measuring economic and creativity performance in city-regions
update on statistical and data analysis

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goal of ISRN's quantitative analysis

- provide quantitative data and statistics that support the qualitative case study research being conducted in the 15 city-regions
  - assist in case study selection (sectors, occupations)
  - background and contextual / comparative data

- provide statistical analyses of the relationships underpinning the hypotheses related to theme I, theme II and (to a lesser extent) theme III
  - macro level using Indicators database at the city-region level
  - micro level (firms) using other Statistics Canada datasets

ISRN project: elements of quantitative analysis

economic and creativity performance of city-regions

| theme I innovation | theme II talent | theme III governance |

city-region profiler (by city, indicator)

indicators database

indicators database: data sources

- sources of data
  - *Census of Population*, 2001 and 2006
    - social, demographic and economic data for the labour force
      - geography, industry, occupation
    - **updates**: detailed data from 2006 Census not released until December 8, 2008

  - *Canadian Business Patterns*, 1998-2005
    - establishments by size category
    - **updates:** add data for 2006, 2007

  - *US Patent and Trademark Office* (USPTO), 2000-2003
    - number of patents, patenting rates
    - **updates:** include data from 1980s-2007

indicators database: structure

- geography
  - city-regions (140), provinces/territories and national totals
    - 27 census metropolitan areas (CMAs, urban core $\geq$100,000)
    - 113 census agglomerations (CAs, urban core $\geq$10,000)

- industries
  - defined using the North American Industrial Classification System (NAICS)
  - 300 4-digit level industries

- occupations
  - defined using the National Occupational Classification System (NOC-S)
 - 520 4-digit level occupations

indicators database: **variables**

- variables measured at three levels
  - city-region
  - city-region x industry[1], city-region x occupation[1]

- socio-economic and demographic indicators
  - educational attainment, major field of study
  - mobility status
  - immigrant status
  - age, gender
  - labour force activity, class of worker
  - income
  - establishments[2]
  - patents[2]

[1] Data currently only for 2001; 2006 data to be released in late 2008
[2] Not available by occupation

city profiler: ISRN case studies in the context of Canada's urban system
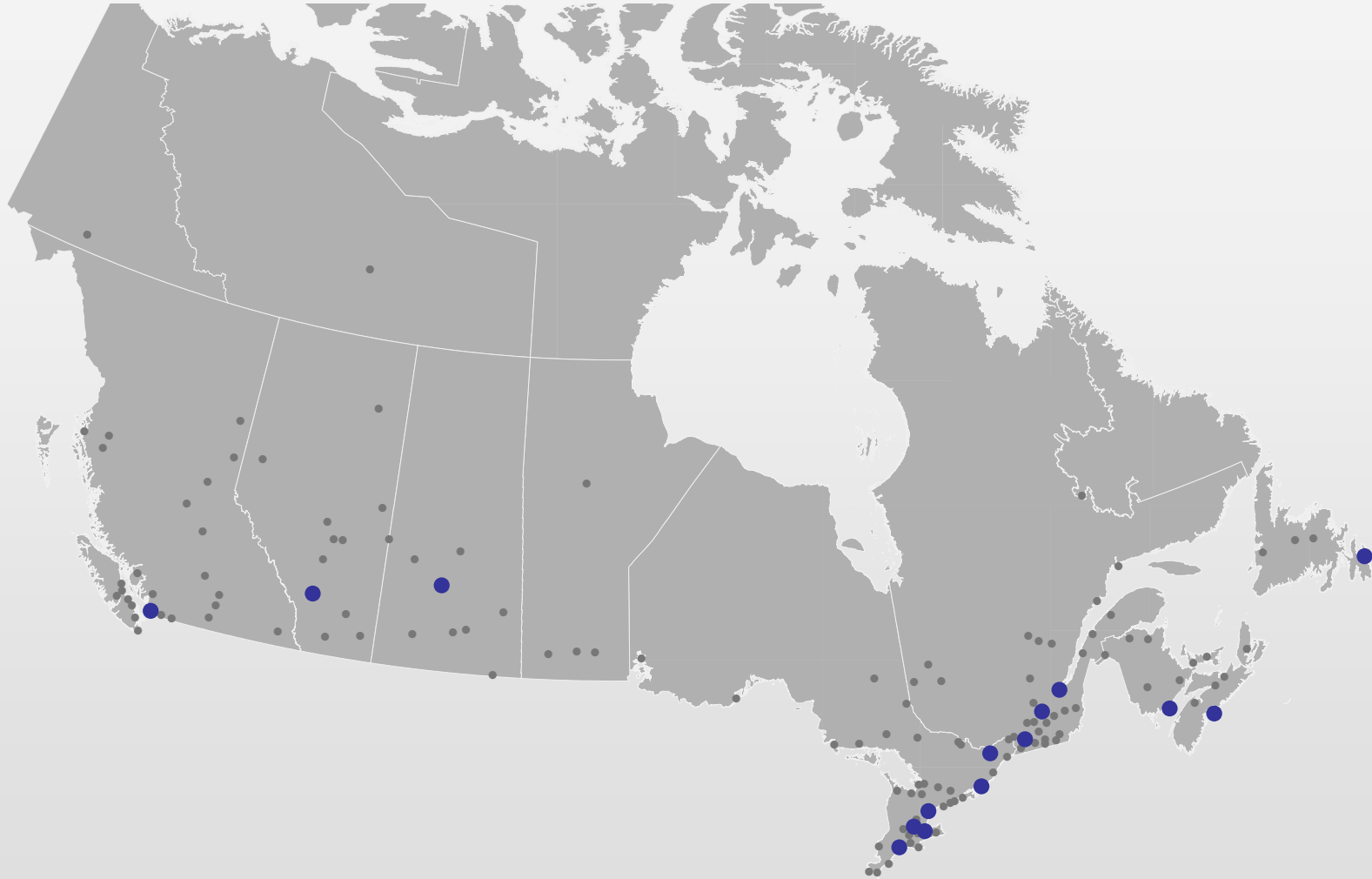
tools to support ISRN research: city profiler

- city-region profile / reports (13 pages)
  - overall / summary statistics
  - demographics
  - migration and population change
  - education
  - employment
  - occupational structure
  - creative occupations
  - industrial structure
  - clusters
  - establishments
  - income

- **updates:**
  - include 2006 Census data
  - comparisons across city-regions by key indicator

city profiler: clusters in city-regions

City-Region Profile   Innovation Systems Research Network

8 - Clusters   Toronto

Number of clusters[8]	11
% employment in clusters[8]	45.6%
% establishments in clusters[8]	44.2%

Figure 8.1 - Cluster characteristics, 2001[8]

	# Labour force	Labour force LQ	% Industry LQs > 1	Cluster (yes/no)
Resource-based				
Agriculture	43,165	0.37	13.3%	NO
Mining	17,840	0.43	0.0%	NO
Oil and Gas	12,255	0.42	11.1%	NO
Wood & Wood Products	14,185	0.24	0.0%	NO
Maritime	3,860	0.16	0.0%	NO
Manufacturing				
Textiles & Apparel	34,765	1.11	41.7%	NO
Food	76,215	1.08	58.3%	YES
Steel	51,845	0.99	50.0%	NO
Automotive	102,935	1.40	76.9%	YES
Plastics & Rubber	107,990	1.61	85.7%	YES
Biomedical	35,585	1.69	100.0%	YES
ICT Manufacturing	68,460	1.74	100.0%	YES
Service-based				
ICT Services	143,785	1.41	88.9%	YES
Finance	227,040	1.66	100.0%	YES
Business Services	293,225	1.40	81.3%	YES
Creative & Cultural	114,810	1.60	93.8%	YES
Higher Education	57,255	0.97	37.5%	NO
Other				
Construction	89,320	1.07	66.7%	YES
Logistics	187,775	1.50	76.9%	YES

Figure 8.2 - Employment by industry category, 2001[9]
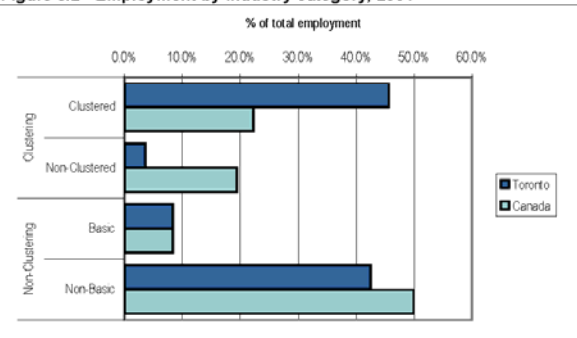
Figure 8.3 - Establishment growth by industry category, 1998-2005[9,10]

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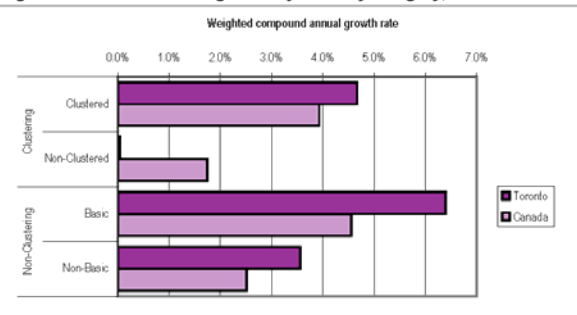
city profiler: creative occupations

City-Region Profile — Innovation Systems Research Network

6 - Creative Occupations — Toronto

	Bohemians	Bohemians per 1000[6]	S&T Workers	% S&T Workers[6]
Toronto	49,400	19.6	207,275	8.2%
Canada	204,305	13.1	1,003,810	6.4%

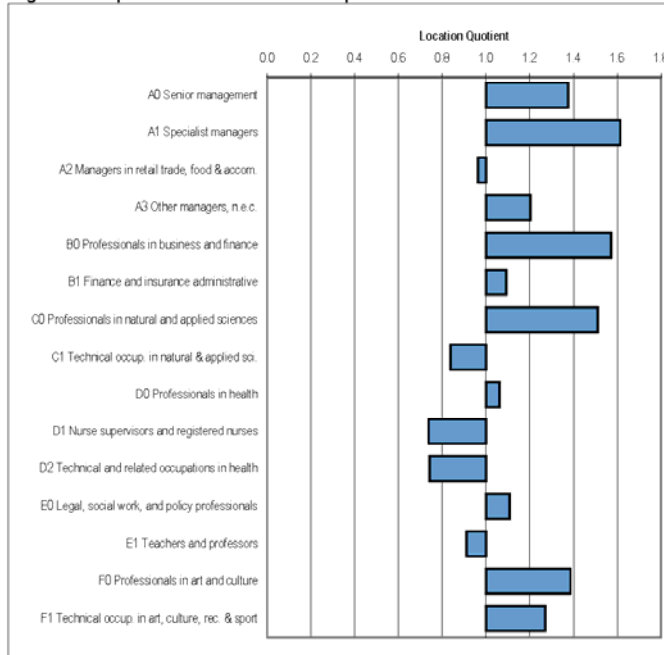| Occupational Groups[7]	Creative	Service	Trades & Manual	Agricultural
Toronto	38.9%	40.7%	20.0%	0.4%
Canada	29.2%	42.7%	23.9%	4.3%

Figure 6.1 - Specialization in creative occupations

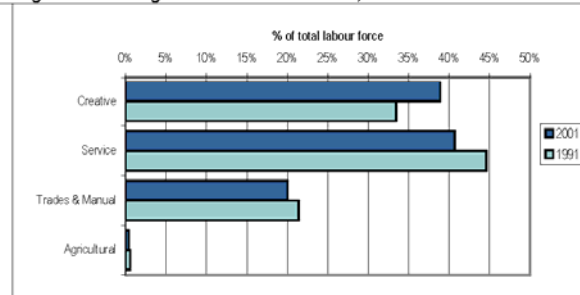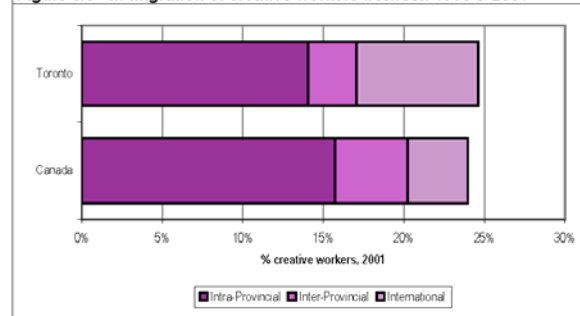Figure 6.2 - Change in share of labour force, 1991-2001

Figure 6.3 - In-migration of creative workers between 1996 & 2001

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ISRN project: elements of quantitative analysis

economic and creativity performance of city-regions

**theme I
innovation**

**theme II
talent**

**theme III
governance**

city-region profiler (by city, indicator)

indicators database

the geography of knowledge flows, collaboration and place-based characteristics of innovating firms in Canada

- facilitated access project with Statistics Canada (Gertler / Vinodrai)
  - Data: Survey of Innovation, 2005
  - 8,000 establishments in manufacturing, natural resources

- how important are place-based characteristics and relationships to the innovative performance of manufacturers?

- what role do the internal resources and capabilities of the firm and plant, as well as their external knowledge-based relationships, play in this context?

the geography of knowledge flows, collaboration and place-based characteristics of innovating firms in Canada

- H: The degree of innovativeness will be greater for manufacturing plants that:
    - are located in larger metropolitan areas
    - are located in more sectorally diverse metropolitan areas
    - have well-developed internal capabilities
    - draw on both tacit and codified knowledge sources
    - use a broader range of external knowledge sources
    - co-operate and collaborate with local and non-local partners

neo-regionalism and spatial analysis: complementary approaches to the geography of innovation?

- facilitated access project with Statistics Canada (Shearmur)
  - 2005 Survey of Innovation
  - using Quebec data only (census of manufacturing firms)

- does innovation in manufacturing firms vary across space?
  - if so, does firm-level innovation vary with distance from a metropolitan area or as a function of local regional attributes?
    - **H:** innovation will vary with distance from major metropolitan areas

- for certain types of innovation it is not local context, but access to resources, that is important
  - *process innovation*: distance from core urban areas is a stronger determinant of innovative behavior (access to resources)
  - *product innovation*: regional attributes are stronger determinants of innovative behavior (local context)

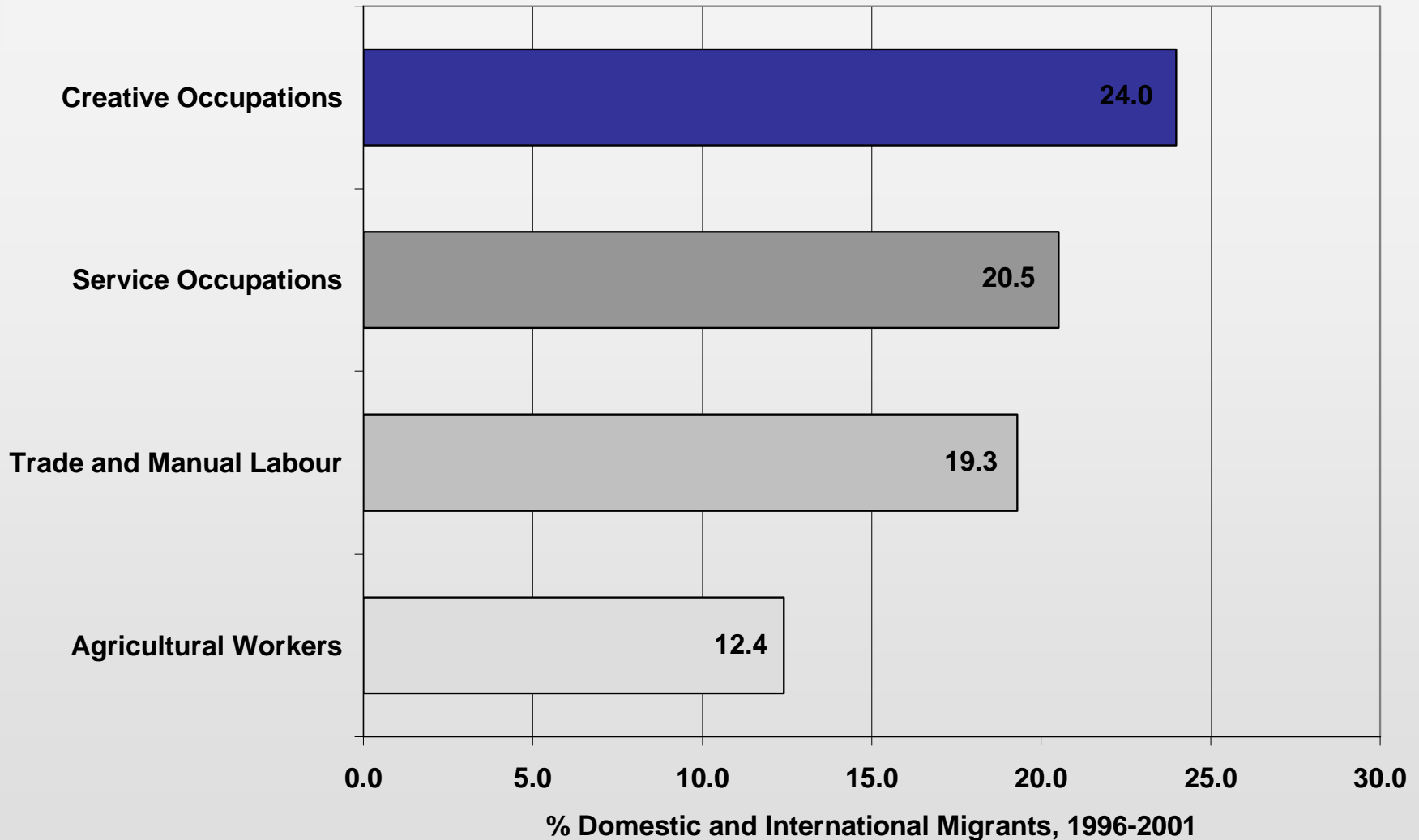# cluster dynamics and change in Canadian city-regions, 2001-2006

- analysis extends the work conducted under the auspices of MCRI
  - changing landscape of clusters in Canadian city-regions
    - emerging / new, declining, disappeared?
  - factors that explain the growth / decline of clusters
  - how does changing cluster performance affect overall economic and creativity performance in city-regions?

- detailed sectoral data will be released in early December 2008

talent, mobility and quality of place

- what place characteristics and dimensions of quality of place are important in attracting and retaining talent?
  - who moves?
  - what kinds of places are able to attract workers?
  - are there differences between occupational groups?

- mobility and quality of place amongst talented workers
  - presented at the 2007 ONRIS Fall Workshop (Toronto) and the 2008 ISRN Annual Meeting (Montreal)
 - manuscript in preparation for *Urban Studies*

talent attraction and retention: mobility

% Domestic and International Migrants, 1996-2001

- Creative Occupations — 24.0
- Service Occupations — 20.5
- Trade and Manual Labour — 19.3
- Agricultural Workers — 12.4

inequality in Canada's knowledge economy?

- is it possible to pursue a talent-based economic development strategy while enhancing social inclusion?
  - are places that are more 'creative' / innovative inherently more unequal?

- inequality defined in several ways:
  - inequality between city-regions
  - inequality within city-regions
  - inequality between social groups

inequality in Canada's knowledge economy?

% Creative Class
2001
- Over 45%
- 35% to 45%
- 25% to 35%
- Under 25%
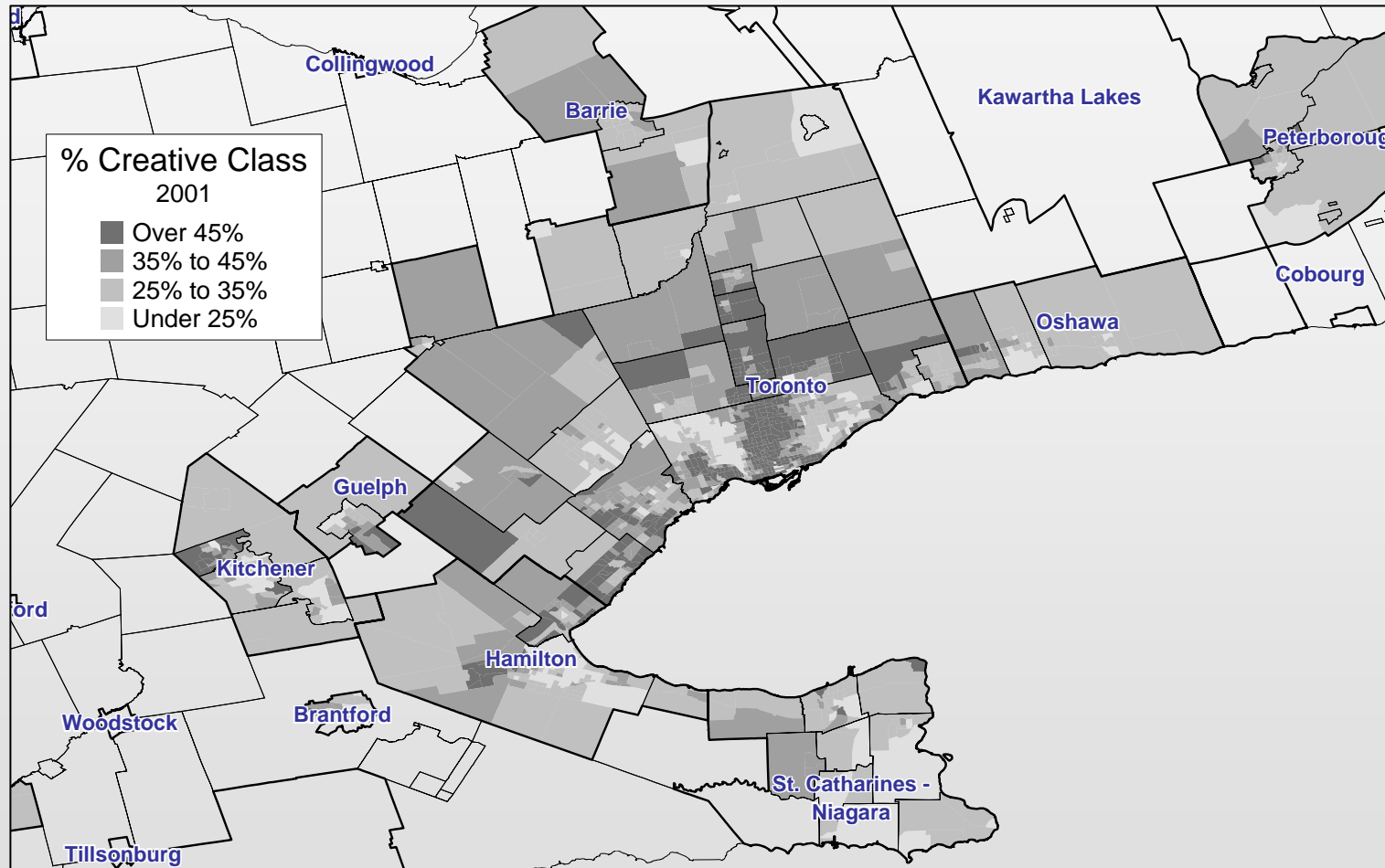
the changing spatial patterns of economic activity in Canadian city-regions

- builds on preliminary findings from research on talent, mobility, quality of place
  - people are moving to places where there is a pre-existing critical mass of people working in similar industries / occupations to themselves

- city-regions are becoming more specialized over time and, therefore, becoming more differentiated from each other
  - variations in economic performance greater between places

- implication: 'one size fits all' policies do not address the unique, local characteristics of city-regions

innovation and creativity in Canadian city-regions

- how do local social characteristics in city-regions shape their economic vitality and dynamism as centres of innovation and creativity?
  - do these relationships hold across small, medium and large cities?

- dependent variables
  - income growth / change
  - employment growth / change
  - innovation performance (patents, R&D activity)

innovation and creativity in Canadian city-regions

- explanatory variables
  - economic & social characteristics of the place
    - economic diversity (related and unrelated variety)
    - social/cultural diversity, openness/tolerance
    - income, cost of living, levels of inequality, provision of public goods
  - quality and investment in regional innovation system
    - university enrolment, patents, tri-council funding, educational attainment
  - quality and investment in local arts and culture scene
    - artists, arts funding
  - career opportunity / local career 'buzz'
    - critical mass of people in same occupation
    - diversity of work opportunities