
Innovation, Diversity & Knowledge Flows in Canadian Cities

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Theme I: Primary Hypothesis

- The economic performance of city-regions depends on:
 - the strength of local knowledge circulation processes *within* individual industries/clusters;
 - the strength of local knowledge circulation *between* individual industries/clusters; and
 - the strength of knowledge-based linkages *between* local and non-local economic actors.



The Benefits of Specialization

- Focus on clusters highlights the benefits of specialization (Marshall, Krugman, Porter)
 - Dense network of specialized suppliers
 - Thick labour market
 - Local knowledge spillovers
 - Specialization alone can be risky
 - Danger of being 'locked into' failing specialization
- Specialization tends to be found in medium-sized and smaller cities
 - Established industries move to take advantage of lower land, transportation costs, etc. outside of large cities (Duranton and Puga)
- Diversity may be more significant for high tech (analytic) industries and specialization for capital goods industries (synthetic) (Henderson)
 - Stage of product life cycle affects location



Jane Jacobs on Diversity

- 'Jacobs' view stresses the benefits of diversity
 - Larger cities are more diverse
- Diversity, not specialization, contributes to employment growth
 - Transmission of knowledge across diverse sectors stimulates growth in additional sectors (Glaeser)
- Diversity across complementary industries sharing a common science base stimulates innovation
 - Degree of local competition for new ideas within a city also stimulates innovation (Audretsch & Feldman)
- Competition for new ideas within a city creates a conducive environment for innovative activity



Cities as Nodes in Global Networks

- Most innovative firms use more external sources of knowledge than less innovative ones (CIS3)
 - Ability to access external knowledge critical for innovate firms
 - Localities embedded in wider sets of national and international linkages
- Merging roles of manufacturing and service activities
 - Centrality of service-based knowledge for urban competitiveness
- An international hierarchy of cities and regions is emerging
 - Repositories of leading edge knowledge for specialized activities
 - Regions are leading nodes for internationally distributed system of innovation
 - Play role as gateways for diffusing leading edge knowledge through their respective national urban and regional hierarchies



Specialization vs. Diversity Reprised

- Dilemma of lock-in for older industrial centres
 - Remain invested in technologies and industries in which they are efficient
 - Pittsburgh, Hamilton, Akron, Windsor
- Older regions may lag in R&D
 - Preference for incremental over radical innovation
 - Lower R&D intensity
- “Important question may be whether a city has specialized in the right thing at the right time” (Storper and Manville)



From the Creative Class to the Creative Economy

- Leading edge technologies facilitate shift to deroutinized production and outputs
 - In leading edge sectors
 - ‘Cognitive-cultural economy’ (Scott)
- Cities are breeding ground for new production or consumption oriented experiments
 - Cities are being reconstituted as ‘Schumpeterian hubs’ - “giant matrices for recombining resources in order to generate innovations.” (Veltz 2004)



Toronto, Vancouver and Montreal: Innovation in the Largest Cities

- Highly diversified local economies
 - **Mature** synthetic industries (steel, auto, advanced manufacturing) co-exist with research-intensive **analytic** industries (biomedical) and cognitive-cultural **symbolic** industries (architecture, media, design)
- **Hubs for creative/symbolic** industries: large fashion, design, film and digital media, gaming and wi-fi
- Sectors participate in global networks of knowledge transfer
- Evidence of cross-sectoral knowledge flows in some analytic (biomedical, fuel cells, biopharma) and symbolic industries
 - Few cross sectoral knowledge flows in Montreal (aerospace, fashion design, Multimedia) – constraints of cluster strategy that concentrates knowledge flows *within* sectors?
- BUT significant variation between sectors – “the dynamics of each cluster and the lifecycle stage of each activity appear to be different”



Synergies of Technology and Culture: Toward a Cognitive/Cultural Economy?

- Strong cross sectoral knowledge flows in most symbolic industries – a “diverse array of industries shaped by synergies of technology and culture”
 - Fashion designers work in film, art, dance and theatre doing costume design - seen as “more creative”, less commercial
 - Synergies between publishing, design, music film and television - magazines, books and digital media all feed off proximity to other cultural and creative industries
 - Synergies in ‘marginal’ emerging sectors - new media, applied design, and advanced technology research, development and production
- Deep pools of creative, technical and business talent (intermediary finance and consultancies)
- Alternative innovation culture of ‘dynamic, entrepreneurial and micro-scale’ start-ups and SMEs



Ottawa, Calgary, and Saskatoon: Innovation in Specialized Cities

- Beyond diversity/specialization - nexus between synthetic and analytic industries
- All have globally recognized specializations in knowledge-intensive analytic activities – operate in niches in global markets
- Weak cross-sectoral knowledge flows
 - Tacit knowledge embedded in self-contained sector-specific local labour markets
 - “bafflement at the idea of learning from another sector”
- Importance of informal personal/professional ties
 - Knowledge flows are highly *relational* through informal personal contacts – “most knowledge sharing is done within a framework of social norms instead of market norms”



Specialization and Integrated Knowledge Platforms

- Each city has a highly specialized local economy that acts as a node in global supply chains
- Integrated local knowledge platforms
 - Industries clustered around specialization (ICT, oil and gas, canola) and provide **knowledge platform** of expertise in management, finance and technology that provides a knowledge base for production (ICT, canola), exploration and extraction activities (oil and gas)
- Key linkages to strong research infrastructure (universities and PROs) and for purposes of talent creation
- Supporting role of professional scientific and engineering firms, ICT firms, and financial services firms
- Weaker attachment to trade associations (seen as less relevant)



Hamilton, Waterloo and London: Innovation in Medium Cities

- Economically diverse with mix of synthetic (steel, auto, advanced manufacturing) and analytic industries (ICT, biomedical, and health services), but few symbolic ones
 - All affected by de-industrialization, but Hamilton and London hardest hit
 - Waterloo and Hamilton have home-grown anchor firms (RIM and Dofasco/Stelco), but London does not
 - Evidence of a ‘manufactured’ cognitive cultural economy emerging in Waterloo?
- Innovation processes mostly in-house and customer-driven
 - Waterloo & Hamilton nodes in global knowledge networks, London not so much
 - Relationship to local universities varies but important for talent creation
- Weak local cross-sectoral & inter-sectoral knowledge flows
 - “almost nonexistent”
- Major difference in intermediary organizations
 - Business community highly organized and active in Waterloo, not well-organized in Hamilton (lacks industry associations), and much weaker in London



Moncton and Trois-Rivières: Knowledge Flows in Small Cities

- Firms in all sectors have stronger non-local linkages than local ones
 - “when you have no one to talk to, you don’t interact much at the local level”
- Weak correlation between local knowledge flows & innovation
 - Moncton and Trois-Rivières share many social characteristics, but their economic performance is different
 - Mature and emerging sector firms in Moncton have weak local knowledge flows and strong non-local ones
 - Mature sector firms in Trois-Rivières have strong local and non-local ties and emerging sector firms have weak local ties and strong non-local ties
 - BUT Firms in all sectors in Moncton doing better than firms in Trois-Rivières
- RIS assumptions about social characteristics of innovation may not apply as well to smaller city-regions
 - True for some small cities (Kingston), but not others (Saskatoon, St. John’s)



Key Findings

- Most industries and sectors report some form of participation in global knowledge networks and/or supply chains
- Role of intermediaries/industry associations varies greatly
 - important (Montreal, Ottawa, Waterloo) to limited (Hamilton) to very weak (London, Saskatoon)
 - Enable (mediate conflict) AND constrain (prevent cross-sectoral knowledge flows)
- Role of universities – talent creation more important than R&D
 - Close collaboration with universities and PROs only in research-intensive high tech sectors (aeronautics, ocean technology, canola)
- Innovation processes vary by sector – no two sectors are alike
 - Majority is non-local customer-driven incremental product and process innovation in analytic and synthetic industries
 - Weak cross-sectoral knowledge flows - “bafflement at the idea of learning from another sector”
- Knowledge flows are *relational* - informal personal ties between workers rather than ‘how-to’ knowledge sharing between firms



Key Insights

- Social learning in cities
 - Importance of informal personal ties over transfer of firm-centred tacit knowledge
- Specialization vs. diversity
 - Significant variation within and between cities – no two the same
- Technology convergence & cross-sectoral knowledge flows
 - Weak to non-existent cross-sectoral knowledge flows outside of large hub cities
 - Little evidence in synthetic industries, some evidence in analytic industries, strongest in symbolic industries
- Cities as nodes in global networks
 - Schumpeterian 'hubs' in larger cities with diverse economies
 - Integrated knowledge platforms in small and medium cities with specialized knowledge bases act as nodes in global knowledge networks and supply chains
- Towards a cognitive/cultural economy?
 - Social dynamics of innovation different for different sized cities
 - Primarily in largest hub cities and even then, qualified – cross-sectoral knowledge flows in analytic and symbolic industries, less so in synthetic industries

