Proposal

Nanotechnology & the Community

Goal and Project Description

1. Background and Purpose

We aim to develop a partnership exploring the relationships between scientific innovation, community development, and urban planning. We wish to better understand the relationship between globally-minded 'high tech' innovation and the urban localities in which economic growth takes place. In particular, we ask how urban planning, community partnerships and civic engagement can come together to contribute to the development of more socially robust development strategies for 'innovation clusters' (Spencer et al 2010; Amin et al 1994). What is the local 'stickiness' of successful innovation? We wish to develop a partnership involving academic institutions, multiple levels of government, business and community so as to inform innovation networks which recognize and engage people and place as key constituents of successful science policy and development strategies.

Edmonton has been designated as a national centre for the commercial development of nanotechnologies by both the federal and Alberta governments. The centerpiece of this strategy was the creation of the National Institute for Nanotechnology (NINT), which was founded in the Alberta Capital Region in 2001. It was the result of a financial collaboration between the National Research Council of Canada (NRC), the Government of Alberta and the University of Alberta. The Institute is imagined as a centre for scientific excellence. But as a part of national and provincial science policy NINT is also imagined as a platform for the rapid commercialization of nanotechnology and as a locus for economic development.

Edmonton has long been defined along three axis: i) its relative northerness; ii) its importance as a support / transportation centre for the natural resource sectors in northern Alberta (particularly oil); and iii) as a government centre. Nanotechnology is imagined as force of change and diversification. It is hoped that associated with the potential economic gains of participating in a high-tech global knowledge-economy are new opportunities for diversifying the city's cultural identity, improving livability and recasting the spatialization of the city and region vis a vis other locations (Ward 2004; Shields 1991).

However, caution should be taken before straightforwardly linking globally-minded state innovation policies with local benefit and development (Sundbo 2006). In a previous pilot project investigating the networks being created around nanotechnology within Edmonton (Killam Foundation, $30,001), our research highlighted a more fragmented relationship between science, business and the community. Our analysis pointed to the isolation of nanotechnology initiatives from local development planning, from the wider regional economy and from the public. It is the identification of this practical problem – of expanding partnerships across innovation, local development agendas and communities – that motivates our proposed partnership development activities.

2. Theoretical Orientation:

Our proposal involves an interdisciplinary and engaged approach to the challenges stated above. The project is led by the convergence of research and theory in the fields of urban and regional planning, with work in the social studies of science, technology and citizenship (Corey 2006). Our first framing of the project relates to the theoretical positioning of urban regions as the locales of economic prosperity (Porter, 2000; Scott & Storper, 2003) within globalized networks of production and consumption

(Sasken, 2006; Scott, 2004; Friedmann &Wolff, 1982). This research has revitalized an empirical approach to city-regions as sites of accumulation and as crucibles where local innovation and entrepreneurship are leveraged (Scott, 2008; Storper, 1997). Urban concentration is argued to facilitate not only local development gains, but advantages that foster the creation of intangible consequences including knowledge (Cooke, 2004; Orderud 2007), quality of life (Florida, 1995), creativity (Bontje 2011; Collis et al), and local culture itself (Anderson 2007; Shields, 2003; Hadjimichalis 2006). Urban and regional policy has, as a consequence, been placed at the heart of economic development strategies in many OECD countries and been accompanied by a more general re-scaling of governance to the urban level (Brenner, 1999; Jonas and Pincetl, 2006). It is in this regard that studies of geographic 'innovation clusters' have risen in prominence on municipal agendas (Brachert 2001). Recent research on clustering has concluded that growth emerges from a felicitous mix of private, public and civic institutions and a density and diversity of social actors (Wolfe, forth.; Wolfe & Gertler, 2004; Doloreux & Melancon, 2007; Wolfe & Bramwell, 2008). Whether focused on firms, labour markets or on cultural aspects such as quality of life, the social networks and the hard and soft infrastructures that bring together teams and expertise are often interpreted as key factors for success.

It is in relation to these emerging theoretical and urban policy contexts where we can situate our case study and begin to understand the aspirations attached to NINT and the NRC-IRAP cluster strategy in Edmonton. However, our finding of a series of discontinuities between the innovators themselves and the Edmonton city-region are suggestive of the difficulties in top-down innovation models and policies (Wei & Xiang 2009). The smooth translation of technological and commercial advancement into economic and social well-being is a complex and uncertain process (Podgorecki et al., 1996; Sandler & Kay, 2006; Land 2006; Perry 2007). Partly, this is because innovation alone is not a sufficient means of engaging socio-economic contexts within which issues of inequality and deprivation are deeply established and multi-faceted (Amin & Thrift, 1995; Morgan, 1997; Etherington 2009). However, top-down down models of innovation further risk failing to acknowledge that development is difficult to direct. It is complemented by research in regional studies showing that innovation and development is often emergent, interactive and 'embedded' or based on pre-existing social relations (Varlander 2009; Lorentzen, 2008; Jones 2008; Bair 2008; Stark & Vedres, 2006; Granovetter 1973).

Our case study begins at this tension between an idealised model of innovation policy which links global networks with local contexts and the difficulty of planning and governing emergent and synergistic communities in practice. Our second theoretical orientation addresses this problem head on. Research in the social studies of science and technology inverts casual assumptions about innovation by reframing science and technology as essentially community-driven and socially contextualised projects at a range of scales (e.g. Latour & Woolgar, 1979; Bijker & Pinch, 1984). In this sense, the failure of top-down and science driven models of innovation to link with communities is not a surprise, but should be expected, as they demand community participation in imposed scientific framings of innovation (Grint & Woolgar, 1997), as opposed to engaging communities as innovative actors themselves (Bijker, 1995; Von Hippel, 2005). The failure to account for, or engage, public perceptions of technology and social needs early in the innovation process can ostracize publics, lead to distrust of science, government and commercial institutions and leave new technologies foundering (MacKinnon, 2009). Public concerns over novel technologies are too often labelled as irrational, or ill-informed, and dismissed in order to avoid waylaying scientific and commercial progress (Irwin, 2001; Irwin & Wynne, 1996). In a context where we are more and more aware that commercial and technological development can be sources of hazard and social inequity (Beck, 1992; Fairbrother & Fairbrother, 2009) as well as benefit, science-public relations are becoming an essential aspect of innovation policy.

The first benefit of integrating a critical approach to innovation is to directly engage how innovation and publics come together. A second benefit of taking social processes of innovation seriously implies opening innovation discourse and networks to a wider range of participants than is traditionally involved in cluster exercises. Encouraging forms of 'upstream' public engagement, studies of scientific citizenship create the basis for emergent innovation dialogues which directly address the social possibilities of nanotechnologies in the community. Publics can participate in making choices about which innovation trajectories are appropriate, and which should be treated with caution (Kearns et al., 2006; Wilsdon and Willis, 2004; Jones, 2007; Wynne, 2002; Arnaldi, 2010). The development of a research program investigating nanotechnology in the community offers the possibility of engendering a more mature and socially robust dialogue about the acceptability of risk, social needs and social aspirations affixed to innovation (Shields, 2008; Jones and Irwin, 2010; Gertler and Wolfe 2004). It is our contention that for innovation to be truly successful it must be embedded in the organic and locally specific needs of the community; and likewise, for city planning to be successful it must consider the kind of economic opportunities at hand and the development it actually wants to foster.

3. Summary of Objectives

To address our partnership aims we propose the following partnership objectives:
a. Short Term
- Extend current partnership networks to include a wide range of actors linking governments, science, industry and civic society across the Alberta Capital Region.
- Bring together interdisciplinary expertise across research fields to inform partnership development and activities.
b. Medium Term
- Create a stakeholder working group linking science policy and municipal planning.
- Create a forum for a wider civic engagement with nanotechnology and its role in the future development of the city-region.
c. Long term
- Create partnership and engagement models which could be employed in other contexts and in other city-regions.
- Foster community knowledge and engagement with nanotechnology.
- Inform socially robust forms of regional innovation and development policy.
- Contribute to scholarly expertise in understanding innovation and city-regions.

4. Activity Plan

To achieve these objectives we propose the following activities:
a. Background Research and Partnership Development
This proposal benefits from previous seed funded research into the case study, however further research is required to:
- develop a community profile of the Alberta Capital Region which specifically identifies the role of innovation and high technology in the city-region's economy and cultures;
- identify, review and evaluate previous partnership activities relating to nanotechnology in particular, and innovation strategies more widely within the city-region;
- develop a literature review and theoretical approach linking urban and regional research with social scientific studies of innovation and scientific citizenship;

- obtain ethics approval for research and engagement components of the partnership.

b. Project Steering Committee

This committee will build collaborations between government, business, the scientific community, and the regional municipalities. It will meet a minimum of twice a year.

c. Stakeholder and Community Engagement Activities

These activities seek to extend the benefits of partnering and collaboration to a wider range of community participants.

   i. Planning Stakeholder Working Group: A planning stakeholder working group will be formed to address the problem of how communities can 'plan for innovation'. Its membership will include representatives from the regional municipalities, planners and members from the project steering committee. It will meet a minimum of twice a year.

   ii. Citizen Panel: Involving a diverse group of engaged citizens, this panel will be convened over two-days to learn and ask questions about nanotechnology innovation in the city-region. It will involve a series of workshops focused on case-study scenarios pertinent to the region. The participation of scientific experts, government officials, business leaders and civic organizations will support this process. It will contribute to:

- developing a knowledge of what communities know and think about nanotechnology and to identify topics of key public importance;
- a dialogue between community leaders, scientific experts, government officials, and business leaders;

   iii. Engagement Exercise: A one-day public engagement exercise will follow the Citizen Panel and involve a wider public. This event will involve presentations on current issues around nanotechnology and development (derived from the Citizen Panel) as the basis of a series of roundtable conversations. It will involve up to 100 community participants and will be supported by members of the scientific, government and business communities. Participants from the Citizen Panel will contribute to the roundtable discussions as citizen experts. This engagement helps achieve our objectives by:

- raising awareness of nanotechnology innovation within the city-region, and by encouraging a wider public dialogue about nanotechnology and regional development.
- providing community input into nanotechnology policy in Alberta, including on topics relating to sustainability and risk; and,
- identifying synergies between innovation in Edmonton and community strengths, needs and ambitions.

d. Researching Partnership

Focused around our partnerships activities, a series of research activities will be conducted to build reflexive understandings of how partnering and engagement can contribute to the development of more socially robust and effective innovation strategies. This research will serve the dual aim of providing an evaluation of our partnering and engagement activities while also informing academic research on communities, innovation and development. Core research activities will include:

- a qualitative study addressing multi-sectoral framings of innovation and city-regional development, and which will further identify the network relations being constructed around nanotechnology in the city-region;
- participant observation of all partnering and engagement activities as an essential means of reflecting on the practices and values of these exercises.
- an evaluation of participant experiences in engagement exercises (survey & interview).

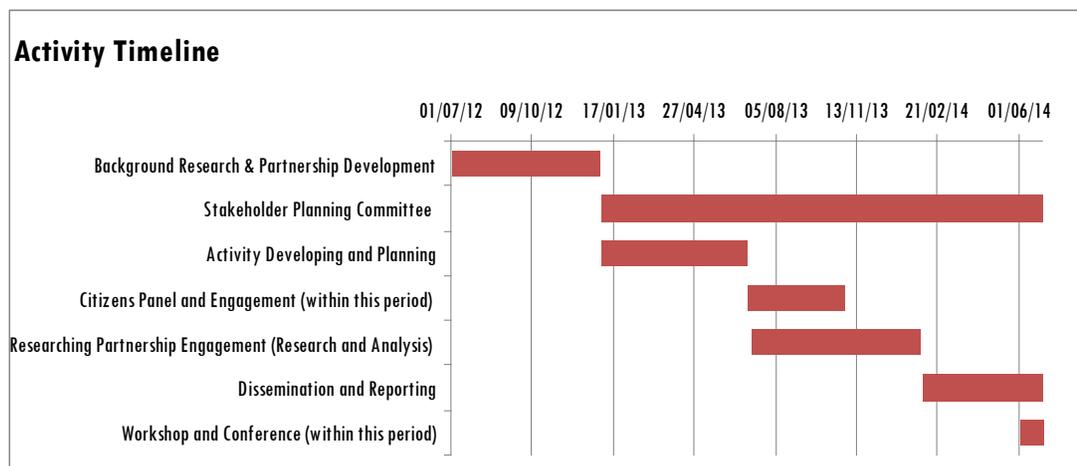5. Meeting Insight and Connection Program Objectives

Interdisciplinarity: This project involves research expertise from across the sciences and social sciences to engage nanotechnology as an area of significant social and economic importance. It further brings together research on innovation, city-regions, governance and development within the social sciences to produce complementary tools for the study of innovation clusters at the interface between research, business and community.

Knowledge Mobilization and Cross-Sectoral Learning: This partnership enables shared learning about nanotechnology and city-regional development across communities of scientists, government officials, planners, businesses and citizens. Stakeholder and engagement activities are designed to facilitate transfers of information and afford opportunities to co-create new knowledge through shared meaning-making. This is a well-founded working practice within the CRSC which works to create a cycle of generating knowledge via reciprocal engagement between citizens and the propinquitous community of the city and region in all its forms.

Accessibility: This proposed project makes knowledge of innovation and city-regional development open to a wide range of stakeholder and citizen communities. We aim to provide communities access to information so as to generate a multi-sectoral dialogue about social and economic action, entrepreneurship and technology governance.

Reciprocal Relationships: This proposal mobilizes a unique and internationally recognized team of researchers, which will enable our partnership to be both informed by international experience, and in-turn inform interdisciplinary knowledge derived from the Edmonton case study.

[Activity timeline – Gantt chart]

Activity Timeline

	01/07/12	09/10/12	17/01/13	27/04/13	05/08/13	13/11/13	21/02/14	01/06/14
Background Research & Partnership Development								
Stakeholder Planning Committee								
Activity Developing and Planning								
Citizens Panel and Engagement (within this period)								
Researching Partnership Engagement (Research and Analysis)								
Dissemination and Reporting								
Workshop and Conference (within this period)								

6. Future Orientation

Most studies of innovation clusters privilege a regional level of explanation, but the case of Edmonton highlights the already-globalized character of researchers and firms dependent on very high levels of capitalization and state subsidized research facilities and equipment. So great is the importance of

transnational networks of information, uniquely skilled labour, venture capital and global markets that the city-region is easily overlooked as offering potential benefits, collaborations and services right at the doorstep. This proposed partnership involves a series of experiments in practice at the level of the city-region. Our intention is that through the knowledge gained in this process, that we take 'lessons learned' and develop models of partnership and engagement that could be applied across other city-regions in Canada, as well as contribute to practice internationally. We consider this partnership a step towards the development of a cross-Canada international Partnership Grant. In other words, we are proposing a process which moves from the local to the global and back again (Geddes, 1915).

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