Learning By Building: How U.S. Innovative Companies Scale Production and Implications for Future Innovation

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Production in the Innovation Economy (PIE)
How can the U.S. capture more of the downstream benefits of its innovative capacity?

Scale-Up Module Research Question

• What are the implications of innovative firms’ scale up strategies for the U.S. innovation ecosystem?
  ▪ What is the process and pathways by which innovative production-oriented firms scale their technology?
  ▪ What are the critical factors necessary for scaling? What if any barriers exist?

Methodology

▪ “Critical case”
▪ Selection bias toward survivors
▪ Focused on companies in early to late stage scale up
150 Production Firms Started with MIT Licensed Technology (1997-2008)

**By Industry**
- Advanced Materials and Energy: 39%
- Biopharma: 21%
- Medical Devices: 21%
- Robotics: 17%
- Semiconductors and Electronics: 10%
- Other: 10%

**By Current Status**
- Operating: 59%
- Closed: 20%
- Merged: 21%
Findings: The U.S. Has a Robust Innovation Ecosystem at the Early Stages of Scale Up

- Capital Available Over Extended Period of Time

- Thick Labor Markets
  - Companies need rapid access to diverse “high intellect” talent
  - Easy to find for prototyping and pilot phases

- Networks Matter

- Range of Suppliers
  - Companies draw from a range of suppliers with an emphasis on speed and quality
  - “We kept eight machine shops busy for two weeks at full capacity getting a system ready.”
82 Production Firms Received Venture Capital
52 Remain Operating

Mean Across All Industries-$74 Million
Firms need a **new influx of significant capital** to reach commercial scale

**Strategic partners and foreign governments** provide complementary assets

Critical moment in firm’s growth – an “**inflection band**”

**Financing, capabilities and customers/suppliers** pull **technology development abroad**
Consequences for the U.S

- Reduces benefits to the country of downstream activities in terms of investments and jobs.

- Increases the movement of the center of gravity for industries away from U.S.

- Decline in capabilities: “industrial commons” is made poorer.