Emergence of the North American center of excellence for transportation equipment

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Abstract

Following the closure of Plattsburgh Air Force Base in 1995, the northeastern region of New York State faced a unique economic development challenge. In addition to the loss of the air base, the rural area suffers from urbanization and automation in manufacturing trends. While the quality of life is highly rated, population and job growth stagnate. Isolated geographically by Lake Champlain to the East, the Adirondack Mountains to the South and West, and long distances to southern economic centers in the state, the region has looked north of the Canadian border and positioned itself as "Montreal's US suburb". Economic developers have crafted bi-national agreements between regional organizations, improved cross-border infrastructure, and enhanced educational institutions for the purpose of attracting Canadian and international manufacturers to the region. In 2015, the North American Center of Excellence in Transportation Equipment was launched and six new companies joined the cluster, doubling its size and perhaps providing a base for further growth. Manufacturing jobs are likely to grow for the first time in more than 20-years. We use cluster theory to argue that this formation of companies may still be insufficient to catalyze cluster emergence and the desired goal of regional competitiveness. Moving forward in the crafting of regional economic development policy, we emphasize the importance of viewing the North American Center of Excellence for Transportation Equipment as a pre-emergent cluster in need of further support to reach its potential.

1. Introduction

Following the end of the Cold War, Plattsburgh Air Force Base ceased operations in 1995 and became a primary focus of regional economic development in Northeastern New York (PARC, 2006). Lying on the shore of Lake Champlain, with the Adirondack Mountains to the West and the Canadian border to its North, the region's rich geographical resources are isolating. The area was, and remains, one of the less prosperous regions of New York State (NYSDOL, 2015). The closure of the air base and the region's geography have given shape to a persistent economic development strategy of positioning the region to participate in the global economy (NCCoC, 2016). An emerging transportation equipment manufacturing cluster spanning the US and Canadian border has promise to positively impact the level of productivity and prosperity in the region (Heath, 2016). Recent increases in manufacturing establishments are poised to provide the first increase in manufacturing jobs in over 20 years. Given these developments, it may be an appropriate time to evaluate the developmental stage of the region's transportation cluster and consider implications for its future development.

Regional clusters are at the core of the regional economic development strategy in northeastern New York (Collins and Douglas, 2015). Beyond integrated supply chains, clusters may include educational, financial, and governmental institutions (Porter, 1998). The emergence of a cluster can be difficult to discern as independent firms and institutions come together to compete, collaborate, and create competitive products (Menzel and Fornahl, 2009). Some interactions between companies

are formal and more easily identified, but others may occur at informal functions or even chance encounters in the community. Competitive clusters emerge as they foster knowledge spillovers, innovation, and entrepreneurship (Tallman et al., 2004). From a knowledge generation, innovation, and entrepreneurship perspective, cluster emergence is challenging to measure qualitatively or quantitatively.

In this paper, we used publicly available information and interviewed four economic development professionals to analyze the three pillars of the regional economic development strategy, which are business attraction/job creation, proximity to Montreal/Quebec, and the cluster approach (Collins and Douglas, 2015). After more than 20 years of persistent redevelopment efforts, an institutional environment has formed that is aligned with the area's unique resources. Through this period, employment and population loss have stabilized as the regional economy has changed. With the recent attraction of six transportation equipment manufacturing firms, the cluster has doubled in establishments. With the opening of a new titanium parts manufacturer in 2016, manufacturing employment in the region is poised to grow more than 10% in 2017, the first increase in over 20 years.

2. Cluster theory in economic development

Economic development professionals seek to positively influence community members' living standards and often rely on cluster concepts to guide their efforts (Desrochers & Sautet, 2004). The cluster approach adds to previous understandings of industrial districts and complexes by focusing on the processes of knowledge exchange (Bronson, Doyle, O'Connor, 2016) and shifting the focus from economies of scale to flexible networks of organizations that are capable of adaptation and innovation. Successful firms continually springing up in Silicon Valley are explained by an agglomeration of firms, educational and governmental institutions, supporting infrastructure, and knowledgeable policy making.

To further understand clusters, researchers have considered their process of development from a life-cycle perspective, clusters may emerge, grow, and fade away (Menzel and Fornahl, 2009). Clusters vary greatly from community to community and in their stage of development, which can be a source of confusion for researchers and policy makers. Speaking of clusters, Desrochers and Sautet (2004), observe "this concept turns out to be so fuzzy that it is now commonly used in a variety of ways by a wide array of academics, consultants and policy makers". While perhaps unclear, the cluster concept has become a cornerstone of economic development practice and is an active area for researchers to explore theory as it is applied.

3. Data collection

Based upon the above perspectives on cluster development processes, we gathered data on the agglomeration of private firms, institutions, and infrastructure in northeastern NY over a 22-year period. Primary and secondary data were collected and analyzed for this study. Board minutes from meetings of the Plattsburgh Airbase Redevelopment Corporation, web sites from regional economic development agencies and regional chamber of commerce, and documents from the regional economic development council were used to provide both a historical context for the economic development efforts and data on the specific companies in the transportation equipment manufacturing cluster. Four interviews lasting 1 to 1.5 hours were conducted with personnel from the Small Business Development Center, The Development Corporation, and the regional chamber of commerce. Interviewees provided guidance on secondary sources of information and discussed their and our interpretation of the events. Finally, the draft of this article was reviewed by several of the interviewees and their written feedback is represented in the analysis and findings.

4. Challenging times for the regional economy

Closure of the Plattsburgh Air Force Base was a singular and highly visible change in the regional economy, which coincided with the less-acute forces of urbanization and automation that have challenged rural economies (Flora and Flora, 2014). The airbase's 4,400 personnel and their fam-

ilies accounted for approximately 5% of Clinton county's population in 1995 (LoTemplio, 2015). These factors have contributed to a generally shrinking population and employment base in the region as shown in Table 1. Population and manufacturing dropped precipitously after the base closure between 1995 and 2000, but stabilized at the lower levels between 2000 and 2015. It is against this backdrop of population and employment trends that we evaluate the emergence of the transportation equipment manufacturing cluster and the related policy making implications for regional economic development.

Table 1.

Demography/Year	1995	2000	2005	2010	2015
Clinton County population	86,444	79,882	81,803	82,280	81,251
Clinton County manufacturing establishments		103	86	82	80
Clinton County manufacturing jobs		5,455	5,052	3,578	3,322
Clinton Country Total Establishments	2,050	2,023	2,008	2,062	2,029
Clinton Country Total Jobs	32,662	33,923	34,725	32,910	32,981

Table 1. Demographic and economic data between 1995 and 2015

5. Regional geography, resources and constraints

Much of the economic development strategy is based on regional resources and constraints. In the map below, the Northeastern New York region is surrounded by natural resources that also isolate it from the East and West. There is national border 20 miles to the north that represents a barrier to, and opportunity for trade. Albany, 150 miles to the south, and New York City, 300 miles to the south, are not oriented north.

Lake to the east - Lake Champlain is the 6th largest fresh water lake in the US at 120 miles (193 kilometers) long and twelve miles (19 kilometers) wide. Of the 571,000 inhabitants living around the lake, about 68% live in Vermont, 27% in New York, and 5% in Quebec. Two bridges connect New York and Vermont at the very ends and only one year-round ferry crossing connects the sparse populations on both sides (LCBP, 2016).

Mountains to the west - The Adirondack Mountains have been home to two Winter Olympic Games in Lake Placid, New York. The Adirondack Park Agency restricts development in its six million acres and much of the private economic activity is in forestry, agriculture, and recreation/tourism. About 130,000 people live in the park's 103 towns and villages, which have experienced a population decline of 1.3% over the last 20 years, compared to growth of 2.2% in New York state (APA, 2016).

Border to the north – The US-Canadian border is the longest unprotected border in the world and separates the globe's two largest trading partners (U.S.D.O.S., 2015).Montréal's population in 1995 was 3,324,000 and has grown to 4,060,700 in 2015 (STATCAN, 2016). Since the 1920's, aircraft have been produced in Montreal, one of the only cities in the world where an entire aircraft can be designed and built (Niosi and Zhegu, 2005). The aerospace industry alone employs over 40,000 people in Montreal, which is greater than the entire workforce of Clinton County (MTLINT, 2016). While NAFTA has made trade easier, crossing the border for business is still a daunting task for most small businesses (Rundh, 2015, Winch and Bianchi, 2006).

Figure 1

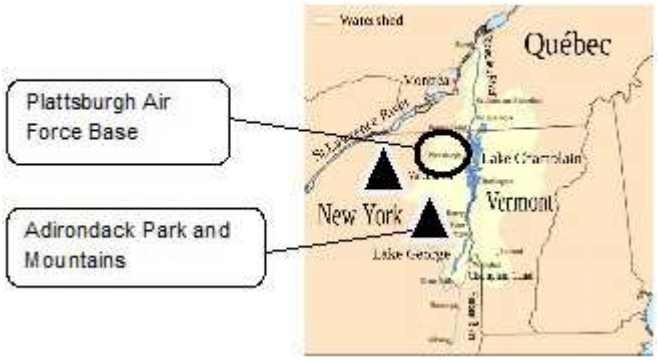


Figure 1, Map of region (Lake Champlain Basin Program)

6. Robust economic development institutions

The Northeastern region of New York State has developed a strong institutional environment where local, regional, state, and federal agencies collaborate to provide a range of programs that support private sector development. The depth and sophistication of these institutions are evidence of strong support from policy makers (Desrochers and Sautet, 2004), which is largely justified by job creation and retention (Collins and Douglas, 2015). Since 1997, the city of Plattsburgh has been highly ranked by "Site Selection" magazine as an excellent small town to locate your business (PARC, 2006). In 2014, "FDI" magazine ranked Plattsburgh the number two small US city to invest in (Heath, 2015). The strong institutional environment in the region is essential for supporting cluster development.

7. Regional economic development strategy

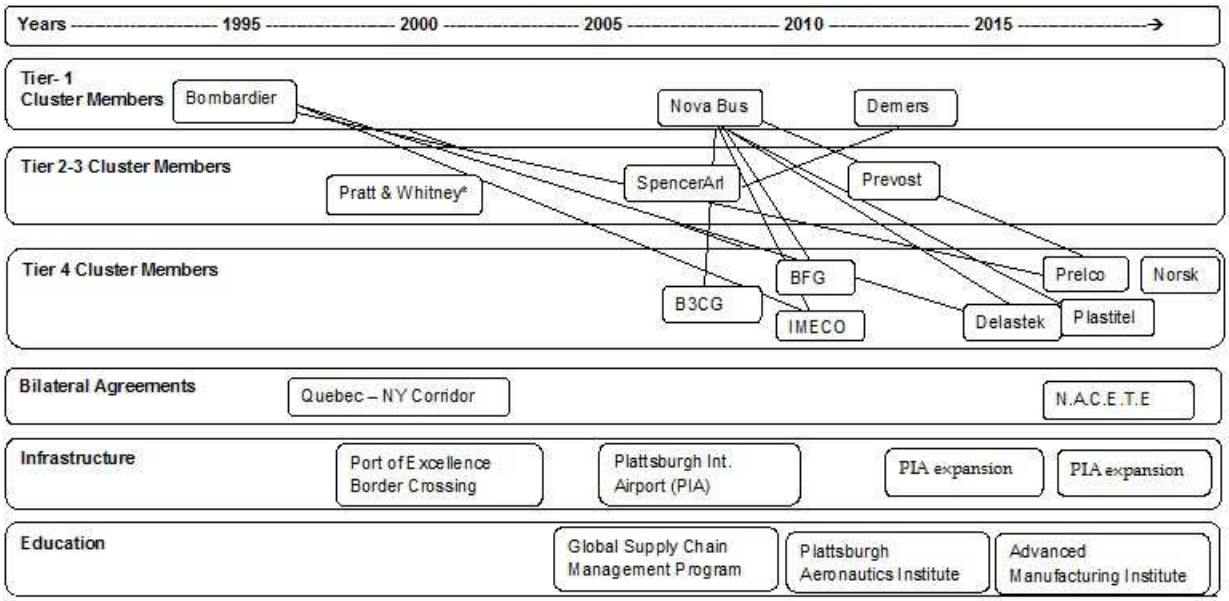
The comprehensive 2015 regional economic development strategy begins with a few phrases that help explain the active development of the NACETE, including: (1) "Builds on growth in the aerospace, transit equipment, … and manufacturing industries, (2) will leverage our gateway to Canada, (3) attract and nurture entrepreneurs, and (4) invest in community development infrastructure" (Collins and Douglas, 2015). These pillars of the strategy can be traced to initiatives dating back to the closure of the base. In 2001, the regional chamber of commerce exclaimed that "To achieve great things, small areas must determine what it is that is bigger than themselves that they can make themselves a contributing part of;" and branded the region as "Montréal's US suburb" (NCCoC, 2001) The development strategy includes the development of bi-national agreements, infrastructure enhancements, and education and workforce development. The execution of the strategy over the 20-plus years is described below and depicted in Figure 2.

Bi-national institution development- The Québec - New York Corridor agreement was signed in 2001 to facilitate economic relations (NCCoC, 2001), giving Northeastern New York a role in the multi-billion-dollar annual trade between Quebec and New York State. In 2013, Quebec's Delegate General to New York, Mr. Boisclair, explained that the relationship "helps Quebec companies export to the United States but also helps create more jobs in this region …the two sides are not fighting for a larger share of the economic pie, but looking for ways to make a larger pie" (Heath, 2013). The North American Center for Excellence in Transportation Equipment was announced in June 2015 (NCCoC, 2015). About one dozen transportation companies meet monthly to identify and fill gaps in the regional supply chain (NCCoC, 2015).

Infrastructure - At the first summit, priorities were placed upon continued summits, rail enhancements, border crossing improvements, expansion of the airport in Plattsburgh, and further down the road, a high-speed rail link between Montréal in New York City (NCCoC, 2001). To date, these projects have been completed except for the high-speed rail line.

Educational institutions -A feature of innovative clusters is knowledge creation and spillovers, where firms get knowledge from other firms and institutions (Tallman et al., 2004). There are many secondary and two post-secondary education institutions in Plattsburgh. To date, there have been three major institutional educational initiatives, in addition to a variety of smaller training and workforce development initiatives. First, at SUNY Plattsburgh the Supply Chain Management program began in 2006, then Plattsburgh Aeronautics Institute was founded at CV-Tech, and most recently a Center for Advanced Manufacturing has been launched at Clinton Community College (NCCoC, 2015).

Figure 2. Formation of the North American Center of Excellence for Transportation Equipment



8. Analysis of manufacturing tiers in the transportation cluster

In Figure 2, we identify 13 firms in the transportation equipment cluster and classify them by their roles in the manufacturing process. Most large equipment manufacturing clusters consist of tiers of firms that perform the functions of design, sales/marketing, assembly, and parts production (Niosi and Zhegu, 2005). Using aerospace as an example (cf. Niosi and Zhegu, 2005), top tier firms design, market, and finalize assembly of aircraft. Second-tier firms supply Tier-1 firms with larger subassemblies, such as jet engines or landing gear. Third-tier firms supply smaller subassemblies like fuel supplies for engines or braking systems for landing gear. Tiers 1-3 are highly specialized, are few in number but global in scale. In the Fourth-tier, there are 100's of firms that supply parts for subassemblies and often serve diverse industries. Tier-1 drives the cluster's overall activity. Figure 2 shows that most of the firms in Tiers 2-4 are tied to either Bombardier and/or Nova Bus.

Figure 2 displays formation of the cluster over time and its recent dramatic growth that is largely related to tier-1 firms, Bombardier and Nova Bus. While some tier-2 companies followed Nova Bus simultaneously, most of the lower-tier companies took a few years to start operations. Nova Bus has initiated more lower-tier activity than Bombardier. Pratt and Whitney's testing facility was not associated with other firms in the cluster and moved to Montreal in 2008. Norsk, which is a Tier-4 parts producer, will be looking to develop relationships higher in the cluster and may not attract other manufacturers (cf. Giblin, 2011). The development of specialized institutional support, industry focused bi-lateral agreements, improvements in infrastructure, new education programs, and the attraction of a growing number of related manufacturers provide the foundation for the early stages of cluster formation (Menzel and Fornahl, 2009).

9. Cluster emergence analysis

One implication from figure 2 is that further growth of the cluster (beyond Norsk) may be related to additional Tier-1 entrants, related to Demer's recent start, and/or growth generated by Bombardier and Nova. A potent mix of world class manufacturers, specialized supply chain members, and now an entrepreneurial start-up are active in the region. For the sake of regional competitiveness, further development of this cluster may be driven by cluster-specific knowledge creation, leading to innovation in products, services, process, new sources of supply, and new markets (Tallman et al., 2004). Entrepreneurship may be seen in the creation of spin-offs and new ventures that are tied to the cluster (Tallman et al., 2004). To date, intra-cluster innovation and entrepreneurship have not manifested in a publicly discernible way (Interview, 2016).

10. Catalyzing cluster emergence

Supporting the further development and emergence of a competitive manufacturing cluster may include continued efforts to attract more tier-1 firms and/or fill gaps in the supply chain with additional lower-tier firms. However, to develop regionally-based competitiveness facilitation of knowledge creation, innovation, and entrepreneurship are necessary (Tallman et al., 2004). An important aspect of competitive cluster development, innovation, and entrepreneurship is randomness or serendipity, such as when an entrepreneur emerges in a specific location and time *(Steenhuis and Kiefer, 2016)*. Entrepreneurship and innovation can be encouraged by educational institutions like MIT in Boston or Stanford in Silicon Valley. To date, the leveraging of existing educational institutions has focused primarily on skilled labor development and supply chain management, which are likely to produce incremental improvements in processes that, over time, can significantly enhance competitiveness (Tushman and O'Reilly-III, 1996). SUNY Polytech, in Albany, NY and Clarkson University in Postdam, NY, are working closely with Norsk Titanium and may bring more advanced technologies and product innovation capabilities to the cluster. Moving forward, the further development of educational programs and their integration with the transportation equipment manufacturing cluster may provide the best opportunities for the development of cluster-specific knowledge and regionally-based competitiveness that is self-sustaining.

11. Challenges in the global travel equipment industry

Given the recent successes in developing the cluster, it may be overlooked how challenging it may be to maintain a position in this competitive and fast-paced global manufacturing system. The transportation equipment manufacturing industry is mature, technologically advanced, highly concentrated, globally scaled, and competitive. Agglomeration of manufactures in Northeastern New York may reflect a dispersion of activity at the global level, just as automobile manufacturing has become less centralized in Detroit in the US (Niosi and Zhegu, 2005). Well-developed technologies are now delivered electronically and reduce the benefits of physical proximity, allowing companies to perform activities in proximity to strategic suppliers or customers. Currently, much of the regional-cluster's activities are driven by global forces.

Clusters and supply chains may be adversely affected by weaknesses/problems experienced by key members (Chopra and Sodhi, 2004). Bombardier has experienced production problems at their Plattsburgh facility and have failed to deliver on a major contract with the Mass Transit Authority in New York City (Rivoli, 2015). Bombardier is also struggling with development of the C-series jet and has received billions of dollars in investment from different Canadian and Quebec-provincial agencies (McNish and Vieira, 2015).

While the NAFTA agreement has been associated with growth in trade that is beneficial to both countries, it allows state and municipal government's leeway to favor US made content in their procurement processes. These provisions at the local-level are contrary to the spirit of the free trade areas (Hufbauer and Schott, 2013) and may be the subject of review in future agreements between the US and Canada. Under President Trump, the US has negotiated for more US-favored international trade deals, been willing to withdraw from the Trans Pacific Partnership agreement, and

threatened to withdraw from NAFTA as part of the negotiating process (Worstall, 2017). It remains unclear how changes to NAFTA might impact economic development in the north-eastern region of New York State, but revisions may be likely in the near future.

12. Conclusion

The potentially devastating impact of the base closure, that was closely followed by a precipitous drop in population and the total number of jobs, has been substantially avoided (see Table 1). The recent attraction of manufacturing establishments may help reverse these downward trends and produce the first growth in manufacturing employment in over 20 years. The anticipated employment of 400 people at Norsk Titanium may increase total manufacturing employment by more than 10%, barring layoffs at other manufacturers. We view the current successes in firm and job growth to have been strategically driven in the policy making process, not the result of an internally-driven cluster emergence and development phenomena. This cluster may require considerable more growth in many areas and a continued or increased level of policy making support before a critical mass is achieved for internally-driven regional competitiveness.

Cluster theory may be "a fuzzy concept," but it seems reflectiveof the current complexity and dynamism evident in the field of economic development. At present, a cluster development approach to economic development is unwieldy for researchers and professionals, but we do not argue here for more parsimonious or generalizable theory of cluster development. We propose that bridging the gap between theory and practice may be best done at the local level by addressing the unique features of a specific cluster. Romme (2016) calls on researchers of management to contribute to "a science-based professional activity that serves the greater good." Cluster development in pursuit of regional economic development seems to be a worthy area for additional research that has immediate importance in our own communities. This paper may be useful for local economic development professionals and help bridge the gap between cluster theory and practice at the local level.

13. Limitations and future research

This research focuses on the ongoing phenomenon of economic development over a period of more than 20 years. Only major events in public documents were taken into consideration to cover such a broad swath of activity over an extended period of time. Economic development experts who were and are actively involved in the above activities corroborated the general sweep of the above narrative and interpretation of the data. The inferences from the data are applied to this specific case study.

Local economic development professionals played an important part in the development of this paper and by their active participation may have already incorporated some of these findings in their approach to cluster development. Research methods for engaging with economic development professionals may be developed for the purpose of bridging local gaps between researchers and practitioners. The importance of economic development to so many communities may justify a more applied methodological approach to cluster theory development.

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