
Local Antecedents and Trigger Events: Policy Implications of Path Dependence in Cluster Development

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Presentation to the ONRIS/MEDT Workshop
Delta Chelsea Hotel, Toronto
October 21, 2004

Innovation Systems Research Network



Concept of Path Dependence

- Explains how structured patterns of development result from random or chance occurrences
 - Polya urn schemes (Arthur and David)
- Shares three common features:
 - Study of causal processes that are sensitive to series of events in early in the causal sequence
 - Involve high degree of chance or contingency
 - Once launched, the sequence exhibits a more deterministic pattern of development (Mahoney)



Path Dependence Claims in Social Sciences

- Importance of specific timing of outcome-shaping events
- Similar starting conditions yield a wide range of possible outcomes
- Small or contingent events can have large consequences
- Practical irreversibility
- In economic & geographic systems
 - effects of increasing returns to scale (C. Davis)



Models of Regional Development

- Initial economic activity triggered by accidents of history become self reinforcing
 - Generate increasing returns over time
 - Initial events generate longer-term regional divergence
 - (Myrdal, Hirschman, Kaldor)
- Increasing returns from agglomeration economies and supply side externalities
 - Deep pool of specialized labour
 - Large number specialized input & service providers
 - Positive technological spillovers & externalities
 - (Marshall, Krugman, Arthur, Porter)



Spillovers and Untraded Interdependencies

- Technological complementarities have strong regional or territorialized dimension
 - Technological competence bundled in ensembles of related capabilities
- Creates ‘untraded interdependencies’
 - Involves codified and tacit knowledge
 - Transmitted through networks of firms
 - Shared institutional frameworks – ‘region’s institutional architecture’
 - Requires trust and ‘social capital’
- Distance Matters
 - Strong geographic spillovers between public research centres and industrial R&D

Cluster Definitions

- Defined as:
 - “Clusters are a geographically proximate group of interconnected companies and associated institutions in a particular field linked by commonalities and complementarities. Clusters encompass an array of linked industries and other entities important to competition. . . . Including governmental and other institutions – such as universities, standard setting agencies, think tanks, vocational training providers and trade associations.” (Porter)
- Collaborative organizational form involving
 - Public-private partnerships
 - Trade associations
 - Research institutes
 - Vocational training programs
 - Large and small firms



Elements of a Cluster

- Firm linkages and networks
- Supply architecture and demand drivers
- Access to capital
- Research infrastructure
- Education and training institutions
- Physical and communications infrastructure
- Governance regime
 - Civic leadership – ‘civic entrepreneurs’ (Henton)
- Policy Framework and supports



Path Dependence in Cluster Development

- How are clusters seeded and how do they develop?
 - Role of 'serendipity'
 - Intended vs. unintended consequences
- Cluster growth is firm-based
 - Role of anchor firms
 - Strategic research infrastructure
 - Public laboratories
 - Post-secondary educational institutions
 - Policy inadvertence
- Key role of civic associations and local entrepreneurs



Cluster Case Studies

- Size and composition of the cluster
- History of the cluster's evolution, including key events (intentional and accidental)
- Relationships between firms
- Relationships between firms, research infrastructure, other institutions/organizations
- Geographical structure of these relationships
- Role of finance capital (especially angel investors and venture capitalists)
- Role of local social capital and 'civic entrepreneurs'



ISRN: Work in Progress (2001-2005)

- **Biotech/Biomed:** (Montreal, Toronto, Vancouver, Ottawa, London, Saskatoon, Halifax)
- **ICT/Photonics/Wireless/e-Commerce:** (Vancouver, Calgary, Waterloo, Ottawa, Quebec City, New Brunswick, Cape Breton)
- **Mechanical Engineering:** Aerospace (Montreal); Steel, Auto Parts (S. Ontario)
- **Multimedia:** (Montreal, Toronto, Vancouver)
- **Food and Wine:** Specialty Foods (S. Ontario); Wine (Niagara, Okanogan)
- **Resource Industries:** Wood Products (BC); Mining Supply/Services (Sudbury)



Path Dependence and Cluster Formation

- Initial conditions and trigger events
 - Entrepreneurial intervention
 - Role of lead or anchor firm
 - Spin-offs and technological spillovers
 - Key role of public sector institutions
 - Institutional and cultural dynamics
- Random acts of entrepreneurialism not fully explained by local circumstance:
 - “Chance, however, often has local antecedents, making its role less than it first appears” (Porter)
 - Cluster emergence inextricably intertwined with local institutions



Cases in Cluster Formation

- Local antecedents
 - Ottawa ICT – federal labs
 - Waterloo ICT – founding of university
 - Calgary Wireless – public infrastructure
 - Silicon Valley – Stanford University
 - Washington, DC – federal labs
- Chance occurrences and trigger events
 - Ottawa ICT – US consent decree – Bell Northern Research
 - Waterloo ICT – Waterloo Maple and early spin-offs
 - Calgary Wireless – NovAtel
 - Silicon Valley – HP and Fairchild Semiconductor
 - Washington, DC – govt downsizing and local entrepreneurs



Importance of History and Path Dynamics

- Discontinuities, shocks
- Resilience, robustness
- Adaptation, evolution
- Learning from **success**
 - spin-offs, demonstration effects
- Learning from **failure**
 - release of surplus assets: key to next wave of prosperity



Policy Implications

- Linkages between elements of the system
 - Especially research infrastructure and clusters
 - Not just a 'supply-push' phenomenon
- Importance of demand side of innovation system
 - Absorptive capacity – at both firm and regional level
 - Knowledge is not a 'free good'
- Growing role of networks and clusters
 - Talent as a key attractor – 'Competing on Creativity'
 - Combination of educational resources and quality of life factors
- Importance of social factors and institution building
- Critical role of strategic planning and regional foresight at the local and community level
 - Coordinate federal agencies at local level



Strategic Planning at the Community Level

- Innovation-based strategic planning
 - Promotes innovative ideas in all aspects of regional economy
 - Facilitate relationship-building
- Strategic assessment of local/regional assets
 - Workforce skills
 - Knowledge assets and R&D
 - Creative elements
 - Infrastructure
 - Quality of place
 - Collaborative institutions
 - Entrepreneurial networks and clusters
- Key Role of Civic Leadership
 - Brings civic interests together to collaborate
 - Creates broad buy-in across all sectors of community

