Incubators and the Development of New Technologies

Donald Siegel
Professor of Entrepreneurship
A. Gary Anderson Graduate School of Management
University of California, Riverside

Presentation Outline

- ❑ **Background Information on Incubators**
- ❑ **Relationship Between Incubators and Science Parks**
- ❑ **Evidence on the Effectiveness of Incubators**
- ❑ **Metrics**
- ❑ **Research Questions**

Background Information on Incubators
Definition and Goals

- Incubator-Designed to Foster the Growth, Survival, and Development of Entrepreneurial Firms
- Common Goals of Incubators
  - Job Creation
  - Enhancing a Region's Entrepreneurial Climate
  - Retaining Businesses Within a Region
  - Building or Accelerating Growth in a Local Industry
  - Diversifying Local Economies

Background Information on Incubators: Growth and Evolution

Two Key Trends: Growth and Specialization

- 1959-First Incubator-Batavia, NY
- 1980-12 U.S. Incubators (All in Northeast)
- 2006-1,115 U.S. Incubators (approx. 5,000 worldwide)
- 2006-U.S. incubators assisted more than 27,000 start-up companies that provided full-time employment for more than 100,000 workers and generated annual revenue of approx. $17 billion (source: NBIA)
- Three Key Champions-SBA, Ben Franklin Technology Partners, and Control Data Corporation
- Evolution of Incubators → More Industry-Specific

  (e.g., Medical Technologies, Alternative Energy, Space Technologies, Software Development, Telecommunications)

Background Information on Incubators: Types of Incubators

Key Objective of Incubator

- 94%- Nonprofit Organizations Focused on Economic Development
- 6%-For-Profit Entities, Usually Established to Maximize Returns on Shareholder Investment

Location of Incubator

- 53%-Located in Urban Areas
- 28%-Located in Rural Areas
- 19%-Located in Suburban Areas

Background Information on Incubators: Types of Incubators (cont.)

Sponsor of Incubator

- 31%-Sponsored by Economic Development Organizations
- 21%-Sponsored by Government Entities
- 20%-Sponsored by Academic Institutions
- 8%-Sponsored by Other Types of Organizations
- 4%-Sponsored by For-Profit Entities
- 8%-Have No Sponsor or Host Organization
- 8%-"Hybrids," With More Than One Sponsor

Background Information on Incubators: Types of Incubators (cont.)

- 54%-"Mixed-Use," Assisting a Range of Early-Stage Firms
- 39%-Focus on Technology Businesses (Clearly Defined as "Technology Incubators")

<u>Technology Incubators</u> Provide a Range of Services to Entrepreneurs and Start-ups Including:

- Physical Infrastructure
- Management Support
- Technical Support
- Access to Financing
- Legal Assistance
- Networking

Background Information on Incubators: Technology Incubators

Technology Incubators Have Four Main Objectives:

- **Economic Development (especially, Job Creation)**
- **Technology Commercialization**
- **Property Venture/Real Estate Development**
- **Entrepreneurship**

Relationship Between Incubators and Science Parks

- **Differences Between Incubators and Science Parks**
  - **Science Parks-Typically, large-scale projects, housing corporate, government, and university labs, as well as large and small firms**
  - **Science Parks-Rarely offer comprehensive programs of business assistance**
  - **However, many Science Parks have incubators (e.g., Dartmouth-Centerra Resource Park (Science Park); Dartmouth Regional Technology Center (Incubator))**
  - **Link and Scott (2006)-Estimated That Over Half of U.S. Science Parks have an incubator (the five U.S. largest parks have incubators)**

Limited Evidence on the Effectiveness of Incubators

- Sarfraz Mian-Research Policy-1996, *JBV*-1997
- Sean Hackett-*JTT* 2004-"Assessing Value-Added Contributions of University Technology Business Incubators to Tenant Firms"
- Rothaermel and Thursby (2005)-Incubator at Georgia Tech (Advanced Technology Development Center)-79 firms
- *JBV* Special Issue on "Science Parks and Incubators" (March 2005)-co-edited by Phan, Siegel, and Wright
  - Paper on Incubation Strategies by Clarysse, Wright, Lockett, Van de Velde and Vohora
  - Paper on Connections Between Incubators and Science Parks by Koh, Koh, and Tschang
  - Overview Paper-Problem With Incubator Evaluation Studies-Endogeneity Problem by Phan, Siegel, and Wright

Metrics

- Firm Survival
- Firm Growth
- Firm Revenue/Profit
- New Products, Services, and Businesses Launched
- Patents
- Copyrights/Trademarks
- Licensing Income
- Funds Raised (Including VC Funding)
- Shareholder Wealth
- Employment/Job Creation
- Measures of Research Productivity (Publications/Citations)
- Better Measures of Knowledge Flows Between Incubator and University

Research Questions (not orthogonal)

- Do Incubators Add Value?
  - Performance Evaluation/Benchmarking (Firm, Park, University, Region, Nation)
  - Need Control Group ("Matched Pairs"-Siegel, Westhead, Wright (2003))
  - Alternative Levels of Analysis (Agents vs. Institutions)
    - The incubator
    - Firms located on the incubator
    - Entrepreneurs and teams of entrepreneurs involved in these enterprises
- Analysis of Linkages Between Incubators/Science Park Firms and Universities
- Desirability of Alterative Incubator Models (for Firms and Regions)