Brock University

Niagara Community Observatory

Moving Niagara towards a KNOWLEDGE ECONOMY

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The recent economic downturn has resulted in marked economic decline and major social challenges for many once-prosperous cities and regions.

Larger urban centres have adapted quicker to these challenges due to a more diversified economic base and other related factors. However, smaller cities and regions that lack economic capacity have felt the impact of the new economic realities more acutely. In particular, those regions, such as Niagara, with an historical reliance on mass manufacturing industries have been hit the hardest.

While the Niagara region is blessed with a geography providing natural strengths in agriculture (in particular fruit and viticulture), tourism (Niagara Falls, award-winning wineries, golf courses, hiking and cycling trails) and transportation (as a border community with the U.S.), employment in the region has traditionally been dominated by a relatively small number of manufacturing enterprises. Unfortunately, this sector has been in decline for some time and this has had a negative economic impact. According to a Conference Board of Canada report, manufacturing output in the St. Catharines-Niagara region fell a total of 38.5 per cent between 2001 and 2009 with some 14,000 jobs lost.

Partially as a result of this de-industrialization, the region's median income is now at the bottom of the list of 11 census metropolitan areas in Ontario. Employment growth was less than one per cent over the past 10 years, compared to an Ontario average of 17.5 per cent. While the local manufacturing sector ended its decline in 2010 and 2011 with slight increases in output, the Conference Board report states that the sector is not expected to have fully recovered by 2016. However, the nature of manufacturing is changing as it moves from a small number of large companies to a larger number of small and medium-sized enterprises (Niagara Workforce Planning Board 2013). For Niagara to regain its economic standing, new approaches and opportunities must be found.

There is a growing body of research emphasizing the importance of developing the capacity to innovate and commercialize innovations as key factors to achieve economic growth. There is a need for making the complicated but essential links between idea generation, research, innovation, and economic growth in an increasingly globalized economy. In essence, there is a need to develop a new path and become a 'knowledge economy.'

A knowledge economy places a premium on creativity and creation of new knowledge and innovation as drivers of economic revitalization. Broadly defined, innovation refers to new creations of economic significance, including radically new inventions (e.g. in genetics or biotechnology), re-combinations of existing goods produced – both tangible and intangible – as well as the methods by which they are made. This environment leads to new products and stimulates new economic activity around the manufacturing of these goods.

This policy brief highlights the dynamics of knowledge-intensive economies, specifically as it relates to revitalization and growth in small city-regions. The aim is to add to the body of local research identifying gaps that continue to exist and to aid in planning with regards to moving Niagara further along the continuum towards a knowledge economy.

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ABSTRACT

The economic downturn over the past decade has hit the smaller regions and municipalities more harshly as they lack the economic capacity of their larger and more diversified counterparts to adapt quickly. Regions such as Niagara, with a historical reliance on mass manufacturing, have been particularly hard hit. However, Niagara is also blessed with natural strengths such as agriculture, tourism and its proximity to the U.S. border. In this brief, we explore the opportunities for Niagara to overcome the recent economic downturn by engaging new approaches, such as developing a knowledge economy – that is, placing a premium on the creation of new knowledge and innovation as drivers of economic revitalization.

To this end, we highlight the factors considered critical for a midsized region such as Niagara to engage and benefit from the knowledge economy, including economic, educational, and technological infrastructure; social, cultural, and relational; and political factors.

Creating new jobs and improving productivity increasingly involves some level of strategic industrial policy designed to support entrepreneurship, innovation, and system-wide economic re-invention. But it is also true that the role of government in the economy will be different than in the past where it used grant subsidies, cheap loans and tax breaks. The most important role of regional governments in the modern economy is to act as facilitators of economic reinvention by creating certain institutional prerequisites of industrial competitiveness, productivity, and innovation.

In this brief, we highlight the factors, conditions, and environment considered critical for a midsized region such as Niagara to engage and benefit from the knowledge economy. These include economic, educational, and technological infrastructure; social, cultural, and relational; and political factors. This paper argues that the best way to enable knowledge-generation and synergies to stimulate and foster innovation and economic growth is through the creation of networking structures of key stakeholder groups. Successful interaction between this broad range of social and economic actors – including local governments, business, and not-for-profit organizations, requires a participatory style of governing. Thus, it is argued that an 'innovation broker' organization is critical to begin, facilitate and sustain this process.

The Knowledge-Based Economy

A city or region competes economically based on its uniqueness in processes or products in relation to its competitors. The degree of uniqueness depends on the specific knowledge base of the various existing industries; therefore, the knowledge base must be assessed – and in some cases, expanded upon – in order to develop strategies to move towards a local knowledge-based economy, and to fully participate in the global knowledge economy (Asheim & Coenen, 2005).

A knowledge base can be primarily analytical – comprised of scientific, new, codified knowledge from university-industry links, which can lead to new inventions and products in areas such as genetics or biotechnology. Alternatively, a knowledge base can be primarily synthetic, whereby existing knowledge or new combinations of knowledge, such as engineering, tacit knowledge and experience, are applied to improve existing products or process development (Asheim & Coenen, 2005).

Much of the literature cautions that when it comes to applying models of economic development 'one size does not fit all,' and stresses the need to contextualize economic development strategies within the social, cultural, and political environment, as well as the historical economic trajectory of the specific area. With this caution in mind, it is argued herein that there are key determinants or factors conducive or essential to achieving innovation-producing outcomes, without which, efforts may result in little or no success.

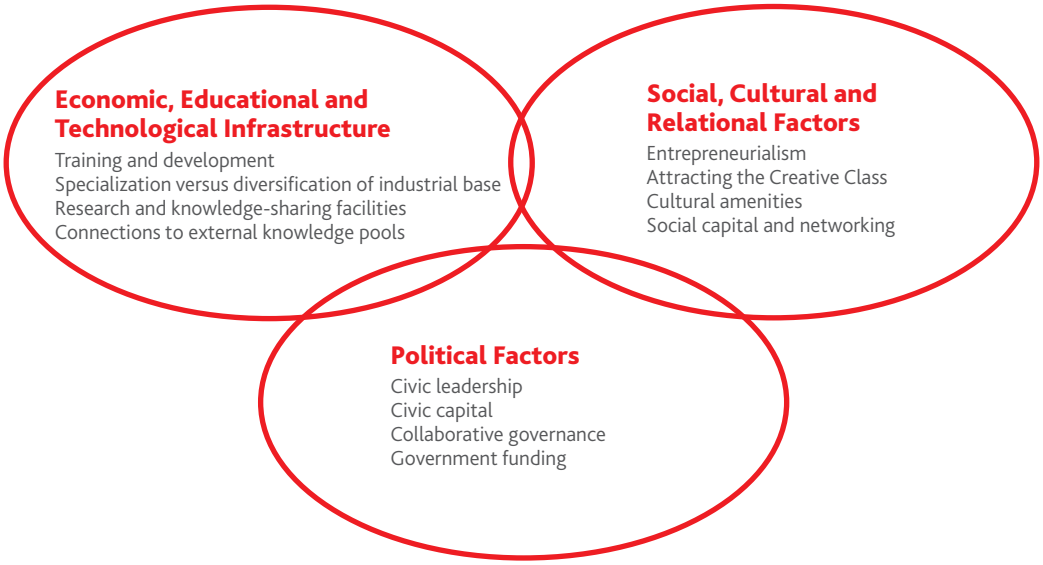
Critical Factors for Creating a Knowledge-Based Economy

Creating strong, sustainable knowledge-based economic renewal in a region like Niagara where economies have been decimated by de-industrialization requires a holistic community-oriented approach. An environment must be created that is conducive to the emergence, nurturing and flourishing of ideas and innovation, knowledge-sharing and entrepreneurialism. This environment is influenced by the presence and quality of higher-education, research and technological facilities, the economic strategies in place, and the social, cultural, and political environment. In this regard, the success of knowledge-creation and innovation processes is greatly impacted by the presence of social or civic capital, and strong civic leadership

and engagement, both of which create the conditions for collaborative governance that can facilitate local initiatives. Strong civic leaders also provide a collective voice at higher levels of government to influence policy and funding decisions, enabling city-regions to draw on existing federal and provincial programs to fund new or expanded research facilities and other institutions such as cultural or innovation intermediaries.

The best practices or critical factors for creating knowledge-based economies can be categorized as: (1) Economic, Educational, and Technological Infrastructure, (2) Social, Cultural, and Relational, and (3) Political. While there is a logical sequence to begin the process of becoming a knowledge-intensive economy, it is not the linear application, but the simultaneous 'inter-play' of these factors that is critical to success. Diagram 1 reflects the inter-related nature of these factors, argued to be critical to building a knowledge-based economy. A brief discussion follows on the factors outlined in the diagram.

Diagram 1
Critical Factors for Creating a Knowledge-Based Economy



Economic, Educational, and Technological Infrastructure

Developing a successful economic strategy for a knowledge-based economy requires first analyzing the existing industry base, and second, deciding upon the desired future. For example, a determination must be made as to whether the focus will be on specialization in target areas or diversification across many. As well, because an educated, skilled talent pool and physical infrastructure for knowledge generation and sharing are key components of an economically vibrant economy, the presence of, and investment in, higher-education and research institutions is a major component of a successful economic strategy. In addition, in order to exploit best practices and recent innovations developed elsewhere it is critical to ensure local research facilities have a connection to external knowledge pools.

Specialization versus Diversification of Industry Base

An important decision for regions is whether to base economic development strategies on a 'specialized' versus 'diversified' industry base, as this impacts the research infrastructure and skills profile that will be needed. The concept of specialization is often referred to as clusters, with Silicon Valley the most often cited successful example.

The development of clusters to spur innovation and economic growth requires a certain level of organizing capacity such as political and societal supports, a shared strategy and vision, and cooperation between public and private sectors with leadership to make it happen (Cinti, 2008: 72).

Higher-Education Institutions

Training and development of human capital is critical to innovation and economic development. In a study of the successful ICT (Information Communication Technology) cluster in Waterloo, Ontario, researchers found the centrality of skilled labour to be the single most important local asset (Bramwell, Nelles, & Wolfe, 2008). The availability of skilled labour was "created and maintained by the attraction and retention of highly educated, potentially mobile workers who are drawn to thick and

deep opportunity-rich local labour markets" (Bramwell et al, 2008: 104; Florida, 2003). The local university was found to play a central role in the development of a local talent pool; in addition, the founders of many firms in the ICT cluster are graduates of the local university (Bramwell et al, 2008).

These researchers argue that colleges and universities act as a 'talent magnet' by attracting not only students but also massing researchers and providing research and collaboration opportunities, which in turn attracts more graduate students and other researchers. This talent pool attracts firms who locate to take advantage of being in close proximity to both an educated workforce and research facilities, thus adding to the continued competitiveness and attractiveness of the region (Gertler & Vinodrai, 2004).

Colleges and universities can also establish technology transfer centres with linkages to industry and venture capital networks. These centres can manage intellectual property issues, educate academics regarding the innovation process and propose management models for given products (e.g. licensing agreement, development of spin-off companies, or joint ventures, etc.) (Mintron, 2009). Various organizational models exist for technology transfer centres, some funded under private endowments, others as a private company owned by the university through which all campus consulting and commercialization efforts flow (Mintron, 2009). Universities and colleges can also become partners in 'innovation generation' for businesses, seeking funding support from businesses for research before the commercialization and technology transfer stage.

Research & Development Infrastructure

Other institutional structures considered critical to developing a knowledge-based economy are private and public research and development (R&D) institutions, and other support organizations or consulting services that facilitate commercialization of technology from academia and R&D laboratories to local industries (Fromhold-Eisebeth, 2009).

Government funding is cited as a key factor in the development of knowledge, research and innovation infrastructures such as colleges, universities, R&D facilities and business incubators (Bellavista & Sanz, 2009). The funding of facilities such as Science and Technology Parks (S&T parks) and advanced manufacturing innovation centres to commercialize technology from academia and R&D laboratories is considered an important component in rethinking the fundamental model of innovation and investing in and developing knowledge assets.

Connecting to External Knowledge Pools

Research reveals that the most innovative places have both a strong local collaboration between firms and institutions and strong linkages to global knowledge and innovation (Zucker, Darby, & Brewer, 1998).

For this reason, increasingly, research facilities such as S&T parks work within networks of similar institutions at the regional, national and international level, in addition to working in networks of companies and institutions internal and external to the region in which they exist (Bellavista & Sanz, 2009). The availability of knowledge contained in these networks is an important driver of economic growth and can enable competitive advances leading to knowledge-intensive clusters (Bellavista & Sanz, 2009). Partnerships emanating from these networks, interaction with distant peers, meetings and conferences all add to improved creativity outputs. Moreover, the informal relationships among the diverse people at the various companies, universities, colleges, and other centres create more opportunity for creativity and innovation as informal networking provides opportunities to capture 'sticky' tacit (cognitive and practical) knowledge essential to creating and sharing knowledge for continuous learning (Bellavista & Sanz, 2009). As a result, there is a dynamic flow of creativity – research institutions such as S&T parks and advanced manufacturing innovation centres are instrumental in jump-starting economic growth; these successes impact those organizations involved in the park, and in turn, creative professionals and individuals at all levels are inspired, setting the stage for further growth.

Social, Cultural, and Relational Factors

Research shows social and cultural dynamics are an important factor for creating a vibrant economy. In particular, much of the literature related to stimulating economic activity stresses the importance of developing an environment conducive to, and which encourages, entrepreneurial activity. In this regard, an emphasis has been placed on attracting talented knowledge-workers – referred to as the 'creative class.' It is believed that the creative class is attracted by 'quality of place,' including employment opportunities, cultural and lifestyle amenities, and a high level of social diversity (Florida, 2002; Glasser & Gottlieb, 2006, Markusen & Schrock, 2006, Wojan, Lambert, & McGranahan, 2007). These 'soft assets' are considered essential for strong social capital and an environment conducive to the development of creative, collaborative networks that generate innovation and lead to knowledge-intensive economies.

Entrepreneurialism and Attracting the Creative Class

Whereas a generation ago public policy looked to great corporations as the engine of economic growth, there is now mounting evidence that the key to economic growth and productivity improvements lies in the entrepreneurial capacity of an economy (Audretsch, 2008). Indeed, much has been written about the speed and resiliency of smaller entrepreneurial companies, versus large bureaucratic organizations, for mobilizing knowledge-intensive assets to keep abreast of advancements in its industries.

In certain industries, small businesses provide greater innovative activity, however, rather than creating knowledge from internal R&D, small firms or start-ups exploit knowledge created by research in universities or R&D in large corporations (i.e. "knowledge spillovers") (Audretsch, 2008). Thus, empirical evidence reveals that industries with a greater investment in new knowledge had a higher rate of start-ups – seen as conduits transmitting knowledge spillovers, while industries with less investment in new knowledge had lower start-up rates.

Cultural Amenities

Consistent with these theories on the social dynamics of innovation and the importance of 'quality of place' for attracting talent and firms, there is a growing body of literature suggesting that a critical mass of cultural activities, entertainment and lifestyle amenities are considered an important component of an economic development strategy. While there is the obvious direct economic impact of the cultural amenities themselves due to revenue generated by theatres, restaurants, museums and art galleries, etc., it is argued that the benefits go beyond this direct impact as these amenities attract the 'creative class', and in so doing, influence the creative, innovative nature of a city or region.

Research reveals that the social dynamics or 'quality of place'(quality of life, cultural and entertainment activities) helps create a regional identity, passion and loyalty for a community, which, in turn, enables a city or region to present a certain image that promotes the area and makes it more attractive to tourists, workers and businesses (Cinti, 2008).

Social Capital and Networking

The by-product of a cultural infrastructure manifest in the mobilization of various community stakeholders to collaborate and work together is often reflected in strong 'social capital'. Social capital is defined as "social relations among agents, resting upon social institutions that allow for cooperation and communication" (Lorenzen, 2007: 807). Social capital contributes to a sense of community based on shared identity, goals and expectations (Wolfe, 2009). Translated to the business realm, social capital includes inter-firm knowledge-exchange and technological learning, and understanding each other's competencies and developing trust that partners can be relied upon (Wolfe, 2009). Such stable and reciprocal relationships among firms due to these densely related networks with high levels of trust can help firms reduce market costs (Brown & Duguid, 2000). For this reason, social capital can be viewed as a local competitive advantage enabled through shared norms and values, greater cooperation, coordination, and communication among individuals, businesses, and sectors for their mutual advantage.

Political Factors

In order to develop successful economic strategies, leadership must come from civil society – non-profit, corporate, government and academia – coming together to tackle the economic and social problems. Thus, a necessary first step is to build a sense of shared identity and vision across existing stakeholder boundaries. Achieving cooperation and a shared vision requires establishing relationships of mutual trust between constituents and using these relationships and open communication to align shared values.

Collaborative Governance

Positive and productive interaction between a broad range of social and economic actors – including local governments, business, and not-for-profit organizations – requires a participatory style of governing. As such, the success of economic development initiatives may depend on two critical factors: (1) strategic cooperation across three levels of government and (2) the direct involvement of a broad range of civic associations and actors as active participants in the design and implementation of this strategic cooperation process (Golden, 2009: 5).

Government Funding

The success of development strategies depends on the ability of city-regions to utilize existing federal, state or provincial programs to support new or expanded research facilities and other institutions (Wolfe, 2009). Strong local governance is important, but not sufficient, as adequate financial resources are still essential to support development initiatives and desired outcomes. Thus, public policy plays a crucial role in shaping an economy's innovative capacity, including the level of R&D resources available, human capital investment in areas such as

science, technology, and engineering; innovation incentives (e.g. R&D tax credits), and the quality of linkages (Furman, Porter, & Stern, 2002). The increase in similar requests from competing regions for government funding, combined with the current fiscal constraints, only serves to highlight the need for greater strategic thinking and collective approaches to governance and economic development.

Civic Leadership

A critical component of successful economic development is the presence of strong social capital and its influence on civic leadership or 'civic capital' (Henton et al., 1997). Civic capital encompasses conditions that support civic engagement among a wide range of individual actors or associations. Effective economic development strategies are best formulated when strong relationships exist between the economic and the civic community, giving both businesses and the community a sustained advantage. Initiatives to this effect are most often spearheaded or fostered by civic leaders or civic entrepreneurs who, with a shared sense of community identity, goals, and expectations, can articulate a common vision of a community's future and formalize alliances, collaborative networks, and other relationship-building mechanisms within and between constituents (Wolfe, 2009). It is civic entrepreneurs and collaborative organizations that bring the respective economic, social, and civic interests together to cooperate on developing strategies (Henton, Melville, & Walesh, 1997). The collaborative institutions – including chambers of commerce, industrial associations, and social organizations – embody values and attitudes intrinsic to the city-region, further strengthening its civic capital and levels of cooperation. Equally important is the sharing of knowledge on each other's strategies and position on key issues; this helps to reduce uncertainty and develop greater buy-in to a common vision.

Developing a Roadmap for Niagara

Large and small communities in Canada and around the world are now positioning themselves to function as vibrant economic hubs. For example, the Canadian cities of Greater Sudbury, Thunder Bay, Greater Moncton, Kitchener-Waterloo, and Winnipeg are transforming themselves into major economic hubs within a single generation. The main ingredients that are needed for such a transformation are the critical mass of skilled people, as well as regional assets like colleges and universities, innovation centres, commercial and cultural facilities, and good transportation, energy, and ICT infrastructure.

The good news is that Niagara possesses these assets to a large degree. The region is even better endowed than most of the more successful regions. The Niagara name-brand is known worldwide. The region enjoys a border location with easy access to major U.S. and Canadian metropolitan markets, a complex and sophisticated network of highway systems, a world-class, globally recognized natural ecosystem, and competitive business costs compared to most other locations. Regions that reinvent themselves in the new economy have been able to build a complex and intricate fabric of a regional economic ecosystem. Some of the major players in this ecosystem would be private sector associations, public and private research firms, universities and colleges, innovation labs and business incubators, among others. Within such a public-private-community collaborative governance framework, strategies of economic reinvention will include joint efforts in seeking to attract new investment, facilitating the growth and retention of existing competitive businesses, responding to labour market needs and opportunities through education, supporting training and entrepreneurship, and supporting research tailored to the needs of local businesses development.

The process of creating a 'Knowledge City' – building the infrastructure and culture for a knowledge-intensive economy – is not a linear one, but rather an 'ensemble of elements' that must be roughly in balance. It is also a process that cannot be done quickly, or without a significant amount of planning. Obviously, the current knowledge base and existing industry base affect decisions related to the strategy, as does the presence of quality higher education and research facilities with a connection to external knowledge pools. Thus, before developing a strategy, a critical first exercise is to objectively assess the existing knowledge assets and deficiencies of a city-region, so that work can begin on establishing a strategy to build on the strengths, address gaps or areas of weakness, and strengthen linkages among institutions. In effect, a process must begin to determine where the region sits on the 'innovation road' and establish a vision or roadmap for greater economic prosperity. This exercise or 'gap analysis' also includes taking an inventory of existing innovation and business support agencies and a review of their utilization criteria.

The Broker

To begin this process requires first identifying civic leaders and civic entrepreneurs who can facilitate the engagement of a broad cross-section of stakeholders from different levels of jurisdiction, and lead inclusive dialogue to establish a collaborative governance structure. It is argued herein that this can best be achieved by creating an intermediary organization or 'innovation broker' early in the process, which expends 100 per cent of its efforts towards achieving the desired outcomes. It is argued that an innovation broker could serve as a catalyst and be instrumental in 'driving' the process to build strong civic capital and effective civic governance mechanisms. The intermediary organization would begin by identifying those civic entrepreneurs with sufficient social capital needed to inspire and engage others, then assist these civic leaders in building the networks of key stakeholder groups and helping to communicate the resultant collaborative strategic vision.

Once the process is underway, the innovation intermediary would work to establish the partnerships to ultimately move toward building innovative capacity. This includes ensuring inclusiveness of local development coalitions, connecting a broadly inclusive group of stakeholders on an ongoing basis – businesses, academia, business support agencies, government, and funders – to facilitate the continuous exchange of ideas and improve networking and a knowledge-sharing culture. The intermediary then fulfills the role of innovation process management such as the bridging and brokerage necessary for effective cooperation, providing information and broker transactions, help finding advice, funding, and other support for innovation outcomes.

The innovation broker should be established as a not-for-profit keystone coordination, networking and liaison organization for the entire effort from its very beginning. Although this organization must be seen as impartial and neutral, it must be led by a broadly known, credible, charismatic and trusted civic leader or civic entrepreneur. To be successful, this organization must have representation from an inclusive group of key regional stakeholders who take 'ownership' of, and participate equally in, this intermediary organization – this includes local government, private-sector businesses, post-secondary institutions, civic organizations, cultural organizations, and citizens. To ensure collaborative ownership of this organization, it must be funded in a collective manner – government (both city, regional, and upper-level), industry partners, and local post-secondary institutions. Once established, revenue could also be generated through membership fees, professional development programs and other private-sector contributions.

Concluding Thoughts

While large city-regions tend to have a greater concentration of the assets deemed critical to this process – such

as post-secondary education and research institutions – smaller cities and regions also have a role to play in the broader urban system of their regional and national economy and the broader global economy, either as areas where established firms relocate for cost advantages, or quality of life for their employees. As such, it is critical that these areas build a political environment conducive to development and strengthen their local research infrastructure and skill profile to enable local firms to embed into global economic systems and nurture innovation in a knowledge-based economy. To this end, government leadership is a key factor in the development of innovation infrastructures such as R&D facilities and business incubators, as well as the regional innovation system as a whole through funding intermediary organizations or innovation brokers.

As well, to attract talented, knowledge workers to drive creativity, innovation, and new venture start-ups, smaller city-regions must focus on 'quality of place,' including cultural and lifestyle amenities that encourage a high level of social diversity and the resultant creativity it inspires. These social or 'soft assets' are essential to building social capital and an environment that is conducive to creative, collaborative networks that foster innovation in knowledge-intensive economies. As such, perhaps the biggest challenge is changing perceptions of how we govern – towards a more collaborative, integrated model involving politicians, business leaders, universities and civic leaders and citizens. Starting with a 'brokerage' or liaison organization to build collaborative networks, smaller city-regions can move towards this goal. Moreover, this innovation intermediary can be the crucial tool to enable knowledge-creation activities and the sharing and exploitation of knowledge for innovation synergies and economic growth. Without this facilitator to bring the often-fragmented regional stakeholders together in the 'big tent,' the potential synergies for the genesis and assimilation of innovation and its transformation into economic growth may never be realized. The challenges are great, but in order for regions like Niagara to thrive, they must adopt economic development strategies that allow them to embrace the economic and social realities that are driving change. To not do so, risks further economic and social decline.

Key Questions

In order to facilitate Niagara's transition to a knowledge-based economy, several key questions must be addressed:

1. Should the focus be on specialization in targeted economic areas (i.e. clusters) or diversification across several?
2. Is the existing educational infrastructure sufficient to provide the required human talent pool and physical infrastructure for knowledge generation and sharing? If not, areas of growth?
3. Does the technological infrastructure exist to support research and development (R&D) and technology commercialization?
4. Is the region imbued with a 'quality of place' that retains and attracts highly skilled knowledge-workers?
5. Does the region benefit from a level of social relations or social capital required for successful economic network interactions?
6. What is the region's history and current capacity for multi-sector collective action/governance?
7. What is the history with respect to input into, and benefitting from, public policies and funding decisions impacting local economic development?
8. Who should be our broker?

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