Forums vs. Fountains: The Evolution of Knowledge Networks in Akron and Rochester

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Graduate School of Business
How can local economies prosper in a rapidly changing, increasingly open global economy?
Typology of Regional Trajectories

Type I: Indigenous creation of new industry
Type II: Transplantation of new industry
Type III: Diversification of old industry into related new
Type IV: Upgrading of mature industry

Absorbing and Unlocking: Diversifying Innovation Ecosystems
Silicon Valleys of the Second Industrial Revolution

Absorbing and Unlocking: Diversifying Innovation Ecosystems
Silicon Valleys of the Second Industrial Revolution

- By the 1980s, major companies had moved manufacturing to lower cost regions.
- Broadened research and development beyond local area.
- Shifted R&D toward advanced materials and applications.

Absorbing and Unlocking: Diversifying Innovation Ecosystems
Absorbing and Unlocking: Diversifying Innovation Ecosystems
Fears of a ‘Flat World’

“There is nothing that guarantees that Americans or West Europeans will continue leading the way [in innovation].”

- Thomas Friedman. *It’s a Flat World After All*. New York Times 3 April 2005
Two Competing Scenarios

Hollowing out

Agglomeration

Universities, Innovation and Local Competitiveness

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Global Co-Patenting Network
Polymers 1976-1980

Absorbing and Unlocking:
Diversifying Innovation Ecosystems
Absorbing and Unlocking: Diversifying Innovation Ecosystems
Absorbing and Unlocking:
Diversifying Innovation Ecosystems
Global Co-Patenting Network
Optics and Optoelectronics 2002-2007

Absorbing and Unlocking:
Diversifying Innovation Ecosystems
### Co-Authoring Network: Akron

#### Table 9.a

<table>
<thead>
<tr>
<th></th>
<th>Local Multinational</th>
<th>Local Tech Farms</th>
<th>Local Universities and Labs</th>
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* — significantly different from Rochester

#### Table 9.b

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† — significant change from 1980-1982

♦ — significantly different from Rochester

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Absorbing and Unlocking: Diversifying Innovation Ecosystems
## Co-Authoring Network: Rochester

### Table 9.c

**Rochester 1980-1982: Truncated Block Model**

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<th>Local Multinationals</th>
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<th>Local Universities and Labs</th>
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• — significantly different from Akron

### Table 9.d

**Rochester 2000-2002: Truncated Block Model**

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<th>Local Multinationals</th>
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</tbody>
</table>

•• — significant change from 1980-1982

• — significantly different from Akron

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Absorbing and Unlocking: Diversifying Innovation Ecosystems
The problem restated: institutional lock-in

Long line of research suggests that the issue has to do with institutional lock-in (Herrigel 1997; Grabher 1997; Krugman 1996). Mature industrial regions cannot regenerate out of existing capabilities because institutional lock-in will impede the development of institutions consistent with environmental needs.
Stark and Grabher: Bricolage and Post-Communist Transformation

- Actors faced with acute economic crisis withhold resource investments and engage in provisional moves.

- Localized processes of sense-making with specific interlocutors result in provisional resource investment accompanied by adjustment of organizational identities.
Annealing

A process used to remove internal stresses in metals, alloys, or glasses making the material less brittle usually by re-heating and then cooling in a specialized furnace.
Second Industrial Revolution
Innovation Ecosystems

Absorbing and Unlocking:
Diversifying Innovation Ecosystems

Federal (esp military)

Industrial R&D

University

Design

Goods

Local & State Gov

Civil Society

Local Banks

Supplier

Supplier

Supplier

Supplier

Supplier

Supplier

People

$
What has changed?

• Large companies: global strategic research partnerships
• Suppliers: need design capability
• Careers unfold across multiple employers and regions
• Small companies need access to patient, knowledgeable capital and specialized equipment
• Hollowing out of civic power structures

Absorbing and Unlocking: Diversifying Innovation Ecosystems
Universities roles have expanded to occupy the central role in the local innovation ecosystem.

- Generate new innovations
- Educate at all levels of the labor market
- Spin-out new companies
- Open access to specialized equipment
- Investments in property and high-growth ventures
- Facilitate industry groups and lead civil society response
Universities occupy a uniquely central role in the networks of trust which define the various spheres of the innovation ecosystem.
The Host at the Party
vs. the Life of the Party
Absorbing and Unlocking: Diversifying Innovation Ecosystems
Absorbing and Unlocking: Diversifying Innovation Ecosystems
Knowledge:
Semrock

- Founder: Promising Assistant Professor from the University of Rochester
- Technology: world leading optical thin film technology, layers of material that sort light in minute ways.
- No intellectual property licensed with or from the University.
- “I was very familiar with optical thin film technology. I had a couple of students working on that stuff. We didn’t make the kinds of structures we make here. It was more intellectual connections than it was realization...”
Bausch & Lomb and CAT-EIS

- Ian Cox, director of research.
- Longstanding philanthropic relationship with the university; no incentives or interest in moving beyond that.
- "And so you know we talk about the Alliance sometimes. That was a nice name for publicity purposes in press releases."
- [Became a real] alliance because it sort of brings together both Bausch & Lomb and the clinical side which is the Department of Ophthalmology, but also the optical side which is the Center for Visual Science so that’s where the tie in with the Center for Electronic Imaging Systems (CEIS) comes in.

Absorbing, Unlocking and Annealing:
Recapturing Innovation in Mature Industrial Regions
Prominent University of Rochester Professor with an entrepreneurial bent

Technology: minimizing light scatter in photolithography

Acquired by Corning Incorporated in 1998

Only hires experienced people; poached mainly from Kodak and Corning. But the connections were made (really maintained) through university ties.
Financial: Trillium

- Venture capital fund with money from High Wealth Individuals, Monroe County and the University of Rochester.

- “We have invested in three companies: an orphaned technology out of Kodak which we brought to the photonics cluster guys and they said there’s probably something there. They bought it to us and it developed and we invested.”
Conclusion

- Institutional change as a process of identity adjustment (annealing) which happens through interaction in the process of problem solving.

- Universities (and other key intermediaries) are in a unique position to facilitate these interactions due to their social capital.

Absorbing and Unlocking: Diversifying Innovation Ecosystems