Specialization versus Diversity in Canadian Cities

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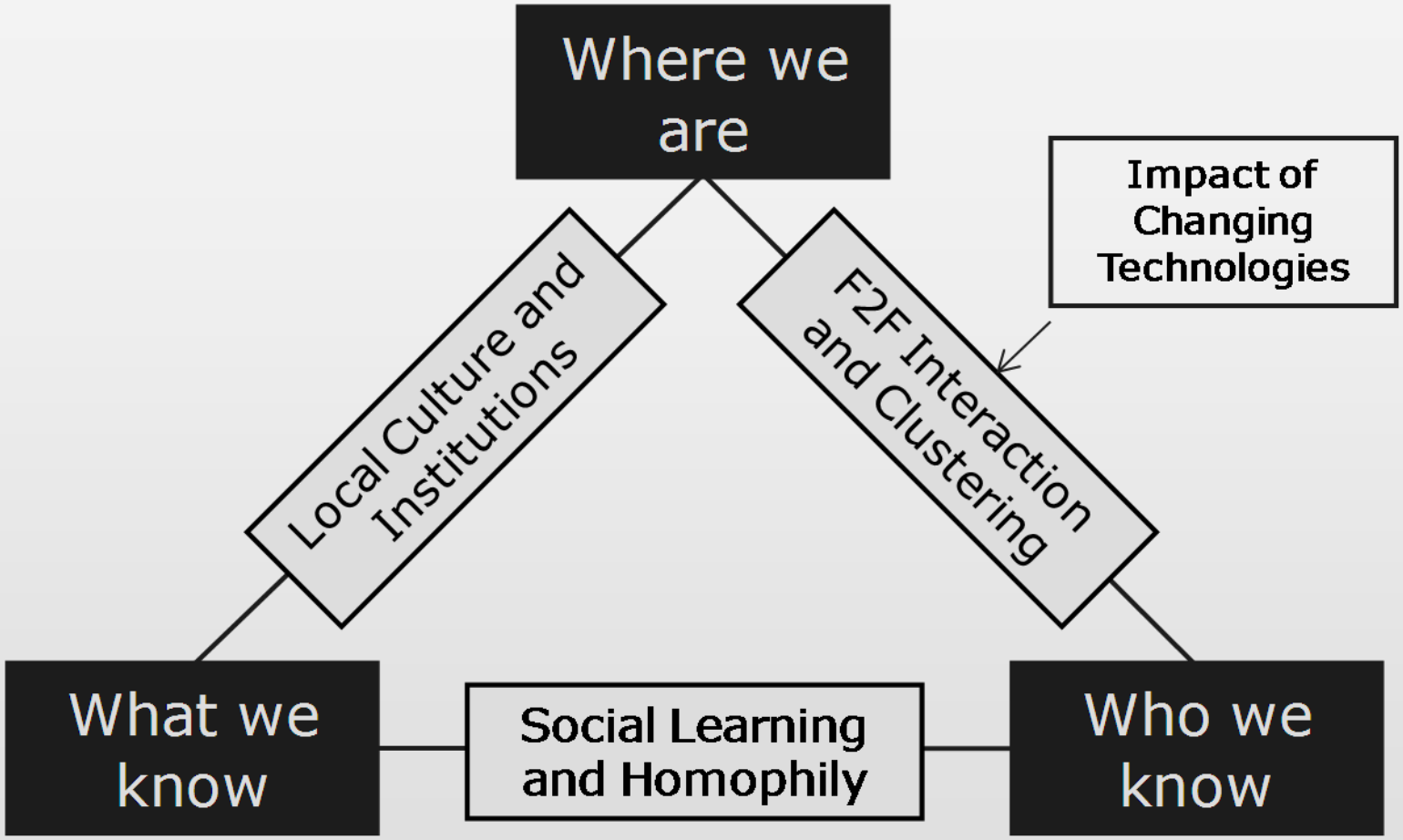
one of three main hypotheses

- 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.

Basic theoretical framework

- Generally accepted that regional advantage is derived from knowledge-based assets
- The ability to produce new knowledge sustains this advantage
- Learning, creativity, innovation are fundamentally social processes
- Therefore some places offer environments that are more conducive to these processes
  - Institutional
  - Cultural
  - Structural

understanding knowledge, relationships, and location



components of research

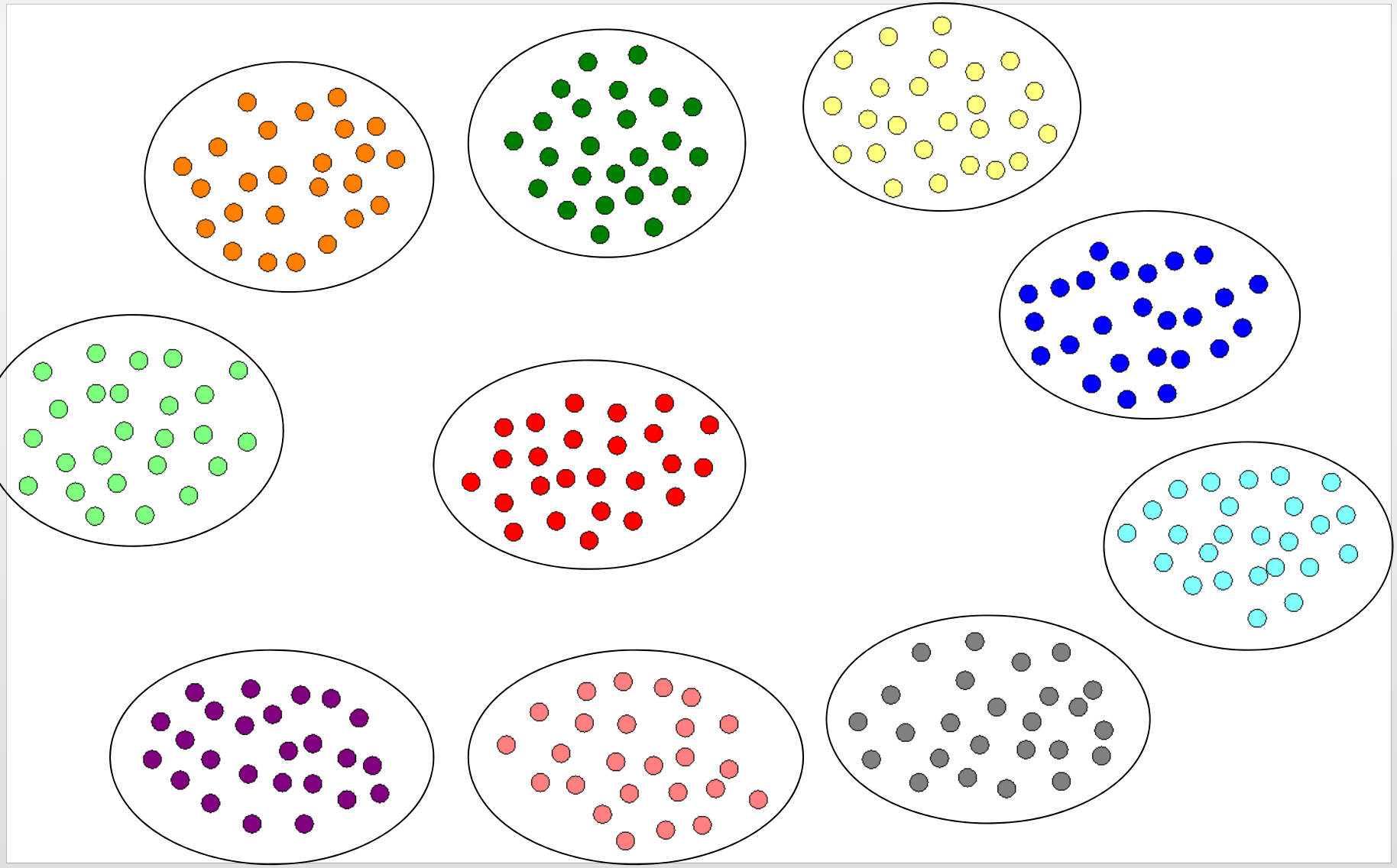
- Theoretical framework derived from sociology (SNA), social psychology (creative process), and geography literatures (linkages and context)
  - General hypothesis: diverse environments are better for producing creative activity as they offer a wider range of learning opportunities
- Agent-based modeling – evolution of networks over time/space
  - Demonstrates connections between context and individual creativity
- Diversity & creative economic activity in Canadian city-regions
  - Economic and cultural diversity strong correlation with creative economic activities
- Social network characteristics of creative workers
  - Creative workers tend to have larger, more diverse, and more dynamic social networks than any other category of worker

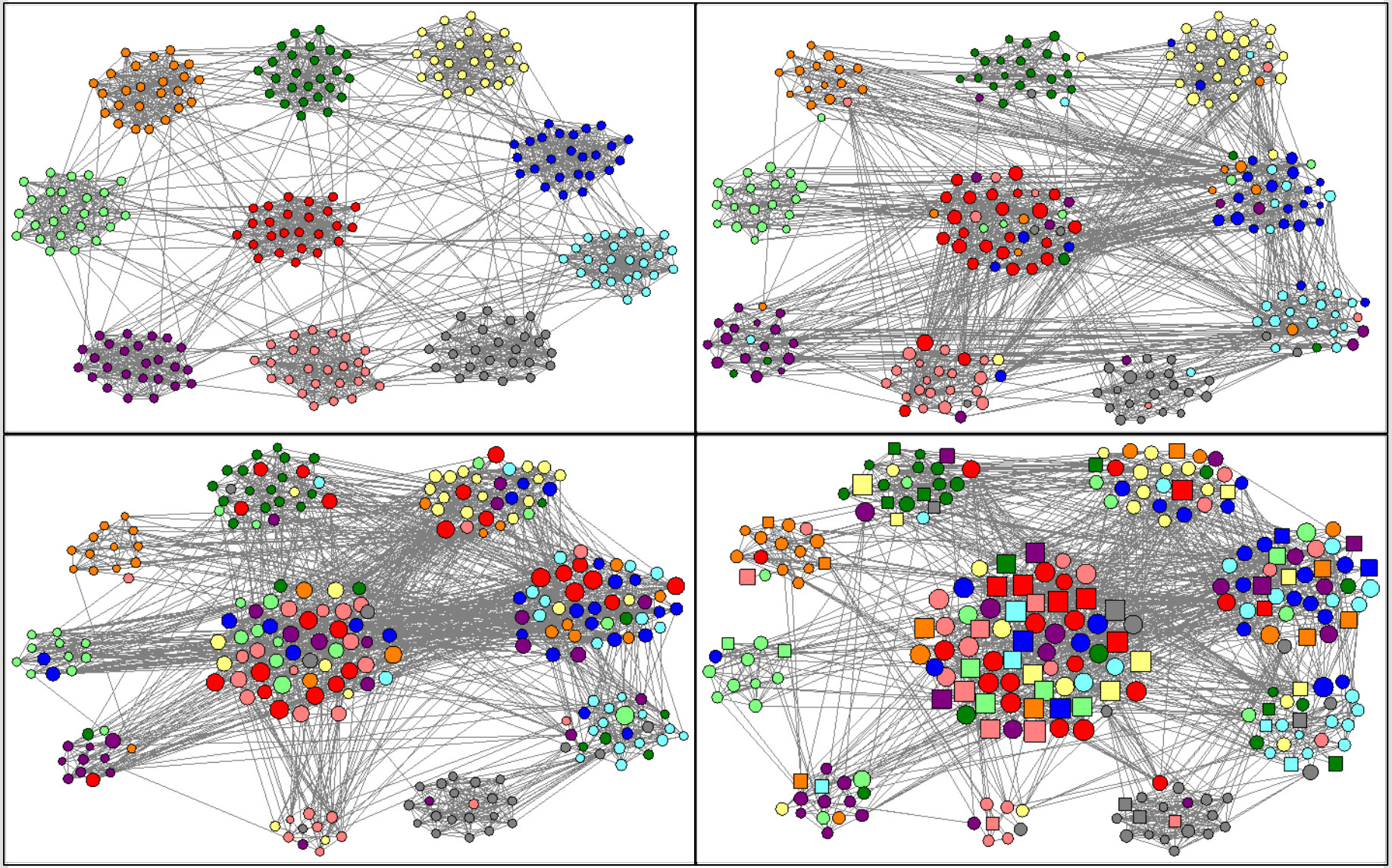
agent based modelling approach

- Computer simulation designed to demonstrate how various theoretical elements of the creative process interact and form a larger system

- Constructed around stylized facts from social psychology, network analysis, and geography literatures – key theories include:
  - Homophily (McPherson et al, 2001)
  - Cognitive Distance (Nooteboom, 2000)
  - Mastery (Simonton, 2000)
  - Face-to-face communication (Storper and Venables 2004)

- Scenarios applied to initial base model in order to address specific research questions and test competing policy inputs





key findings and messages

- Systematically demonstrates how the various social dynamics of the creative process interact
- Shows how local context (specifically diversity) influences the creative performance of individuals
  - also demonstrates how places may become diverse through patterns of social interaction and learning
  - Reinforces notions of the interconnections between scale and diversity
- Highlights that there are potentially constructive roles for public institutions/policies
- ABM effective tool for testing ideas about how various micro theoretical concepts may interact and generate larger patterns
  - Deals with issues of scale, observation & measurement of knowledge flows, and addresses the endogeneity problem
  - Issues of external validity need to be addressed with related empirical research

local context and social networks

- Many connections between social networks and economic performance (i.e. getting a job; higher incomes)
- Connections between social networks and creativity?
- Many examples in the (social psychology & management) literature on team/workplace composition and creativity
  - Can this be extrapolated to a larger scale?
  - Do certain kinds of work require different kinds of networks?
- Data from the Canadian Social Survey used to address these questions

scale of networks

'creative and cultural' workers tend to have the largest social networks

Business, finance and administrative occupations	3.20	3.08	4.55	4.94
T-statistic	*1.80*	*-1.00*	*-3.10*	*-4.50*
Natural and applied sciences	3.10	3.10	4.60	5.01
T-statistic	*-1.80*	*0.20*	*-0.50*	*-1.60*
Health occupations	3.24	3.10	4.64	4.98
T-statistic	*2.10*	*0.00*	*0.50*	*-2.00*
Occupations in social science, education	3.28	3.24	4.75	5.25
T-statistic	*4.10*	*5.60*	*4.00*	*2.30*
Artistic/culture/recreation/sport	3.18	3.35	4.85	5.40
T-statistic	*0.50*	*6.50*	*5.00*	*3.30*
Sales and services occupations	3.14	3.08	4.60	5.05
T-statistic	*-1.00*	*-0.80*	*-1.20*	*-1.80*
Trades, transport and equipment	3.08	3.00	4.60	5.22
T-statistic	*-3.00*	*-4.00*	*-0.50*	*1.90*
Occupations unique to primary industry	3.19	3.26	4.67	5.43
T-statistic	*0.70*	*3.50*	*0.90*	*3.00*
Occupations unique to processing and manufacturing	2.98	2.90	4.39	4.80
T-statistic	*-5.20*	*-6.00*	*-5.10*	*-4.30*
Column Total	***3.16***	***3.10***	***4.62***	***5.11***

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dynamism of networks

- 'creative and cultural' workers tend to have the most dynamic social networks

	T-statistic	*6.00*	*4.20*	*2.30*	*-0.90*	*-0.20*	*-2.00*
Business, finance and administrative occupations		**2.39**	**2.38**	**3.12**	**3.76**	**1.68**	**0.17**
	T-statistic	*4.20*	*-1.60*	*-3.30*	*6.10*	*-3.80*	*-2.20*
Natural and applied sciences		**2.51**	**2.57**	**2.86**	**3.63**	**1.69**	**0.29**
	T-statistic	*6.00*	*5.50*	*-8.40*	*0.10*	*-2.20*	*0.50*
Health occupations		**2.46**	**2.36**	**3.44**	**3.76**	**1.64**	**0.06**
	T-statistic	*4.20*	*-1.30*	*4.30*	*3.30*	*-3.60*	*-9.20*
Occupations in social science, education		**2.35**	**2.42**	**3.02**	**3.61**	**1.76**	**0.19**
	T-statistic	*1.40*	*0.70*	*-4.80*	*-0.40*	*0.10*	*-1.00*
Artistic/culture/recreation/sport		**2.23**	**2.16**	**2.72**	**3.53**	**1.92**	**0.43**
	T-statistic	*-2.30*	*-6.70*	*-8.70*	*-1.90*	*3.70*	*1.50*
Sales and services occupations		**2.17**	**2.20**	**3.09**	**3.60**	**1.85**	**0.37**
	T-statistic	*-9.50*	*-12.50*	*-4.50*	*-1.00*	*5.90*	*2.70*
Trades, transport and equipment		**2.29**	**2.60**	**3.80**	**3.57**	**1.72**	**0.18**
	T-statistic	*-1.30*	*7.50*	*14.80*	*-1.90*	*-1.50*	*-1.80*
Occupations unique to primary industry		**2.22**	**2.58**	**3.57**	**3.15**	**1.83**	**0.22**
	T-statistic	*-2.30*	*3.80*	*4.50*	*-7.90*	*1.80*	*-0.30*
Occupations unique to processing and manufacturing		**2.32**	**2.63**	**3.69**	**3.74**	**1.61**	**0.14**
	T-statistic	*0.10*	*5.80*	*8.10*	*2.80*	*-4.40*	*-2.40*
Column Total		**2.32**	**2.41**	**3.21**	**3.62**	**1.75**	**0.24**
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Column Total		**2.32**	**2.41**	**3.21**	**3.62**	**1.75**	**0.24**

diversity of networks

- ‘creative and cultural’ workers tend to have the most diverse social networks

T-statistic	*1.40*	*-0.80*	*-0.20*	*-5.10*	*-4.50*
Business, finance and administrative occupations	**1.74**	**1.82**	**4.48**	**3.56**	**3.52**
T-statistic	*-0.30*	*-0.40*	*2.90*	*-0.70*	*1.50*
Natural and applied sciences	**1.90**	**1.89**	**4.37**	**3.47**	**3.42**
T-statistic	*4.50*	*2.10*	*-2.70*	*-2.70*	*-1.70*
Health occupations	**1.77**	**1.92**	**4.54**	**3.51**	**3.48**
T-statistic	*0.80*	*2.70*	*4.00*	*-1.40*	*0.00*
Occupations in social science, education	**1.71**	**1.83**	**4.54**	**3.37**	**3.42**
T-statistic	*-1.10*	*-0.20*	*5.10*	*-5.40*	*-1.70*
Artistic/culture/recreation/sport	**1.80**	**1.98**	**4.52**	**3.30**	**3.35**
T-statistic	*1.30*	*4.10*	*3.10*	*-5.00*	*-2.60*
Sales and services occupations	**1.73**	**1.88**	**4.47**	**3.69**	**3.60**
T-statistic	*-0.90*	*3.20*	*3.00*	*5.50*	*5.90*
Trades, transport and equipment	**1.69**	**1.72**	**4.30**	**3.67**	**3.43**
T-statistic	*-2.10*	*-5.50*	*-6.60*	*3.30*	*-2.00*
Occupations unique to primary industry	**1.63**	**1.63**	**4.38**	**3.74**	**3.47**
T-statistic	*-2.60*	*-5.90*	*-1.60*	*3.30*	*-0.40*
Occupations unique to processing and manufacturing	**1.74**	**1.80**	**4.30**	**3.73**	**3.48**
T-statistic	*-0.20*	*-0.80*	*-4.10*	*3.60*	*0.00*
Column Total	***1.74***	***1.83***	***4.44***	***3.58***	***3.48***

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Column Total	***1.74***	***1.83***	***4.44***	***3.58***	***3.48***

local diversity and creative economic activity

- What is *creativity* and how do we measure it?
- What is *diversity* and How do we measure it?
- How does creativity & innovation relate to the economic performance of city-regions?
  - What is the dependent variable?

mapping knowledge intensive industries

		Most common subject of qualifications		
		Fine Arts, Humanities & Social Sciences	Engineering & Applied Sciences	Natural Sciences & Mathematics
Percent of Work Force with Post-Secondary Qualifications	Above Average (52%)	'Creative' Industries	'Innovative' Industries	'Discovery' Industries
	Below Average (52%)	Cultural Goods & Services	Manufactured Goods & Services	Natural Resources Goods & Services

mapping knowledge intensive industries

	'Creative' Industries		'Innovative' Industries		'Discovery' Indsutries	
Rank	Geography	LQ	Geography	LQ	Geography	LQ
1	Toronto	1.58	Kitimat	4.73	Ottawa - Hull	2.95
2	Vancouver	1.41	Labrador City	4.50	Salaberry-de-Valleyfield	2.32
3	Calgary	1.25	Wood Buffalo	3.56	Québec City	2.20
4	Regina	1.23	Baie-Comeau	2.79	Brockville	2.12
5	Montréal	1.22	Thompson	2.45	Montréal	2.05
6	Halifax	1.15	Sept-Îles	1.92	Sherbrooke	1.76
7	Yellowknife	1.09	Estevan	1.83	Hawkesbury	1.76
8	Ottawa - Hull	1.05	Chicoutimi - Jonquière	1.82	Guelph	1.48
9	Kelowna	1.04	La Tuque	1.78	Saint-Hyacinthe	1.43
10	Whitehorse	1.02	Timmins	1.77	Charlottetown	1.23
11	London	1.01	Fort St. John	1.67	Saskatoon	1.22
12	Victoria	1.01	Rouyn-Noranda	1.66	Brantford	1.21
13	Winnipeg	0.99	Calgary	1.64	Swift Current	1.20
14	Kitchener	0.97	Powell River	1.62	Toronto	1.19
15	Hamilton	0.97	Granby	1.58	Vancouver	1.12
16	Oshawa	0.97	Shawinigan	1.54	Kingston	1.05
17	Moncton	0.96	Alma	1.53	Victoria	1.01
18	Rimouski	0.96	Brockville	1.51	Saint-Jean-sur-Richelieu	0.94
19	Barrie	0.94	Lloydminster	1.49	Brandon	0.86
20	St. John's	0.93	Sarnia	1.47	Lethbridge	0.85

measuring local (cognitive) diversity

Geography	Industrial	Occupation	Field of Study	Economic Rank		Place of Birth	Mother Tongue	Ethnicity	Religion	Cultural Rank		Combined Rank
Vancouver	5	5	8	**1**		2	2	2	10	**2**		**1**
Toronto	2	9	12	**3**		1	1	1	4	**1**		**2**
Calgary	11	8	6	**4**		6	7	3	7	**4**		**3**
Edmonton	7	2	17	**5**		13	9	5	5	**5**		**4**
Kitchener	3	6	31	**8**		4	5	10	3	**3**		**5**
Hamilton	6	3	22	**6**		3	4	6	21	**7**		**6**
Winnipeg	12	4	33	**10**		17	10	4	9	**8**		**7**
Guelph	20	7	9	**7**		8	11	31	25	**11**		**7**
London	14	21	18	**14**		9	12	26	19	**9**		**9**
Kelowna	13	20	27	**15**		26	24	22	15	**12**		**10**
Saskatoon	21	12	19	**12**		61	26	17	12	**22**		**11**
Victoria	64	18	3	**19**		15	21	29	37	**17**		**12**
St. Catharines - Niagara	15	13	64	**23**		16	16	41	27	**16**		**13**
Lethbridge	41	47	26	**30**		32	25	9	8	**10**		**14**
Oshawa	17	23	43	**18**		19	30	51	36	**25**		**15**
Abbotsford	32	34	70	**38**		11	13	8	1	**6**		**16**
Nanaimo	26	42	21	**21**		22	31	25	59	**26**		**17**
Vernon	28	36	58	**33**		30	29	24	13	**14**		**17**
Montréal	1	1	16	**1**		7	8	71	107	**48**		**19**
Regina	43	25	39	**27**		62	33	16	32	**29**		**20**

correlating local diversity and creative economic activity

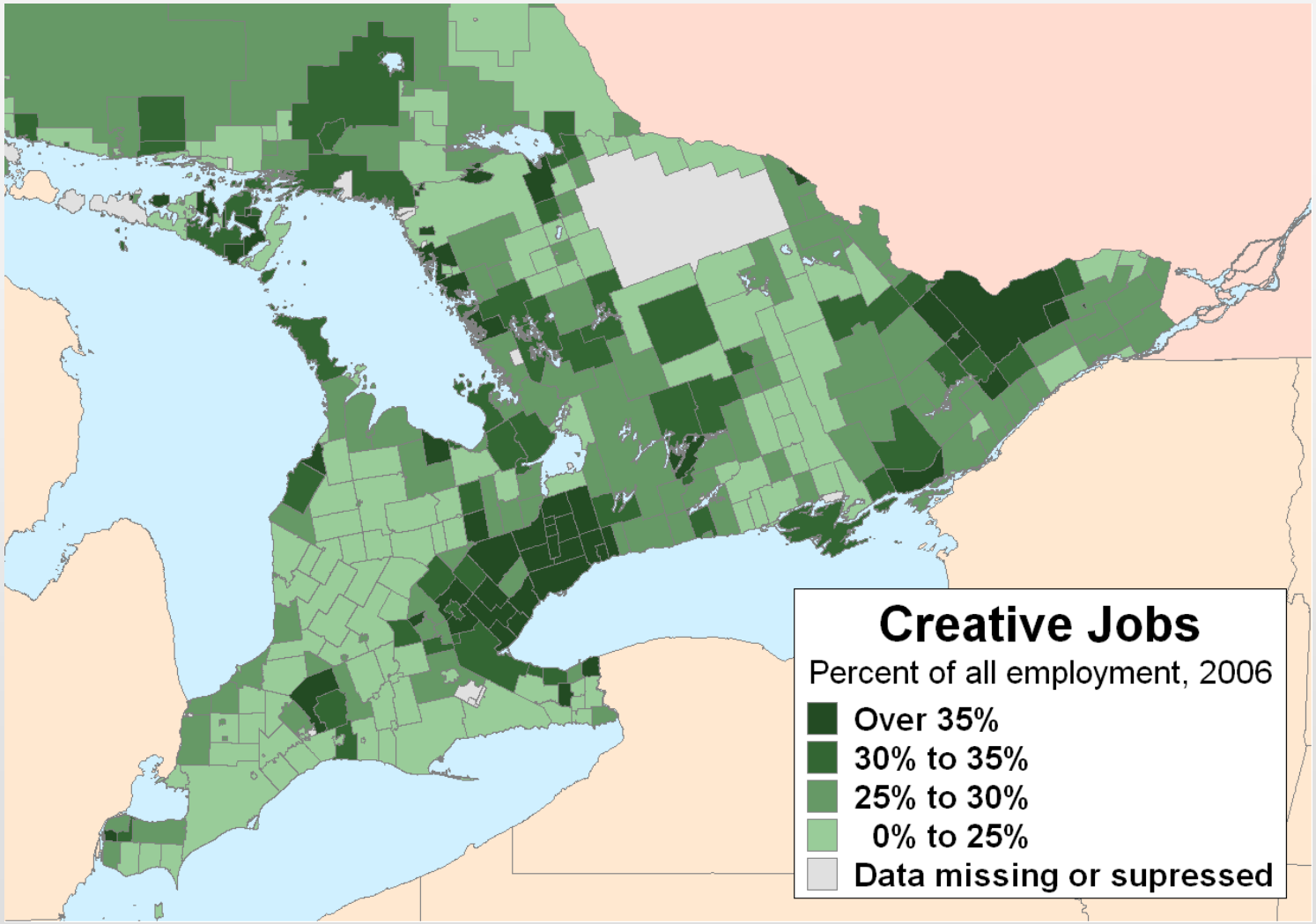
	Above Average Post-Secondary Qualifications		
	Fine Arts, Humanities & Social Sciences	Engineering & Applied Sciences	Natural Sciences & Mathematics
	'Creative' Industries LQ	'Innovative' Industries LQ	'Discovery' Industries LQ
Adjusted R Square	.619***	.186***	.258***
Standardized Coefficients (Beta)			
Economic Diversity Index	.438***	-.047	.315***
Cultural Diversity Index	.239***	-.063	-.205**
Scale (Population)	.324***	.145	.330***
Affordability	.073	-.442***	.052

Significance: <.01***; .01 to .05**; .05 to .1*

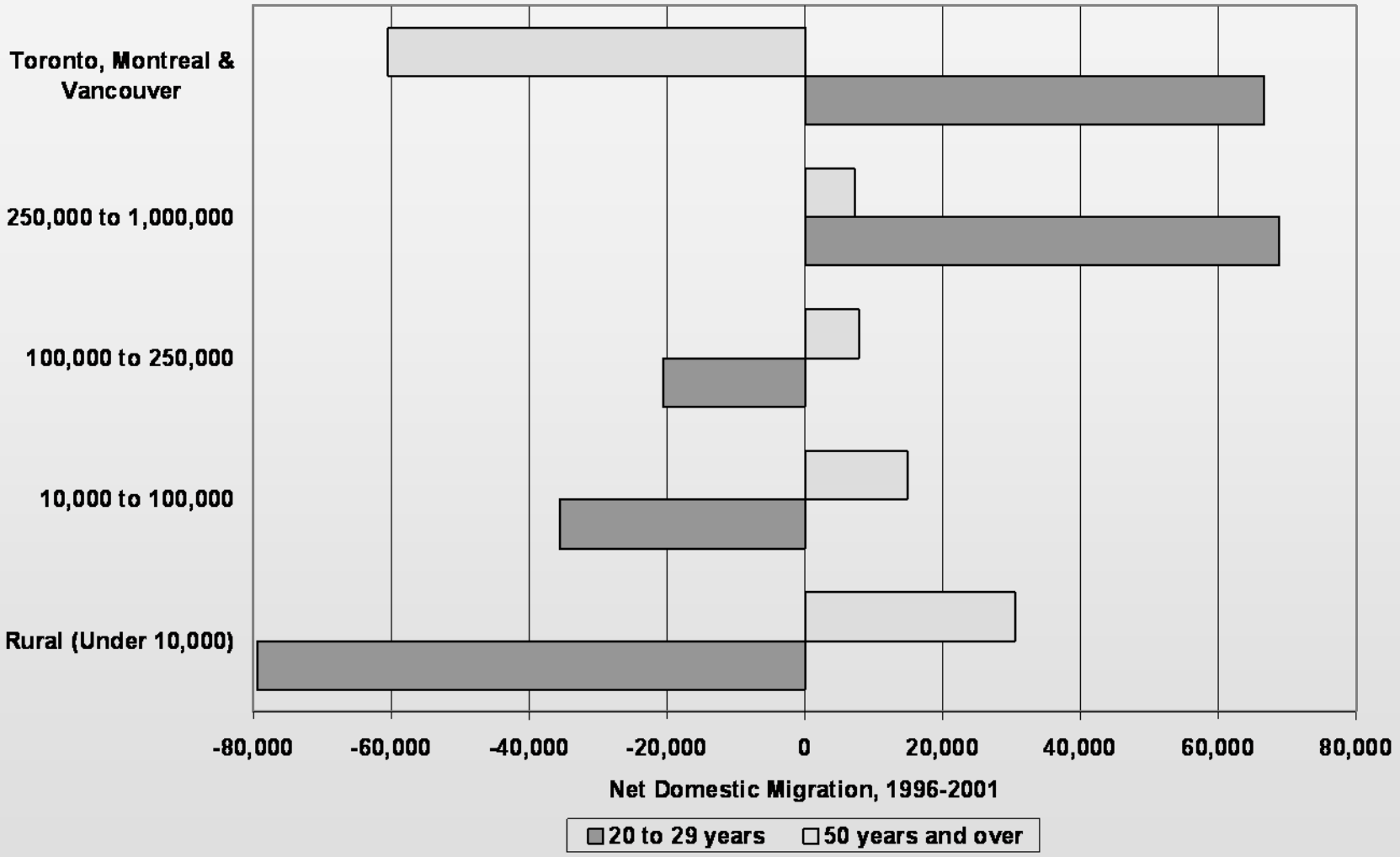
key findings and messages

- Research suggests that dense diverse social learning opportunities are important for creative economic activity
- Local diversity less important for technology/innovation industries (specialization important?) (Duranton & Puga 2004)
- Not only do different places require different strategies but so do different industries
  - Some backing from case studies – i.e. Warrian - Hamilton Starbucks vs. Tim Horton's
- Matching industrial strategies to local context
- Building, maintaining relationships locally and non-locally

mapping ‘creative’ employment in southern ontario



quality of place for whom?



key findings and messages for rural areas

- Rural and peripheral areas suffer from lack of ‘creative advantage’
  - Sparse local networks and learning opportunities
  - Low diversity
- Perhaps a larger role for public sector involvement in network building
- Attraction and retention of younger workers a serious problem felt in most developed countries
  - Not just economic opportunity but social (marriage)
- Active place marketing for lesser known places