The Emergence of a Cluster?
The Biotechnology Community in London, Ontario

Dean A. Hennessy

Rotman School of Management
University of Toronto

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Introduction

Research Question:

(1) When is a cluster a cluster? Does the biotech community in London, Ontario constitute a cluster?

(2) How does a cluster emerge, and how do community level resources and linkages facilitate or impede their growth and development?

- Plan:
  - Theory
  - Research setting/design
  - Next Steps

Theoretical Background

What is a cluster?:

- Measures of clustering:
  - Counts of firms in an industry
  - Relative concentration of an industry in a region
- Standard story: positive externalities ✍ agglomeration
- Evidence that few industries are concentrated in a way other than what could be described as random (*Ellison & Glaeser, 1997*)
- Higher degree of clustering in knowledge intensive industries (*Swan & Prevezer, 1996*)
  - Cost/risk minimization; knowledge sharing/learning/spillovers
- Fundamental identification problem with all emergent phenomena:
  - Can it only be identified as such after it becomes fully realized?
  - Or, are there stages that can be identified?
- Why is understanding clustering as a dynamic phenomenon important?
  - policy

Theoretical Background

Organizational Emergence:

- Two primary mechanisms for (localized) emergence:
  - Start-ups: most likely to emerge from the localized environment (*Feldman, 2001; Klepper, 2001; Zucker, et al., 1998*) inheritance with variation (*Winter, 1990*)
  - (re)-location (eg. branch plants): knowledge seeking as a motivation for location choice (*Chung & Alcacer, 2002*); self-selection (*Shaver, 1998*)
- Startups are more sensitive to their local environments: especially due to legitimacy and competition (*Lomi, 1995*)
- Institutional transfer - from the academy to the economy:
  - Knowledge transfer is facilitated by:
    - university policy (*Zucker, et al., 2002*)
    - Culture of entrepreneurship in the academy (*Audretsch, 2000*); entrepreneurship in the community (*Feldman, 2001*);

Theoretical Background

- Coevolution
  - co-evolution between industry, technology and supporting institutions (*Nelson, 1998*)
  - There are positive feedback economies from agglomeration (*Arthur, 1988*); the more agglomerated, the more the region becomes a basin of attraction, leading to:
    - more institutional supports: new institutions; enhanced resources at local institutions
    - more intermediate suppliers;
    - more specialized labour flows
  - These reinforce the agglomeration of industry in a particular region; more specialized labour lowers the labour constraint; more intermediate suppliers lowers costs; increases institutional supports.

Research Setting

Characteristics of the Biotechnology Industry:

- Highly heterogeneous:
  - research fields: agriculture, biological, medical
  - Industry fields: agriculture, chemicals, diagnostics, therapeutics, etc.
- technologically intensive industry:
  - Perpetual knowledge generation at the industry level
  - Highly innovative: patenting is a common activity
  - Long lead times in bringing new products to market; highly uncertain outcomes
  - Alliances are a prominent feature of biotech industry, of which there are two main types:
    - Research alliances: combines the tacit knowledge of the partners
    - Commercial alliances: focuses on marketing and distribution
  - Institutions: local and national

Research Setting

Data:

- interviews of key personnel in organizations in London: firms, research institutes, universities/ hospitals, VCs, civic associations, government agencies.

Research Setting

Biotechnology in London, ON:

- Roughly 40 firms
  - Research and industry fields: biomedical devices, biotechnology, bioinformatics, pharmaceuticals.
  - Institutions: LHSC, UWO, LRCC, NCA, CHRI, NRC(IMTI), RRI, LHRI (core research); LBCC
  - Policy: federal/provincial funding used to promote the development of the sector (CFI, CIHR)

Research Setting

Biotechnology in London, ON:

- **UWO** was recently awarded $4.8 million of research infrastructure funding from the **CFI** for development of projects including **Biomedical Engineering** and the **Advanced Biotechnology Research Centr**e. The U.S. based Whitaker Foundation also awarded UWO $1.4 million to assist with the establishment of a graduate program in biomedical engineering.
- G. Scott Paterson, the Chairman and CEO of Yorkton Securities Inc., donated $1 million to UWO for a new biotechnology wing in the Medical Sciences Building.
- In July of 2000, LHSC was awarded over $6 million dollars in grants from the **CFI** and the Ontario government to create the **National Centre for Minimally Invasive Robotic Surgery.**

Summary of Observations:

- Most of the startups in the region were spunoff of local institutions
- Strong institutional linkages remain
- There are emerging commercialization capabilities in the region, and an entrepreneurial culture
- There is evidence of the coevolution of industry, institutions (and probably technology):
  - Much federal and provincial funding supporting the development of the local industry
  - Local institutions adapting to policy and industry demands
  - Firms adapting to the local institutions
  - Presence of local industry and civic entrepreneurs

London, ON – the downside…

- Few inter-firm linkages (high degree of differentiation in products/ technologies)
- Few firms are locating in, or setting up branches in London because of the biotech community
- Financing: some VCs located there but do not necessarily serve the local market
- Transportation is underdeveloped
- Proximity to another biotech region: “That great sucking sound from Toronto”
- Perception of entrepreneurship is still lacking

So…

Is this a cluster?

Next Steps:

- Theory refinement
- Data collection
  - More interviews/construction of the genealogy of the community
  - archival data of the whole biotech industry in Canada since its inception
    - Firm level CMA level
    - Ties – by partner: to firms, institutions, etc.; R&D consortia; by type: research, commercialization alliances, licensing agreements
    - Spillovers: Patents/products
    - Community characteristics: Institutional, etc.

Figure 1: A Model of a Regional System of Innovation