpeter's theories re-emerged in the 1980s as a result of Birch's (1979) contention that most net new jobs are created by small business. Porter (1998) has noted that clusters of entrepreneurship can be identified globally and that they revolve around specific industries. Bruno and Tyebjee (1982) suggest that clusters of entrepreneurs occur at certain times and places because the social and economic environment at those times and in those places encourages entrepreneurship.

Eisinger (1988) suggests that state and local governments have attempted to create the entrepreneurial environment through a variety of means. Among the approaches taken by Eisinger's "Entrepreneurial State" is the small-business incubator.

Much early research in small business focused on the personality characteristics of the entrepreneur rather than the environment in which the entrepreneur was created.

Livesay (1982; 12) notes that “after nearly two decades” of research into the psychological characteristics of the entrepreneur there exists “a lot of debate, not much factual information, and little if anything in the way of satisfactory explanatory theory.” This research so frustrated Shapero (Shapero & Sokol, 1982) that he stopped writing about entrepreneurs in favor of analyzing what he terms the “entrepreneurial event.” He defines it as follows:

Operationally, the entrepreneurial event is denoted by

1. *Initiative-taking*. An individual or group takes the initiative.
2. *Consolidation* of resources. An organization is formed or restructured to accomplish some objective.
3. *Management* of the organization by those who took the initiative.
4. *Relative autonomy*. Resources are disposed of and distributed with relative freedom.
5. *Risk-taking*. The organization’s success or failure is shared by the initiators. (Shapero & Sokol, 1982; 78)

Shapero suggests that the entrepreneurial event is triggered by displacement, both positive and negative but more often negative. The displacement is filtered through “Perceptions of Desirability” which are influenced by culture, family, peers, colleagues, and mentors. And, filtered again by “Perceptions of Feasibility.”

Bruno and Tyebjee (1982) build a model of the entrepreneurial environment based on their review of the dozen or so authors, including Shapero, who have dealt with it. It is based on a list of most frequently cited factors. These are: (Bruno & Tyebjee, 1982; 293)

- *Venture Capital Availability*
- *Presence of Experienced Entrepreneurs*
- *Technically Skilled Labor Force*
- *Accessibility of Suppliers*
- *Accessibility of Customers or New Markets*
- *Favorable Government Policies*
- *Proximity of Universities*
- *Availability of Land or Facilities*
- *Accessibility to Transportation*
- *Receptive Population*
- *Availability of Supporting Services*
- *Attractive Living Conditions*

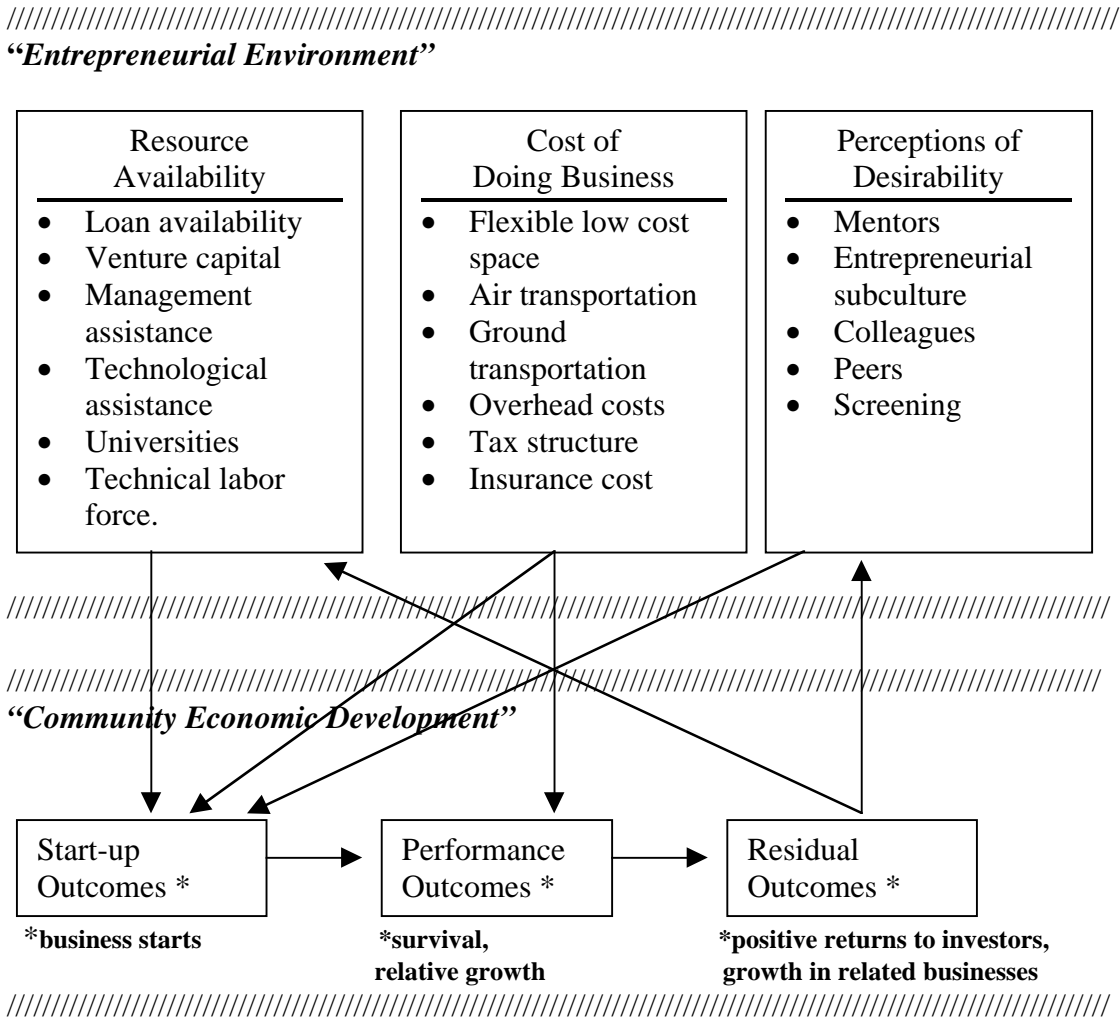
These factors are analyzed and categorized into two influences – “resource availability” and “cost of doing business.” Resource availability influences the successful start-up of a company (“Start-up Outcomes”) and the eventual disposition of the firm, which may include payoff of venture capital, merger or acquisition, or spin-off companies (“Residual Outcomes”). The Cost of Doing Business influences the start-up and the success of the company in its formative years (“Performance Outcomes”).

Figure 1 is a model that combines the Bruno and Tyebjee (1982) model and the Shapero and Sokol model into a comprehensive model of the entrepreneurial environment. It consists of three general factors: Resource Availability, Cost of Doing Business and Perceptions of Desirability. The Resource Availability and Cost of Doing

Business factors are derived from the Bruno and Tyebjee model. The Perceptions of Desirability factor is derived from the Shapero and Sokol model.

Further, it is asserted here that small business performance measures impact these factors in a systematic way. All three factors influence business starts (Start-up Outcomes). The Cost of Doing Business factor influence the ability of business starts to succeed (Performance Outcomes). When business succeed with returns to investors, broadly defined (owners, equity investors, debt investors, etc.) it encourages others to start or invest in small business (Residual Outcomes), thus encouraging others to start or invest in other small businesses.

Figure 1. Model of the process of creating an environment for entrepreneurial clusters.



A small-business incubator, then, may be seen as an enterprise designed to improve the entrepreneurial environment of its “place” both directly, by attempting to alter components of the three factors in favor of the entrepreneur, and indirectly by producing successful companies (“graduates” in the parlance of the incubator industry) that improve the environment through residual outcomes.

The factors identified in the model (Figure 1) are present in a community whether or not there is an incubator. However, even when a business chooses not to locate in the incubator, the incubator’s influence may still be felt by

- Improving the visibility of entrepreneurship in the community and thus its attractiveness as a career.
- Improving the competitiveness of business services, including financing, for business start-ups.
- Improving the availability of technical and labor resources and generating spin-off companies, especially if the incubator is successful in generating a cluster of businesses in specific markets.

Research Question

For public policy makers the symbolic significance of the small-business incubator may be sufficient. It provides a physical place that represents public support of small business. However, as an economic development tool the small-business incubator must be judged on its ability to alter the entrepreneurial environment sufficiently to create more small businesses and more jobs than would have been created without an incubator.

Public support of small-business incubators is a local or state affair. Even when small-business incubators are supported by state government, however, the intent is to encourage entrepreneurship at a local level. This objective is acknowledged in the University of Michigan study (Molnar et al., 1997) in which incubators reported that 84 percent of graduates remained in their community. However, “community” is undefined.

For this study a narrow definition of community is selected because most small-business incubators are insufficiently large to impact the entrepreneurial environment metropolitan areas in a way that can be detected by general economic data. Within a metropolitan area, even within a rural county, a small-business incubator may be expected only to influence the entrepreneurial environment within a neighborhood.

Thus, the research question for this study is: Do small-business incubators – through their influence on the entrepreneurial environment – increase business formation and job creation above the levels found in similar neighborhoods without incubators?

Research Design

The research question was analyzed using measures of neighborhoods, defined by zip codes, with and without incubators. The zip code is not an ideal definition of neighborhood as a neighborhood may reasonably include more than one zip code or portions of more than one zip code. However, the county level is too broad a definition of neighborhood. Using the zip code definition probably misses some business and job growth impacts of a small-business incubator but does not overstate them.

The latest available directory of small-business incubators from NBIA (McKinnon 1998) lists 582 incubators. Of these, 144 are identified as manufacturing or general technology incubators. These were selected for two reasons. First,

manufacturing and general technology firms are those most desired in economic development because they are seen as creating wealth within a community. Second, the entrepreneurial environment theories of Schumpeter, Porter and others focus on the creation of clusters of related firms. Other types of incubators defined by NBIA were too broad (Rural, University-Sponsored, For-Profit) or had too few within the category (Arts, Biotechnology, Software) to allow for comparative analysis.

Of the 144 manufacturing or general technology incubators 91 were created before 1995. These were selected as having sufficient time to impact the entrepreneurial environment. A geographic zip code was used to define each neighborhood. For each of the 91 manufacturing or technology incubators founded before 1995 a geographic zip code was identified. Ten of the incubators had postal zip codes that are unique to the institution with which they are affiliated (usually a university). For these incubators the zip code corresponding to their physical location was substituted. A geographic zip code was selected to correspond to each incubator zip code to make up the control group. These zip codes were selected on a demographic basis using zip code data from CACI. The selection was based first on five factors: 1) within the same state, 2) urban or rural, 3) population, 4) ethnic composition, and 5) per capita income. These criteria were used so that businesses in the control group operated under similar laws and had similar access to capital and services as did those businesses within the “treated” group (zip codes with incubators).

The U.S. Census Bureau Zip Code Business Patterns contain data for each year between 1994 and 1997 inclusively. The 1994 and 1997 data were compared.

Results

Neighborhoods (defined by a zip code) with manufacturing or general technology incubators had significantly greater growth in the number of manufacturers than did similar neighborhoods without incubators. Neighborhoods with incubators also had a significantly greater increase in total employment.

The rate of growth in the number of manufacturers was significant for zip codes with incubators only for manufacturing establishments with fewer than 10 employees. The zip codes without an incubator had a significant greater growth in manufacturing firms with 10 – 19 employees. There was no significant difference between the incubator group and the control group in the rate of growth in manufacturing establishments with 20 – 99 employees.

The mean absolute number of manufacturing establishments was significantly greater in zip codes with an incubator than in zip codes without an incubator ($M_{\text{incubator}} = 40.06$; $M_{\text{control}} = 37.90$), $F(1, 90) = 22.11$, $p < .01$. The mean absolute cluster of very small manufacturing establishments (1- 9 employees) was significantly greater in zip codes with an incubator than in zip codes without an incubator ($M_{\text{incubator}} = 19.20$; $M_{\text{control}} = 17.21$), $F(1, 90) = 85.48$, $p < .01$. The cluster of manufacturing establishments of medium size (10 – 19 employees and 20 – 99 employees) and of large size (100 or more employees) were also significantly greater for zip codes with an incubator than for zip codes without an incubator (Table A).

Table A

Analysis of variance of manufacturing clusters by zip code, 1997

	Means		Sample Variance		F (1:90)
	Incubator	Control	Between	Within	
No. Manufacturers	40.06	37.90	211.08	9.55	22.11**
1-4 Employees	12.54	11.22	79.12	.91	86.98**
1-9 Employees	19.20	17.21	180.01	2.11	85.48**
10-19 Employees	6.24	5.97	3.43	.32	10.63**
20-99 Employees	9.95	10.33	6.73	1.04	6.50*
>99 Employees	4.68	4.40	3.71	.20	18.56**

Populations are equal (n=91). * $p < .05$. ** $p < .01$.

The mean percentage increase in manufacturing establishments was significantly greater in zip codes with an incubator than in zip codes without an incubator ($M_{\text{incubator}} = .09$, $M_{\text{control}} = -0.02$), $F(1, 90) = 102.86$, $p < .01$. The mean percentage increase in manufacturers with fewer than 10 employees was significantly greater in zip codes with an incubator than in zip codes without an incubator (Table C). However, the mean growth rate in manufacturers with 10 – 19 employees was greater in the control group ($M_{\text{incubator}} = .16$, $M_{\text{control}} = .19$), $F(1, 90) = 6.73$, $p < .05$. There was no significant difference in the mean percentage change in manufacturers with 20 – 99 employees.

The mean percentage increase in total employment was greater for zip codes with an incubator than for zip codes without an incubator ($M_{\text{incubator}} = .13$, $M_{\text{control}} = .09$), $F(1, 90) = 72.43$, $p < .01$.

Table B

Analysis of variance of percent change in employment and number of manufacturing establishments by zip code, 1994-1997

	Means		Sample Variance		F (1:90)
	Incubator	Control	Between	Within	
Total Employment	.13	.09	.07	.00	72.43**
No. Manufacturers	.09	-0.02	.61	.00	1046.77**
1-4 Employees	.13	-0.01	.86	.00	310.70**
5-9 Employees	.23	.08	1.02	.01	123.81**
10-19 Employees	.16	.19	.03	.00	6.73*
20-99 Employees	.09	.09	.00	.00	1.57
>99 Employees	.07	-0.02	.32	.00	133.36**

Populations are equal (n=91). * $p < .05$. ** $p < .01$.

Analysis

Small-business incubators appear to be associated with neighborhoods (as defined by zip codes) with significantly greater increases in very small manufacturers and total employment than zip codes without incubators. However, these zip codes also had a significant increase in larger manufacturers (100 or more employees).

Two causes other than the presence of a small-business incubator may account for the significant difference in the performance of the incubator zip codes. First, the significant difference in the growth of larger manufacturers may contribute to growth of smaller manufacturers. This would be so if the smaller manufacturers were created in response to a demand by the larger manufacturers for suppliers. However, for this to be the case one would have expected significant increases in the rate of growth for the medium sized manufacturers (10 – 19 and 20 – 99 employees) rather than the very small manufacturers. The second, and more likely cause, is that neighborhoods with small-business incubators had a more active economic development effort than did neighborhoods without small-business incubators. One would expect that a community that sponsors a small-business incubator to be more likely than other communities to also sponsor other economic development efforts.

The growth in very small manufacturing establishments provides evidence that the entrepreneurial environment for entrepreneurs in neighborhoods with small-business incubators is most significant among the very size of manufacturer a small-business incubator is most directed at encouraging. The comparison data is not longitudinal. That is, it measures the difference in the number of very small manufacturers rather than in the success of individual manufacturers. It is probable that some manufacturers identified in 1994 were no longer in business in 1997. However, the rate of growth indicates that potential entrepreneurs in zip codes with small-business incubators felt a significantly greater opportunity than did those in zip codes without incubators.

The comparisons in this study were limited by the time span available in the U.S. Census Bureau Zip Code Business Patterns. As additional years of data are made available it will be important to determine if the growth rate difference in very small manufacturers continues to be significant for the zip codes with small-business incubators. Just as importantly, for economic development policy, will these very small manufacturers mature to larger firms and cause a significant growth among medium-sized manufacturers?

References

Birch, D.L. (1979). The job generation process. Cambridge, MA: MIT Program on Neighborhood and Regional Change.

Brooks, O., Jr. (1986). Economic development through entrepreneurship incubators and the incubation process. Economic Development Review(Summer), 24-29.

Bruno, A. V., & Tyebjee, T. T. (1982). The environment for entrepreneurship. Encyclopedia of Entrepreneurship (pp. 288-315). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Eisinger, P. K. (1988). The rise of the entrepreneurial state. Madison, WI: The University of Wisconsin Press.

Livesay, H. C. (1982). Entrepreneurial history. Encyclopedia of Entrepreneurship (pp. 7-15). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Molnar, L. A., Grimes, D. R., Edelstein, J., De Pietro, R., Sherman, H., Adkins, D., & Tornatzky, L. (1997). Business incubation works. Athens, OH: National Business Incubation Association.

Porter, M. E. (1998, November-December). Clusters and the new economics of competition. Harvard Business Review, 77-90.

Shapiro, A., & Sokol, L. (1982). The social dimensions of entrepreneurship. Encyclopedia of Entrepreneurship (pp. 72-90). Englewood Cliffs, NJ: Prentice-Hall, NJ.

Schumpeter, J. A. (1936). The theory of economic development. (Redvers Opie, Trans.). Cambridge, MA: Harvard University Press.

Wood, W. C. (1994). Primary benefits, secondary benefits, and the evaluation of small business assistance programs. Journal of Small Business Management 33(3) (65-75)