
Social Capital and Economic Development: Local and Regional Clusters in Canada

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Innovation in the Knowledge Economy

- Innovation is defined as:
 - “the processes by which firms master and get into practice product designs and manufacturing processes that are new to them, whether or not they are new to the universe. . .” (Nelson and Rosenberg 1993)
- Includes both the first introduction and the diffusion of technology
- Lundvall expands the definition to include:
 - New forms of organization
 - Institutional innovations



Innovation in the Knowledge Economy

- New product features → new service capabilities
- Continuous transformation, capture of human capital to structural capital
- Extraction of value from discovery, invention, exploration by codified, explicit tools application (intellect to intellectual property)
- Extension of human capital via:
 - embedding knowledge
 - sharing and sourcing information / knowledge
 - investing in infra-technologies
 - building enterprise networks
 - renewing corporate business models



The Innovation Systems Approach

- network of institutions that interact to initiate, import and diffuse new technologies
 - government policy
 - corporate R&D
 - education and training system
 - structure of industry
- patterns of interaction between firms as collective learning process in acquisition and use of new knowledge
 - internal organization of firms
 - network of interfirm relationships
 - role of public sector
 - degree of R&D intensity
 - nature of R&D organization

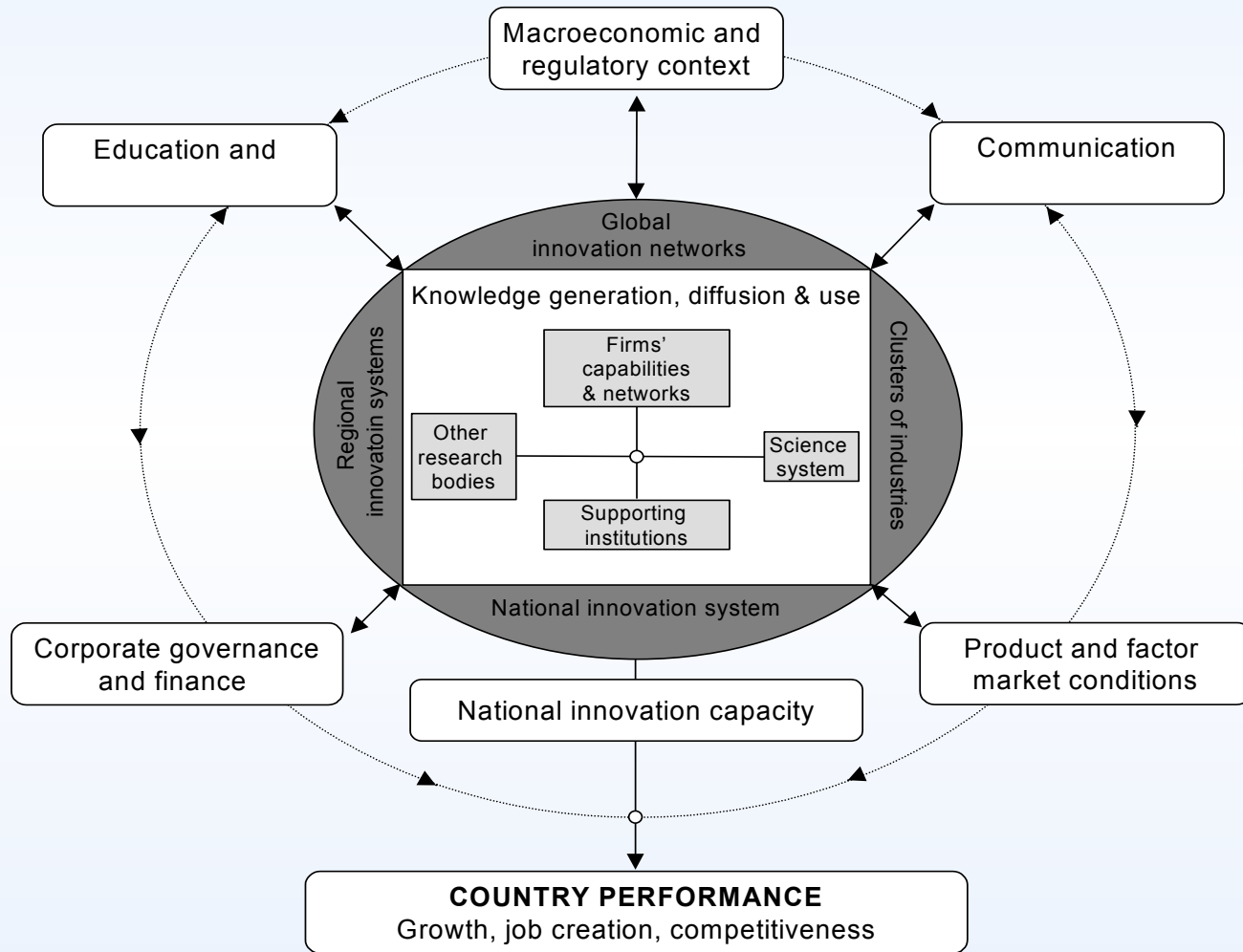


Elements of the Innovation System

- Private firms - especially R&D performers
- Science System - S&T infrastructure
 - Public research institutions
 - Private and cooperative research organizations
 - Technology transfer agencies
- Government Programs
- Networks to facilitate knowledge and technology transfer
 - Including business organizations
- Education and Training System
 - Including local labour markets and training institutions
- Financial system - support for technology financing



National System of Innovation



From the National to the Regional

- Shift in focus from the national to the regional level:
 - Recognition that spatial proximity facilitates the sharing of tacit knowledge and capacity for localized learning;
 - Firms clustered in a region share a common regional culture that facilitates learning;
 - Localized learning is facilitated by a common set of regional institutions
- Regional Innovation System:
 - “The set of economic, political and institutional relationships occurring in a given geographic area which generates a collective learning process leading to the rapid diffusion of knowledge and best practice” (Nauwelaers and Reid)



Elements of the Regional Innovation System

- Consists of the infrastructure of R&D institutions in the region
 - Internal and external networks of relationships between public R&D institutions and private actors
- RIS includes both supply and demand side of the process
 - Supply side includes the institutional sources of knowledge creation
 - Demand side includes the private firms that absorb and use scientific and technological knowledge
- Innovation support organizations bridge the gap between the two
 - Technology brokers and technology transfer centres
 - Organizations in the PSE sector to facilitate knowledge transfer
 - Outreach from public research labs
 - Venture capital firms



Knowledge Spillovers in the RIS

- Strong geographic spillovers between public research centres and industrial R&D
- Distance Matters
 - firms located close to research centres benefit disproportionately
- Benefits of knowledge spillovers (Martin and Salter)
 - Increasing the stock of useful knowledge
 - Training skilled graduates
 - Creating new scientific instrumentation
 - Forming networks and promoting social interaction
 - Increased capacity for scientific and technological problem solving
 - Creating new firms



Learning Regions

- Encourage private and social learning at four scales:
 - Individual worker;
 - Individual firm;
 - Within groups of related firms;
 - Within public organizations and social institutions
- Defined as:
 - “collectors and repositories of knowledge and ideas (that) provide an underlying environment or infrastructure which facilitates the flow of knowledge, ideas and learning” (Florida)
 - “representing the territorial and institutional embeddedness of learning organizations and interactive learning” (Asheim)



Conceptions of Social Capital

- Features of social organization of a region that facilitate coordination and cooperation among economic actors
 - Capital refers to asset
 - Social connotes that it is attained through community
- Two concepts of social capital:
 - Communitarian – attributable to historic and cultural factors buried deep in the region's past;
 - Performance-based – built up through the dense interactions of firms engaged in interrelated economic activities that generate high level of trust in mutual dealings
 - Silicon Valley —'swift trust' (Brown and Duguid)



Sources of Competitive Advantage

- ‘untraded interdependencies’ - technological spillovers
 - knowledge and practices transferred between firms
 - not always codified or explicit - ie. tacit dimension
 - transferred through networks
- networking - based on trust
 - shared intelligence of group of firms
 - grounded in a regional economy
- social capital - shared norms and trust
 - rooted in social and political institutions of a region
 - facilitates cooperation among firms and sectors



Promoting Local and Regional Institutions

- institutional dimensions that build a networking capacity
- pre-competitive R&D
- technology transfer and diffusion
- design and technological intelligence
- marketing assistance and export promotion
- financial brokering and venture capital
- training and labour market adjustment



Cluster Characteristics

- Defined as:
 - “a geographically proximate group of interconnected companies and associated institutions in a particular field linked by commonalities and complementarities” (Porter)
- Competitive advantage of clusters:
 - Superior access to specialized inputs reduces transaction costs - availability of specialized and experienced personnel – ‘thick labour market’
 - ‘diverse specialization’ – focus on core competences and increases flexibility
 - Improves capacity to innovate through access to knowledge
 - Stimulates process of firm formation through startups and spinoffs

Critical Factors for Cluster Emergence

- Local champions with greater vision than single firm success
- Presence of at least one exporting firm, with some global reach
- S&T knowledge infrastructure - research university, government labs etc.
- Local networking facilitators - building socio/economic social structure & interdependency
- Involved/knowledgeable local sources of innovation financing
- Dynamic new role for the venture capital industry
- Sustained, aligned development strategies by local institutions and governments (staying power)



Canadian Clusters

City	Focus	Status
Vancouver	- Multimedia	Emergent
	- Forest Industries	Adapting
Calgary	- Resource informatics/ geomatics	Expanding
Saskatoon	- Agricultural biotechnology	Expanding
Winnipeg	- Health devices & systems	Early stage
Greater Toronto	- Automotive	Mature, adaptive
	- Financial services	Growth stage
	- Multimedia/IT	Emergent
	- Health biotech.	Expanding
Nat'l Capital Region	- Telecommunications	Growth stage (45K)
	- Health biotechnology	Early stage (5K)
Greater Montreal	- Aerospace/materials	Mature, adaptive
	- Pharma biotech.	Growth stage
	- Multimedia/IT	Emergent
Fredericton	- IT/geomatics	Early stage
Halifax	- Marine bioscience & food products	Early stage



Policy Supports for Cluster Development

- Regulatory reform & competition measures
- Strategic technology foresight & roadmaps
- S&T and business information for innovators
- Network agencies, technology advisors
- Local cluster development catalysts (of NRC in Saskatoon, Montreal)
- National support for diverse regional knowledge growth industries



Context

- ISRN cluster initiative will investigate the process of cluster development in both knowledge intensive/traditional sectors, and in both metro and non-metro settings.
- It builds upon the capabilities and partnerships of the Innovation Systems Research Network (ISRN), established in 1998 with initial network grants from SSHRC, NSERC and the NRC.



Goal of the MCRI Project

- to determine how the formation and growth of clusters contribute to economic development within a set of regions across Canada.
- to know how local networks of firms in these regions interact to foster innovative dynamism leading to robust economic development.
- To what extent — and in what ways — do local, extra-firm relationships and interaction enable firms to make the transition to more innovative and knowledge-intensive forms of production?



Research Plan

- The research will proceed along three lines of inquiry:
 - a statistical analysis of the data in Statistics Canada's 1999 Innovation Survey (SCIS);
 - detailed case studies of the individual clusters in each region;
 - and a cross-cluster/cross-region comparative analysis in the latter stages of the project.



Statistical Analysis

- The statistical analysis will measure:
 - the number and importance of product and process innovations produced by firms (dependent variable)
- and explore its relationship to a set of independent variables including:
 - the importance of different external sources of innovative ideas,
 - firm size,
 - sector/industry
 - and location.



Statistical Analysis

- Designed to:
 - identify key *members* or *elements* of the *regional innovation system*;
 - identify key *assets* and *obstacles* to *collaboration* in the region/industry;
 - identify *region-wide characteristics* (i.e. those which appear to be common to all or most sectors in the region);
 - identify important *sources of innovative ideas* *inside and outside the region*;
 - make systematic quantitative *comparisons across locations* within each sector/industry (and also across industries)



Cluster Analysis

- size and composition of the cluster
- history of the cluster's evolution, including key events (intentional and accidental)
- relationships between firms
- relationships between firms and research infrastructure
- geographical structure of these relationships
- role of finance capital (especially angel investors and venture capitalists)
- role of local social capital and 'civic entrepreneurs'
- other factors contributing to the growth of the cluster



ISRN Cluster Matrix

Clusters	BC/Alberta	S. Ontario	Ottawa	Québec	Atlantic
Biotech/ Biomed	Holbrook	Gertler	Niosi/Dalpé	Niosi/Dalpé	Rosson
Culture/ Multimedia	Smith	Britton		Tremblay	
Photonics/ Wireless	Langford	Wolfe	de la Mothe (Doutriaux)	Landry	
Wood Products	Schuetze				
Food & Beverage (including wine)	Padmore	Donald/ Mytelka ¹			
Information Technology			de la Mothe (Doutriaux)		Schaefer Johnston/ Hadow ⁴
Auto/Steel Aerospace		Warrian Holmes/ Kumar ²		Niosi ³	

Comparative Analysis

- Comparative analyses will:
- look at clusters within a region, clusters across the country, new sectors versus traditional sectors (e.g. wireless versus wood products), and metropolitan versus rural issues.
- generate a set of comparative papers across regions and clusters in years four and five.
- undertake cross–regional comparative analyses for the six major sectors for which we are conducting studies in more than one region: biotech/biomed; cultural industries/multimedia; photonics/wireless; food/beverage/wine; information technology, including telecom equipment; auto/steel/aerospace



Lessons Learned

- identify a set of 'best practices' to assist local and regional development agencies to identify policy instruments that promote cluster formation and monitor their progress;
- develop guidelines to design and animate interactive learning and governance in the various parts of the local and regional innovation systems;
- provide universities and public research laboratories with better insights into their roles in cluster formation and how they can participate more effectively;
- Identify the role played by local leaders and civic entrepreneurs in creating the conditions conducive to cluster formation and growth

