

Mapping the Economic History and Assets of Niagara in a Changing World: A Wilson Foundation-funded project

Introduction

There is a rich body of literature attesting to the importance of regions and cities as critical threads within the wider fabric of a nation's economy and global competitiveness (Breznitz 2021; Asheim et al., 2019; Clark, 2013; Cooke and Morgan, 2003). For example, local and regional economies deploying their diverse natural and human assets are foundational pillars in the economic scaffolding of geographically expansive nations like Canada (Bradford and Bramwell, 2018; Conteh 2014; Greenwood, 2014; Bourgeois; 2014; Andrew and Doloreux, 2014; Wolfe and Gertler, 2016; Warriar and Bramwell, 2016; Vinodrai, 2016; Grant, 2016; Bourgeois, 2016;). The history of economic growth and development of large cities and regions worldwide are well documented. However, midsized regions are often overlooked in the extant literature (McFarland, 2018; Conteh 2024—Forthcoming).

This project rests on the central premise that our current understanding of economic development trends in midsized regions like Niagara, and insight into the underlying forces that shape their economic resilience, adaptability, growth and development, is still inadequate. Yet these midsized regions have been emerging over the past few decades as dynamic centres exhibiting the most potential for adaptive and nimble economic reinvention in an age of breakneck industrial restructuring (Economist Intelligence Unit, 2016). This project sheds light on trends and transformations in Niagara from the early 1800s to present day against the backdrop of global tectonic shifts in technologies, markets, human migration and ideas.

Context: The Niagara Region in a Changing World

As the papers in the project reveal, the general history of Niagara is the story of a region that has punched well above its weight in helping to shape and enrich Canada into the nation we know today. The papers also shed light on how the region has adapted (to varying degrees of success) to

the shifting currents of change, thanks to its border location, natural resources, economic and institutional assets and most of all, its creative and hardworking residents.

If there is a single sentence to summarize Niagara's core assets, it might be this: Many rivers run through it. Niagara's numerous creeks and rivers, along with Lake Erie and Lake Ontario, were the conduits through which diverse groups of people in several waves of migration converged to participate in the early industries that formed the region's foundational economic structures.

However, the region's story has not always been rosy. It has seen undulating waves of boom and busts, economic prosperity and industrial decimation, massive in-migration and youth out-migration. Nevertheless, Niagara has weathered these waves. There is little doubt this border region will continue to play a vital role in the economic, social and political life of Canada—a country that is defined by its vast and complex geography, diverse regions, and shared socioeconomic destiny with the United States of America.

Physically located at the existential crossroads of Canada and the U.S.'s deep and complex bilateral ties, Niagara as a border region is a microcosm and embodiment of the economic, historical, political, and geopolitical elements of their interwoven coexistence. The past 150 years, in particular, have witnessed profound growth and change in the prosperity of Niagara as the region, like the rest of Canada, aspired to carve its unique place in the world under the long overarching shadow of its giant neighbour to the south.

There are compelling histories to tell about the region's grit, determination, economic growth and development over this period. In particular, it is a story of how entrepreneurs, visionaries, opportunists and a mosaic of characters in key economic sectors like marine, electric power generation, and agriculture have contributed to building the Niagara we know today.

The papers in the project shed light on how their efforts changed the region over the years as it responded and adapted to ever-shifting contours of local, provincial, national, continental and global currents of technological, market, and cultural transformations.

These foundational sectors in those earlier years fed the creation and development of other economic sectors like manufacturing, tourism, and information and communications technology (ICT). These sectors have all grown, developed, and been subjected to the fluctuating currents of advances in science, technology, and innovation over the past few decades.

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As the papers in this project reveal, there are compelling trends to analyze and histories to share about the economic growth and development of the key economic sectors that drive the prosperity of Niagara. Together, the papers aim to advance our understanding of the growth and development of these key economic sectors in the region, linking and comparing them to local, national, and global economic trends. In this regard, they serve as a modest effort to address the gap in our understanding of the trends and forces that shape the economic resilience, adaptability, growth and development of Niagara, a quintessential midsized region in Canada.

Project Goals, Objectives and Scope

The goal of the project is two-fold: First, to map the economic history and assets of the Niagara region over the past 150 years; and second, to analyze the region's recent economic and demographic history (over the past three decades) against the backdrop of ever-shifting provincial, national and global trends, opportunities and challenges. These two goals taken together mean that the project is partly a narrative of the story of Niagara's socioeconomic history and partly an analysis of the region's assets, strengths, weaknesses and opportunities as a key economic hub and an innovation ecosystem in a changing world.

In pursuit of these two goals, the project focuses on development trajectories in a select number of key

economic sectors, namely: agribusiness, manufacturing, tourism, marine commerce, electric power generation, and ICT.¹ While all these sectors continue to play a vital role in Niagara's current economic configuration, assets and growth opportunities, they do so to varying degrees, as borne out in the respective papers in this project.

Some of these sectors were selected because of their deep roots that go down to the very foundation of Niagara as an economic hub, serving as the initial driver for human migration and settlement that made Niagara into the vibrant community that it is today. In this regard, these sectors serve both an economic and symbolic value as the critical defining features of the very contours of Niagara as a distinct place with its unique history, identity, culture and global outlook.

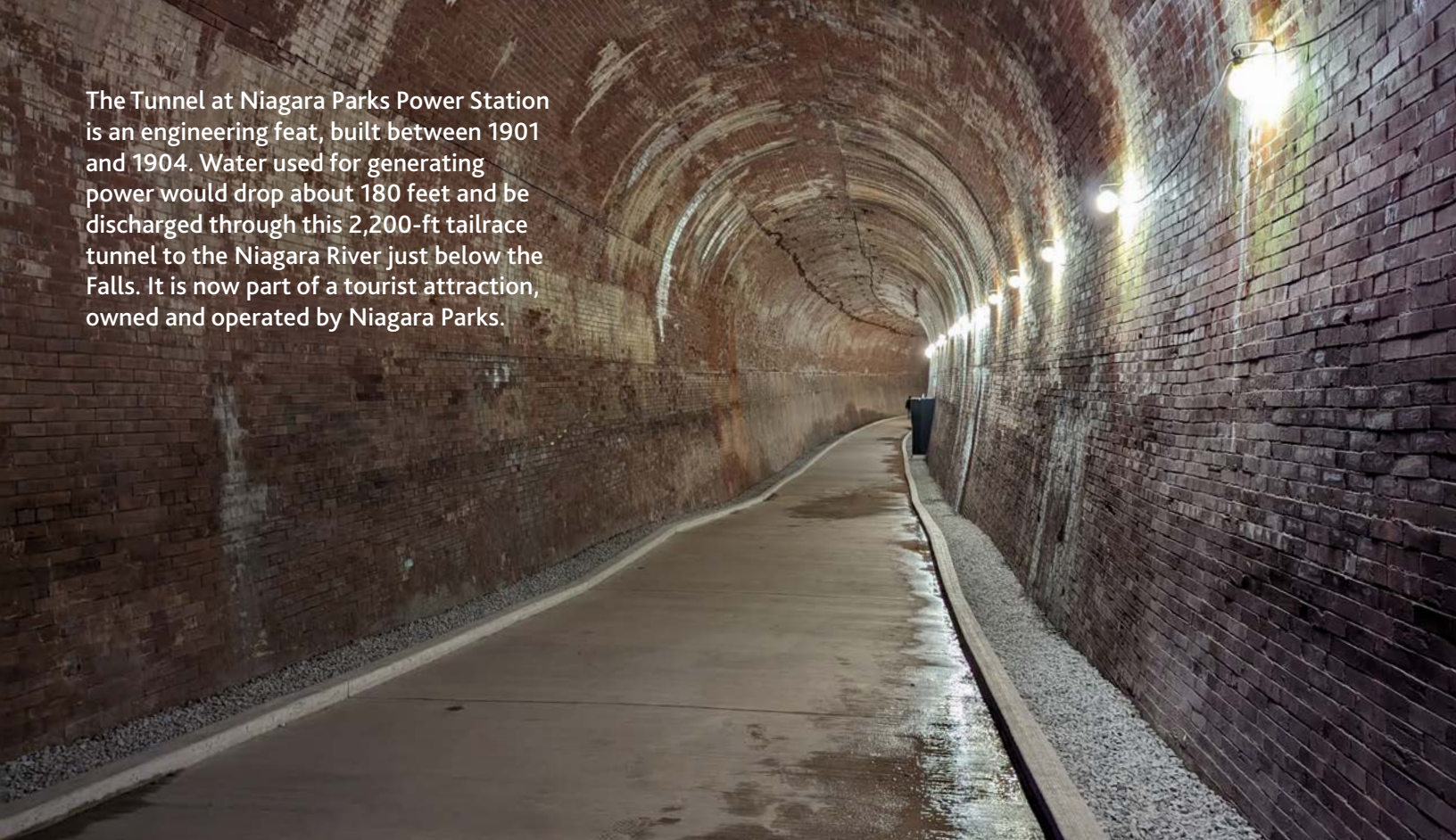
The sixth sector in the list above—ICT—was included because it represents an indispensable platform of Niagara's launch and ushering into the digital economy of the 21st century. Given its relative novelty (becoming conspicuous and strategically vital in Niagara only over the past three decades), with composite industries such as computers, software, data processing and the like, the ICT sector is only included in components of the study focusing on recent trends in the region.

Finally, this project will be incomplete in its objective of analyzing the region's economic trends and assets as a key economic hub and an innovation ecosystem in a changing world if it does not include an examination of emerging sectors in Niagara. Coincidentally, the centrepiece of sector development and support strategy in Niagara's most recent Economic Development Strategy (2022) is "to foster resilient diversity in our economy through the development of emerging sectors and value-added opportunities while continuing to grow and support our strong industry clusters." (Economic Development Strategy 2022. p.35).

The Region's official economic development strategy identifies existing sectors of strength in Niagara as agribusiness, manufacturing, tourism, and professional services while it identifies emerging sectors as health care (and the broader life sciences), film, sport tourism/active economy, marine, and electric vehicles. The latter are considered "emerging" to the extent that "investments in these sectors have not traditionally been a focus of the Region's official economic development strategy and therefore will require research to understand the assets and develop actions going forward" (Economic Development Strategy p.40).

¹ For our definitions of these sectors, see Appendix I.

The Tunnel at Niagara Parks Power Station is an engineering feat, built between 1901 and 1904. Water used for generating power would drop about 180 feet and be discharged through this 2,200-ft tailrace tunnel to the Niagara River just below the Falls. It is now part of a tourist attraction, owned and operated by Niagara Parks.



In this regard, this project led by Brock University researchers takes up the Region's call for further research to support efforts at building on Niagara's existing economic strengths while identifying and pursuing potential opportunities in emerging sectors.

In pursuit of the goals outlined above, the project is broken down into several objectives, namely to:

1. examine the history of regional economic development in Niagara from the early 1800s to present day, dividing this vast period into pre- and post-1969 (1969 being the year that the Regional Municipality of Niagara was first incorporated);²
2. compare the region's key economic sectors, trends, and assets with those of similar mid-sized regions in Ontario;
3. situate these sectors within the context of broader provincial and national employment trends;
4. analyze the growth and development of current and emerging economic sectors in Niagara through the lens of regional innovation systems, leveraging the Niagara Region's 10-Year Economic Development Strategy as a frame of reference.

Key Components, Activities and Deliverables

In keeping with the above goals and objectives, the research team divided the project into six components that allowed the researchers to undertake distinct but interrelated investigations individually. The rationale for doing so was to provide in-depth insights into significant events and developments at critical junctures or inflection points over such a vast stretch of time in the history of the sectors under study. We briefly outline these components below.

The first component of the project focuses on examining the history of economic development in Niagara from the early 1800s to about 1969. This involves rigorous historical case-study research on five of the economic sectors listed above. The papers in this section draw from a rich and eclectic body of archival documents to track and highlight critical trends. Together, they shed light on a variety of intertwining factors that shaped the development of the sectors over the duration of more than 100 years.

² The researchers use the year 1969 as a point of demarcation between "early" and "modern" developments in Niagara in part because of its symbolic meaning to the region, but also in part because it roughly marks a critical inflection point as new waves of investment and technological innovations gave birth to an industrial boom in the region.

As the papers demonstrate, a few of these early determinants that shaped the foundational features of Niagara's economy remain relevant today, including the ceaseless tides of globalization, market competition, public and private investment, and technological change. Although the papers in this component are structured chronologically, they attempt to spotlight key themes vital to the respective sectors. For instance, they analyze how trends like international trade policies, government legislation, technological advancements, entrepreneurship, population growth, and shifts in market trends have all individually and collectively impacted developments within each sector.

The second component focuses on examining the history of economic development in Niagara from roughly 1969 to present day, providing robust case-study research on the same five economic sectors covered in the pre-1969 section of the project. The papers in this section deploy a mixed-method approach (consisting of archival, interview and statistical data collection and analysis) to shed light on significant milestones in each sector.

They highlight how key opportunities were exploited and challenges addressed over the past five decades, concluding with discussions of the policies and opportunities that are likely to shape the sectors moving forward. Building on the papers in the first component of the study, the papers in this section provide a compelling narrative of not only how the select sectors served as foundational drivers of Niagara's early development but also how they have weathered the changing seasons of time to remain cornerstones in the region's economy today.

One critical feature shared by all the papers in the two components above is their testament to the undulating waves of structural change as the sectors adapt to breakneck changes in technology, ideas, markets, culture, and policies. Another feature all the papers share is the central role of human grit, vision, creativity and resilience, not only with respect to the entrepreneurs who invested in the region but as a testament to the "army" of skilled and unskilled workers who toiled the fields, forests, lakes, rivers, canals, and machinery that birthed and drove each sector and the economy as a whole.

A final feature shared by all the narratives in the first two components of the study is the role of local and regional policymakers who envisaged and invested in the requisite

infrastructure as well as deployed a plethora of regulatory instruments, fiscal incentives and other policy levers to shape the trajectory of the sectors at critical crossroads over the past 150 years. Together, the two components thus provide a continuous, comprehensive, in-depth narrative of the developments of these sectors and how their distinct threads weave into each other. They also shed light on how the sectors weave into other aspects of life in Niagara, forming the vital economic tapestry that inspired the waves of human migration and settlements that made Niagara the diverse and thriving community it is today.

The third component of the project continues with the focus on post-1969, mapping Niagara's changing population. It allows for a comparison of population changes among the region's local municipalities to shed light on their distinct patterns of growth.

The fourth component of the study marks a shift in focus from providing a narrative that sheds light on significant economic events and junctures to a more quantitative analysis of composite industrial assets of each of the key economic sectors outlined above. This section reports on employment trends in six economic sectors in Niagara from 1971–2021.³ The six sectors are: agribusiness; manufacturing; marine transportation, electricity generation, transmission, and distribution; tourism; and ICT. (As noted above, the ICT sector is only included in components of the study focusing on recent trends in the region).

Headcounts of the number of people employed in the establishments within each sector are reported along with some disaggregation by gender, the percentage of self-employed, and the sector's share of total employment in Niagara. The employment data are compiled from the long-form census samples collected every five years and reported on the Statistics Canada website.

The fifth component of the study continues with the focus on quantitative analysis of composite assets of each of the six economic sectors outlined above. The aim, however, was to compare key trends in Niagara with those at the provincial (Ontario) and national levels over the past 20 years (2001–2022). This component also compares the character of change and development in Niagara with those in other midsized regions in Ontario with the aim of highlighting the implications for Niagara's national and global competitiveness, prospects and challenges.

³ *Employment, measured here as the number of people working in an industry, is an extremely important measure of the significance and contribution of the industry to Niagara, and so it is well worth reporting. But it does not provide reliable measures of other very important (and overlapping) characteristics of the industries such as the overall level of economic activity; the value added; or the amount of revenue, income, or wealth generated by the industry. Levels of employment tell us even less about other, more difficult to measure, characteristics such as the industry's contribution to the region's social fabric, (in)equality, or environmental sustainability.*



The Morningstar family operated a small flour mill at the top of Decew Falls, St. Catharines, from 1883 to 1933.

For purposes of data analysis, this component focuses on a set of industries and occupations listed under the four-digit North American Industry Classification System (NAICS) and National Occupation Classification (NOC) codes, respectively.⁴ The data was generated by Statistics Canada but was sourced from Lightcast's Labor Market Analytics. It consists of two distinct sets of data that serve as prisms for analyzing trends in the respective sectors, namely, jobs by industry and jobs by occupation. While the distribution of jobs by industry (represented in NAICS codes) gives us a good picture of trends across Niagara's key sectors, another lens through which we can view such trends is the distribution of jobs by occupation (represented in NOC codes).

The importance of including the "occupation" lens in this component of the study is that it sheds light on the human and talent dimensions of the sectors, providing insights into the nature of skillsets or expertise in each sector. NOC codes can help track changes in the types of jobs required within a sector or industry that NAICS cannot. They supply a framework to understand the composition, skill requirements, labour market trends, and other characteristics of economic sectors. The NOC codes facilitate the identification of emerging job sectors and the decline of traditional occupations. This information, in turn, allows us to make inferences about the region's existing talent pool and its implications for innovation, adaptability, and resilience of each sector, thus allowing for effective policy responses.

The data for this component of the study also include the national location quotients for the industries that make up each sector. The value of the location quotients is that they indicate a region's level of specialization in each industry. Specifically, in this case, it allows us to compare Niagara's job concentration in a given sector relative to total jobs concentration in the sector at the national level. An LQ of 1.0 or higher shows a level of concentration above the standardized national average. A score of 1.5 or higher shows a high degree of specialization.

Like other components of the study, the data largely focuses on Niagara.⁵ However, for comparative reasons, this section also includes provincial and national figures and trends for the same period, as well as data from a select number of Census Metropolitan Areas (CMAs) within Ontario that have sizeable sectors similar to the ones under study in Niagara. We chose midsized regions

as comparators because in addition to their demographic characteristic as midsized CMAs, they have identified the sectors in their economic development strategies as part of their lead economic drivers.

The sixth and final component of the project is different from the others in the sense that it has a stronger policy focus aimed at generating recommendations and action steps.⁶ This section of the project is still in the early stages (as of January 2024). The papers will be centred on analyzing the content of Niagara's economic development strategy to shed light on how policy actors understand and seek to leverage the region's human and natural assets, exploit emerging global opportunities and mitigate endogenous and exogenous challenges. Therefore, a critical part of the endeavour in this section is an examination of the emerging sectors identified in the region's most recent economic development strategy: health care (and the broader life sciences); film; sport tourism/active economy; marine; and electric vehicles. As noted above, the Region has identified these "emerging sectors" as offering new and growing opportunities to Niagara's economy.

Using NAICS and NOC codes to delineate the industries within each sector, the researchers will track continuities and shifts in these sectors over the past decade to account for pre- and post-pandemic patterns, thereby controlling for any COVID-19 pandemic-related fluctuations. In addition to highlighting trends, the study will investigate areas of alignment between Niagara's identified strengths in the emerging sectors and the key features of industry characteristics, human talent, and physical, digital and institutional assets that constitute global best practices for each sector. The goal will be to juxtapose Niagara's articulated strengths and opportunities with those of similar sectors worldwide and to shed light on potential areas of policy action to address challenges and/or barriers as well as maximize the exploitation of emerging opportunities.

Finally, in undertaking the above analysis, we will deploy the regional innovation systems (RIS) literature, which views regions as the most relevant geographic unit for understanding innovation and economic development policies and systems (Asheim et al., 2019; Wolfe and Gertler, 2016; Breznitz 2021; Conteh 2024). This literature offers a well-tested and widely used analytical framework for understanding place-based designs of innovation system policies and regional economic development strategies.

⁴ *Ibid.*

⁵ *It is important to note that for this study, we used the geographical area of the St. Catharines-Niagara Census Metropolitan Area (CMA), which does not include Grimsby and West Lincoln. This was necessary to be able to compare the local sectors to other CMAs (the geographical unit of economic analysis) in Ontario.*

⁶ *The data for this component of the study is being collected and analyzed, and the papers generated from these findings will form the core focus of the next set of working papers and knowledge outreach activities.*

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We briefly define below the sectors selected for this project.⁷ The definitions in this appendix do not include the emerging sectors identified in the Niagara Region's 10-Year Economic Development Strategy (2022) because the NCO research team is still finalizing the composite industries for each sector and collecting the relevant data from Statistics Canada.

Agribusiness

We define the agribusiness sector as a composite of industries consisting of agricultural produce; the processing, storage, and distribution of such farm produce; the manufacturing and distribution of farm equipment and supplies; and the provision of requisite services in support of farming operations. As the name "agribusiness" implies, we see the sector as a collection of activities that connect agriculture and business with an emphasis on the interdependence of the various industries and activities within the production and distribution chain.

These industries consist of the following, as defined by the North American Industry Classification System (NAICS): "Farm supplies merchant wholesalers"; "Agriculture, construction and mining machinery manufacturing"; "Beverage manufacturing"; "Beverage merchant wholesalers"; "Farm product merchant wholesalers"; "Farm, lawn and garden machinery and equipment merchant wholesalers"; "Farms";⁸ "Food merchant wholesalers"; "Fruit and vegetable preserving and specialty food manufacturing"; "Meat product manufacturing"; "Other food manufacturing"; "Pesticide, fertilizer and other agricultural chemical manufacturing"; and "Support activities for agriculture".

Manufacturing

Manufacturing is the largest sector in this study. No other sector demonstrates the fluid boundaries of the economy like manufacturing. According to the NAICS,⁹ the sector "comprises establishments primarily engaged

in the chemical, mechanical or physical transformation of materials or substances into new products."

These products may be finished, meaning that they are ready to be used or consumed. They could be semi-finished, in the sense of being used as raw materials for further manufacturing. They could be deployed in related activities, such as the assembly of the component parts of manufactured goods, the blending of materials, and the finishing of other manufactured products.

The multiple uses of products and activities classified as manufacturing are further complicated by the vast range of establishments engaging in such activities, including a variety of trade designations such as plants, factories or mills. NAICS further notes that "certain activities involving the transformation of goods are classified in other sectors." For example, some activities classified under manufacturing intersect with post-harvest activities of agricultural establishments. This means that some activities listed under the manufacturing sector are also listed under the agribusiness sector.

The manufacturing sector thus encompasses a vast array of industrial and occupational activities that intersect and overlap with most other sectors. A general way of thinking about manufacturing is that it is a secondary sector of the economy, distinct from primary activities like agriculture or resource extraction on the one hand, and tertiary activities like services on the other. However, the sector is best seen as largely consisting of intermediate processes linking primary, secondary and tertiary activities and processes in a range of other economic sectors, including age-old ones like agriculture and more recent ones in service-based sectors like ICT.

It generally applies to most activities that involve the deployment of machinery and equipment to create or produce goods and deliver services. The generic nature of this construct means that any mechanical, chemical or biological processing or formulation deployed to create or add value to a widget or service can legitimately constitute manufacturing.

⁷ The conceptual definitions of the sectors reflect a general understanding of how they are construed by business and policy actors. However, for empirical purposes, the operational definitions of the composite industries within each sector vary slightly across the respective papers in this study due to the fact that one component of the project focuses on 4-digit NAICS/NOC codes while another focuses on the same codes but at the 3-digit level. While the 4-digit NAICS codes provide a more granular and precise definition, the reason for choosing the 3-digit NAICS codes was to provide a higher level of abstraction that can allow for a longer timeframe in the trends analysis. The 3-digit codes tend to better accommodate Statistics Canada's shifting definitions of industries and sectors over time.

⁸ Note that there is no single NAICS that captures "farms." Lightcast (the data analytics firm from which the research team sourced the StatsCan data) combines NAICS 111 (crop production) and 112 (animal production and aquaculture) into NAICS code 1110 for farms in their data.

⁹ North American Industry Classification System. Manufacturing: The Sector as a Whole. <https://bit.ly/3G1n7ok>

Wineries and their vineyards have become pillars of both Niagara's agriculture and tourism sectors.
Photo courtesy Chateau des Charmes.



This leaves the term applicable to a range of human activity, from handicraft to high-tech. For our present purpose, the focus is on industrial activities by which raw materials from the primary sector are transformed into some form of finished product or semi-finished goods and services.

Tourism

The United Nations' World Tourism Organization (UNWTO) defines tourism as "a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involve tourism expenditure."¹⁰ Tourism in this regard, the agency notes, is not just limited to holiday activity, but more broadly, people travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure and not less than 24 hours for business and other purposes. It also involves both domestic (within the traveller's own country) and international.

The activities that constitute tourism are primarily a composite of cultural industries with facilities, services, and products geared towards visitors. These include establishments engaged in producing and distributing cultural products. The processes involved in their production and distribution "distinguish this sector from the goods-producing and services-producing sectors" such as manufacturing. "The value of these products lies in their information, educational, cultural or entertainment content, not in the format in which they are distributed (Statistics Canada, 2022)."

"Arts, entertainment and recreation" is part of tourism and is described by the NAICS as including "establishments primarily engaged in operating facilities or providing services to meet the cultural, entertainment and recreational interests of their patrons. These establishments produce, promote or participate in live performances, events or exhibits intended for public viewing; provide the artistic, creative and technical skills necessary for the production of artistic products and live performances; preserve and exhibit objects and sites of historical, cultural or educational interest; and operate facilities or provide services that enable patrons to participate in sports or recreational activities or pursue amusement, hobbies and leisure-time interests (Statistics Canada, 2022)."

Finally, other vital activities related to tourism include "Accommodation and food services," and they are described by the NAICS as "establishments primarily engaged in providing short-term lodging and complementary services to travellers, vacationers and others, in facilities such as hotels, motor hotels, resorts, motels, casino hotels, bed and breakfast accommodations, housekeeping cottages and cabins, recreational vehicle parks and campgrounds, hunting and fishing camps, and various types of recreational and adventure camps. This sector also includes establishments primarily engaged in preparing meals, snacks and beverages, to customer orders, for immediate consumption on and off the premises."

In light of the above discussion, for this research, we define the tourism sector as a composite of the following industrial activities: "Scenic and sightseeing transportation (land and water)"; "Travel arrangement and reservation services"; "Air transportation (scheduled and non-scheduled)"; "Taxi and limousine service"; "Charter bus industry"; "Performing arts companies, spectator sports, promoters (presenters) of performing arts, sports and similar events"; "Agents and managers for artists, athletes, entertainers and other public figures"; "Independent artists, writers and performers"; "Heritage institutions"; "Amusement parks and arcades"; "Gambling industries"; "Other amusement and recreation industries"; "Traveller accommodation"; "Recreational vehicle (RV) parks and recreational camps"; "Special food services"; "Drinking places (alcoholic beverages)"; and "Full-service restaurants and limited-service eating places".

Marine Commerce

Marine commerce refers to waterborne systems transporting goods (cargo) and people (passengers) via waterways. Such systems could include boats, ships, sailboats or barges, and the waterways can involve oceans, lakes, canals and rivers. While the various means of marine transportation can be deployed for commercial, recreational, or military purposes, our focus in this study is on commercial uses.

Marine commerce is etched in the contours of Niagara's geography, much like hydroelectricity, which is discussed in another paper in this series. It is also deeply rooted in the region's cultural and economic history and has served as a vital support system facilitating the early settlement and socioeconomic prosperity of the region.

¹⁰ *United Nations' World Tourism Organization (UNWTO). "Glossary of Tourism Terms." <https://www.unwto.org/glossary-tourism-terms>*

Beyond its historical and cultural significance, the sector enhances the strategic significance of Niagara as a multimodal gateway between Canada and the United States. More importantly for our present purpose, marine commerce still constitutes one of Niagara's central economic drivers and has been identified in the Region's current 10-Year Economic Development Strategy as an "emerging sector" due to its recent surge of new business investments.

Marine shipping along the Great Lakes-St. Lawrence waterway, which runs through the heart of Niagara, not only directly generates a large number of jobs in the sector, it also serves as a fulcrum for other economic sectors in Niagara, including manufacturing and agribusiness.¹¹

The flows of marine cargo moving through Niagara's waters include domestic cargo moving between U.S. ports, domestic cargo moving between Canadian ports, cross-lake cargo moving between the U.S. and Canada, and international cargo moving between system ports and overseas ports. By one recent study, in 2022, 135.7 million metric tons of domestic and international cargo travelled at some point through the Great Lakes, its connecting rivers and/or the St. Lawrence Seaway.¹² This cargo contained commodities that include steel, general cargo, iron ore/bulk, grain, stone/aggregate, cement, salt, other dry bulk, other liquid bulk, and coal.

Electric Power Generation

The electric power generation sector in Niagara has historically been dominated by hydroelectric power owing to the natural endowment of the Falls. "Hydro" consists of forms of energy generated by leveraging water, usually falling or fast-running water, to produce electricity or to power machines. The sector helped position Niagara as one of the vital centres of Ontario's industrial development and economic growth since the early years of the 20th century.

While power generation in Niagara and the province of Ontario has gone through considerable transformation, it still accounts for more than one third of Ontario Power Generation's (OPG) electricity production. OPG's figures for March 2023 show that hydroelectric power generated 7,613 megawatts of energy for the province, boasting 66 stations, 241 dams on 24 river systems. Some 34.2 terawatt-hours of power was produced in 2022.¹³

Although hydroelectric power is a renewable energy source, enjoying the reputation of being a clean, reliable and flexible way to produce energy, it has its complexities. The sector's reliance on water systems intersects with the rights of Indigenous communities, the jurisdictions of local and regional governments, the needs of industry and household consumers of electric power, the sensitivities of environmental groups, and the interests of recreational users.

Despite the historic importance of hydroelectric generation to Niagara, the province of Ontario and Canada as a whole, the sector has expanded over the years to include other forms of electric power generation. In this regard, we adopt a broader construct of electric power generation that includes other sources of power, with the aim of reflecting and capturing the changing contours of the power generation sector as dictated by new technologies, including the emergence of wind, solar, and biomass forms of energy in recent decades.

In light of the above, for this research we define the electric power generation sector as a composite of industrial activities related to generation, transmission and distribution of electric power. It also encompasses occupations vital to the sector, such as electrical, civil, mechanical, and electronics engineers, power system electricians, electrical power line and cable workers, and power engineers and power systems operators.

Information and Communications Technology

Information and communications technology (ICT) is a broad range of industries comprising technologies related to communications media (including wireless signals) and computers, including software, apps, digital platforms, data storage, management and dissemination, and audiovisual systems. ICT gadgets, conduits and platforms include "the Internet, wireless networks, cell phones, and other communication mediums."

These technologies and their related systems together support the access, storage, transmission and management of information and devices. This means that a region's ICT capacity reflects its ability to build the critical physical, digital, and human infrastructure to support a wide spectrum of activities across all sectors in a knowledge-driven economy.

¹¹ *Economic Impacts of Maritime Shipping in the Great Lakes—St. Lawrence Region*. Published by Martin Associates economic analysis and consulting services, Lancaster, PA. July 2023. <https://bit.ly/3ucRVQk>

¹² *Ibid.*

¹³ *Ontario Power Generation*. 2023. "Hydroelectric Fleet in Ontario." <https://www.opg.com/powering-ontario/our-generation/hydro>

As the name implies, the ICT sector includes establishments primarily engaged in producing and distributing (except by wholesale and retail methods) information and communications products. The sector in a narrow sense is typically associated with computing infrastructure providers, data processing, web hosting, and related services industries.¹⁴

In light of the above, for this research we define the ICT sector as a composite of industrial activities as defined by the NAICS: “Computer and peripheral equipment manufacturing”; “Communications equipment manufacturing”; “Audio and video equipment manufacturing”; “Navigational, measuring, medical and control instruments manufacturing”; “Computer and communications equipment and supplies merchant wholesalers”; “Software publishers”; “Wired and wireless telecommunications carriers (except satellite)”; “Satellite telecommunications”; “Other telecommunications”; “Data processing, hosting, and related services”; “Computer systems design and related services”; and “Electronic and precision equipment repair and maintenance”.

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Brock Partners

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¹⁴North American Industry Classification System (NAICS) Canada 2017 Version 1.0. Data processing, hosting, and related services. <https://bit.ly/47g3qFG>