“If I had a hammer…”

The role of infrastructure in creative, innovative clusters and the community in Saskatoon

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Introduction

- Infrastructure is the answer—what is the question?
- Saskatoon is major beneficiary of large industrial and scientific infrastructure investment
- Saskatoon widely recognized as having innovative clusters and a creative community
- Goal is to use ISRN I and II survey data and other location specific data to test 3 hypotheses about the role infrastructure

Major investments in Saskatoon

Period	University	Government	Industry developed/ government support
1940-70	1955: Uni Hosp 1965: Vet Coll	1947: SRC 1948: NRC lab 1959: AgCan Lab	1944: CCF investment policy 1950: 1st U3O8 mine 1962: 1st potash mine
1970-90	1972 SED Syst. 1975: VIDO 1980: Eng Bldg	1972: new airport 1980: Innovation Place 1983: NRC PBI 1989: AgWestBio	1975: PCS 1977: POS Pilot Plant 1988: Cameco 1989: PCS privatized
1990-2009	2004: CLSI 2010: InterVac 2011: Health Sci Complex	1992: SREDA formed 1998: AAFC centre 1999: Airport Auth 2004: NRC Incubator 2008: Persephone Th. 2012: New Art Gallery	

> $1 billion on USask campus alone

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ISRN hypotheses:

1. Innovation depends upon learning that this spatially proximate: infrastructure (e.g. uni) creates space
2. Successful regions attract ‘talent’: knowledge institutions—e.g. uni—are key in this dynamic.
3. Success of cities is linked new forms of democratic and civic engagement

Data

- 1997-99: Phillips & Khachatourians global oilseeds complex in Saskatoon: 30 semi-structured interviews
- 1999: Dobni & Phillips ScienceMap: 100 institutions
- 2002-3: ISRN I: 75 in-person, structured interviews of biotechnology cluster
- 2007-8, ISRN II: 75 structured interviews
- 2008: Phillips & Webb creatives survey: 109 respondents
- 2009: Webb SNA on social entrepreneurs in Saskatoon: 30 individuals

H1: Infrastructure & innovation networks

- Firms in ISRN II-1 reported innovation basis for competitive advantage
- Collaboration often only supply chain relationships
- Knowledge infrastructure important—USask, SRC, PBI, POS, AAFC, IP, VIDO—esp. for biotech (ISRN II-1)
- Consistent with earlier cluster analyses

Key leaders in development of the biotech cluster

Sector and institution	64 individuals		157 citations	
	#	% total	#	% total
Industrial lobby groups	**9**	**14**	**51**	**33**
AgWest Biotech	2	3	31	20
Private firms	6	9	19	12
University	**16**	**25**	**27**	**17**
Administration	9	14	16	10
Faculty	5	8	8	5
CLSI	2	3	3	2
Federal Government	**18**	**28**	**42**	**27**
AAFC	5	8	11	7
NRC-PBI	5	8	22	14
Provincial Government	**12**	**19**	**17**	**11**
Innovation Place	2	3	4	3
City	**2**	**3**	**13**	**8**

Source: Phillips et al 2004; responses to ISRN Survey Section F: Q3 from entire sample.

Key factors related to research location

	N = 28	%
Proximity to competitors or collaborators	14	50%
- competitors	8	29%
- collaborators	11	39%
Access to labs, greenhouses and test fields	4	14%
Access to local pool of skilled labour	7	25%
Key scientists in your company or partner organisations	5	18%
Access to large/accepting market for seeds being produced	6	21%
Role of government agencies (federal, provincial, regional, SREDA) related to hospitality, red tape	5	18%
Source: Phillips and Khachatourians 1999.		

BUT

- Connections were informal—often simply picking up phone to call acquaintance at Uni who might be able to lend assistance
- Firms did not report significant cross-sectoral knowledge flows
- Only ‘buzz’ in Innovation Place; nowhere else (ISRN II-1)

Knowledge infrastructure key to labour mobility

	Current	Past employment experience			
	Current Employer	*Uni*	*Other firms*	*AAFC*	*NRC*
Firms	189	45	81	13	8
AAFC	162	42	50	--	4
NRC	39	19	9	3	--
Total	390	151	140	16	12
% total		39%	36%	4%	3%

Source: Phillips and Khachatourians 1999.

~35% of firms' employees

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Employees said (Phillips & Webb)

- Does economy enable mobility between sectors?
  - 10 point scale (1=none; 10=high)
  - 58 responses with average of 6.5 (STDEV 1.6) that the economy facilitates mobility
- Does respondent use knowledge gained in other sectors in current work?
  - 10 point scale (0=never; 10=frequently)
  - 62 responded with average 6.6 average (STDEV 2.2)
- No significant correlation between the responses and the talent index.

Social capital investments

- Evidence is weaker
- Phillips & Webb: “How open are the social networks in Saskatoon to new people and new ideas?”
  - average response of 6.32 (range 2-10; STDEV 1.85)
  - “growing pockets of very open, innovative and welcoming networks” but some resistance that newcomers experienced
- ISRN II-3: “Do interactions [between various networks, associations and government actors] tend to be collaborative or competitive?”
  - 19/27 with average response 6.95 (range 2-9; STDEV 2.20).
  - social capital investments biased to supporting collaboration and weakly support innovation

H2: infrastructure & quality of place

- ISRN II-1 revealed that many firms credit their capacity to innovate and connections and alliances to having the right people: some firms reported capacity due to interactions and cross-learning with other institutions, but those were minor contributors
- Characteristics of Saskatoon that enhance firm's ability to attract and retain highly educated and creative workers:
  - community quality of life and community structure
  - science & business community that make it exciting place to work and offer alternative job

Divergence between sectors

- Key feature in HQP attraction/retention:
  - biotechnology firms reported facilitated by fact Saskatoon is important center and well known—natural place for aspirant careerists—industrial/R&D infrastructure key
  - software firms emphasized social and cultural factors in attraction and retention—global competition intense and people won't move to unattractive locations—community and social infrastructure key

Employees views

- Phillips and Khachatourians reported mobile workers in canola cluster (principal scientists, PhDs, MAs) worried more about quality of work not quality of life
- Phillips and Webb show creatives attracted or put off by a diversity of variables

Canola workers: job v. the community, 1998

1 = most important; 5 = least important	Ph.D. (n=25)					Masters (n=45)				
	1	*2*	*3*	*4*	*5*	*1*	*2*	*3*	*4*	*5*
Proximity to other companies/agencies hiring	22			1	2	39	2	1	2	1
Type of work in the job	17	2				13	12	1	1	1
Salary and benefits		9	4	2	1	5	9	11	2	
Future career prospects within the company		6	5	5	1	4	3	8	5	1
University links (adjunct appointment; collaborations)	1		2	4				1	2	2
Workplace setting (e.g. research park)			2		1			1	2	2
Cost of living (excl. housing)			3	1				4	2	
Cost of housing			1	2				3	3	
Proximity to friends and family			1	1		6	1	3	3	3
Community facilities (e.g. cultural, sports)	1	1	1	2				1	2	

Survey questions: If you have moved from elsewhere, have considered employment opportunities elsewhere or are actively considering a move elsewhere, what factors are most influential to your decision? Rank top five (1 = most important)

Source: Phillips and Khachatourians 1999.

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Talent: job v. community, 2007

	Correlation coefficient	Statistical significance
Salary	0.245	99
Cutting edge work in the field	0.234	95
Affordable living	0.219	95
Restaurants/nightlife	-0.335	99
Proximity to family	-0.347	99
Proximity to friends	-0.383	99
Source: Phillips and Webb 2008.		

Talent attraction: job v community?

- "particular aspects of Saskatoon … facilitate creativity in the city"
- 80 responses on community features
  - 26 reported specific +ve industry/infrastructure
  - 31 reported +ve cultural aspects
  - 20 reported –ve features
- Correlation coefficient between talent index and industry/institutions was .298 (significant at 99% level)—talents see value generated by institutional/industrial features unique to Saskatoon
- No statistical correlation between talent and community/culture or negative attributes

Industrial/institutional v. community/cultural attributes that support creativity

	# cites	Specific attributes cited
Industry & Institutions	26	• Inclusiveness; large scientific community; competition and cooperation • Biotech industry • Research infrastructure (university, CLSI, federal labs)
Community Culture & Amenities	31	• Size; amenities; lifestyle; pace; cost; sense of community • Cultural events; affordable and accessible activities • Rural/agrarian/small town virtues (friendly, accepting, volunteerism)
None	20	Negative features: isolation; conservatism
Source: Phillips and Webb 2008.		

Correl=+0.3 with talent @ 99%

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H3: innovation & associative governance

- Saskatchewan hotbed of innovation in associative governance from beginning:
  - Cooperatives and community leadership
  - Crown corporations (utilities)
  - Nationalization (mining, energy, SMDC)
  - Central control and planning (PRB, BB, CIC)
- Uncertain had any differential impact: Sk v. Ab.
- Traditional models less effective (capital mobility, lower communitarian spirit, greater market competition, trade liberalization)

New associative governance: P3s

- New P3 style models
  - Industrial: PIMA/PAMI
  - Sectoral: AgWestBio
  - Community: SREDA
  - Functional: Tourism Authority and STEP
- New team efforts integrating traditional infrastructure (uni, NRC, AAFC) with new models to leverage investment: genomics; CLSI
- Spillover to social and community infrastructure (sports, theatre, gallery)

Conclusions and extensions

- H1: knowledge infrastructure spurs innovative learning: necessary as host for P2P links; not really institutionalized (except perhaps in clusters)
- H2: infrastructure attracts talent:
  - R&D/industrial infrastructure important and correlated with creatives for biotech
  - Social infrastructure important for ICT but not correlated with creatives
- H3: successful cities use new associative governance: Saskatoon is exemplary but not clear it is necessary let alone sufficient