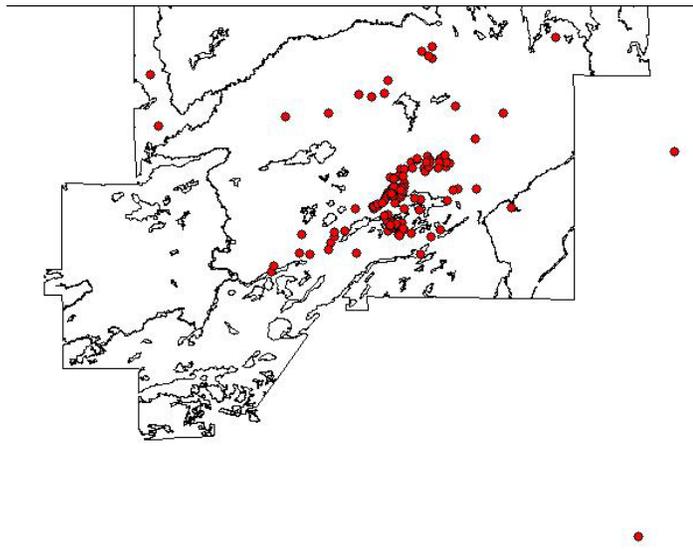


Cluster evolution: in itself to for itself

Observations from Sudbury's Mining Supply and service cluster

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The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood."

John Maynard Keynes

1. Introduction

Theory affects history and history affects theory. This is a story about the evolution of cluster theory and the evolution of a cluster. It is also a story about the evolution of collective consciousness, of "cluster consciousness" and the role of theory in that evolution.

Sudbury is Canada's leading mining community. With a GDP that is much larger than the GDP of Prince Edward Island, (5.6 vs. 3.4 billion) and a population greater than the combined populations of the Yukon, the Northwest Territories and Nunavut,

Sudbury has been called one the world's four great "mining city-states"¹. It is the only city in the world with 15 producing mines within the city limits. It is the only mining community in Canada with a research university. It also contains an empirically significant cluster of specialized mining supply and service (MS&S) firms, many of which export their products and services, and a concentration of administrative services related to mining in the form of the headquarters of the Ontario Ministry of Northern Development and Mines and the Ontario Geological Survey. In the age of cluster development, it would seem inevitable that the community would present itself as having a mining cluster and that it would be recognized as a nationally significant industrial cluster.

As late as 2002, however, the notion that a mining cluster or an MS&S cluster in Sudbury was disputed by City officials, officials of the Ministry of Northern Development and Mines (MNDM), the Director of the Canadian Association of Mining Equipment and Service Exporters (CAMESE). The first working paper of the Institute for Competitiveness and Prosperity (ICAP)², in fact, provided profiles of the top five clusters of traded industries listed in decreasing order of employment for each of Ontario's CMAs. For Sudbury the five candidates were

- 1 Education and Knowledge Creation
- 2 Hospitality and Tourism
- 3 Heavy Construction Services
- 4 Financial Services
- 5 Business Services

The absence of any mining related sector in this list is striking³. Even in the private sector, where the economic importance of mining and mining supply was well

¹ The term is usually ascribed to John Baird, Executive Director of CAMESE.

² A View of Ontario: Ontario's Clusters of Innovation. The Institute for Competitiveness & Prosperity. Working Paper No. 1, April 2002, <http://www.competeprosper.ca/public/wp01.pdf>

³ It is striking that neither the mining nor the MS&S cluster appears, although in retrospect, since the supply firms fall into perhaps 17 separate SIC groups it would be virtually impossible to

understood, as late as the fall of 2003 ten managers and owners of the first 12 firms interviewed for this study indicated that they did not believe a network of firms existed or that they were part of a “cluster.”

Demonstrating the existence of a cluster that fits most of the criteria proposed in the literature is relatively straightforward. There are large customers - INCo and Falconbridge - that serve as anchor firms. The anchor firms are demanding customers of the sort that Porter suggests drive suppliers to become increasingly competitive. Furthermore, there was by 2002 a collection of mining-related research centers and administrative offices related to the mining sector. Objectively it was difficult to argue that the cluster was not present.

The failure to recognize the cluster by the community, by the authorities charged with promoting economic development, and even by agencies committed to promoting clusters as a development strategy is surprising and requires explanation. The focus of this paper, however, is on the process of self discovery underway in the cluster, on the change from a cluster “in itself” to a cluster “for itself” and eventually to a cluster “for others.” These expressions intentionally echo the Marxian distinction between a class in itself and a class for itself. They serve to call attention to the role of consciousness and solidarity in transforming a collective entity from an object of history into a subject of history. The distinction throws light on both the Sudbury MS&S cluster and on one of the more difficult aspects of cluster theory and practice.

A useful starting point is the “cluster checklist⁴” published in May of 2002 by the Institute for Northern Ontario Research and Development. The checklist was cobbled together from several sources. It was intended to help policy makers in the community decide whether the community could plausibly claim to have a MS&S cluster. Many of

capture the cross-group cluster using standard Location Quotient methods and the SIC or labour force data.

⁴ http://inord.laurentian.ca/5_02/Cluster%20Checklist.htm David Robinson, May 10, 2002

the checklist criteria were satisfied. The list, however, included a number of softer, perceptual criteria including the following criteria from the Industry Canada website in 2002:

Experts say much of what defines a tech cluster is image. If image is a criterion, these questions must be asked to measure whether an area is a tech cluster:

1. Would an outsider say the city, town or region in question is a tech cluster, without prompting?
2. Institutional research. Basic research must be conducted in a tech cluster for it to be considered one. Those could include research done at universities or by private think tanks.
3. Do the people involved in the tech cluster understand what it is and define themselves in one?
4. Is there a mouthpiece, a news organization or organizations that are very supportive of the industry.
5. Is there a professional organization that supports technology exists in every tech cluster

<http://www.technologycanada.com/views.cfm>

Features 1, 3,4, and 5⁵, all of which the Sudbury cluster lacked, are proxies for features of consciousness rather than objective measures of cluster size, export performance, growth, concentration or market structure. Their presence in a list

⁵ A variant of the second question appears in the ISRN questionnaire.

designed to identify clusters reflects the curious evolution of the cluster concept, as well as a theoretical confusion that seems endemic in attempts to apply the cluster model⁶.

The history of cluster theory explains some of the confusion⁷. Michael Porter initially used the term cluster in *The Competitive Advantage of Nations* (1990 p287) to refer to a sector in which a nation has demonstrated international strength. Clusters are groups of industry classifications revealed by a straightforward procedure for transforming aggregate data. The term “sector” might have served as well, except that Porter excluded the industries that were not competitive.

At this stage the construct had very little explicit theoretical content. The primary focus was comparative advantage, indicated by either a significant and sustained share of world exports, or as foreign direct investment, which reflects the skills and other strengths of the firms investing. Porter went on to discuss firms despite the fact that his analysis used industry-level data. High scores on either measure indicate the presence in the nation of firms that are internationally successful. The firms that were the focus of his discussions throughout the rest of the book were hypothetically reconstituted from the aggregate data.

The relative unimportance of the cluster concept is obvious in his 1990 article summarizing his book for the Harvard Review of Business. Clusters are first mentioned late in the piece, and they are described as being generated by the “diamond”, which Porter clearly saw as the main theoretical contribution in his book. The diamond was a construct at the national level. The word cluster only appears five times in two consecutive paragraphs and once in a figure, and is not mentioned in the conclusion to the paper.

⁶ Much of the following discussion is from A paper presented to the Laurentian University Economics Department, December 2002. Cluster Theory as Constructive Confusion: With

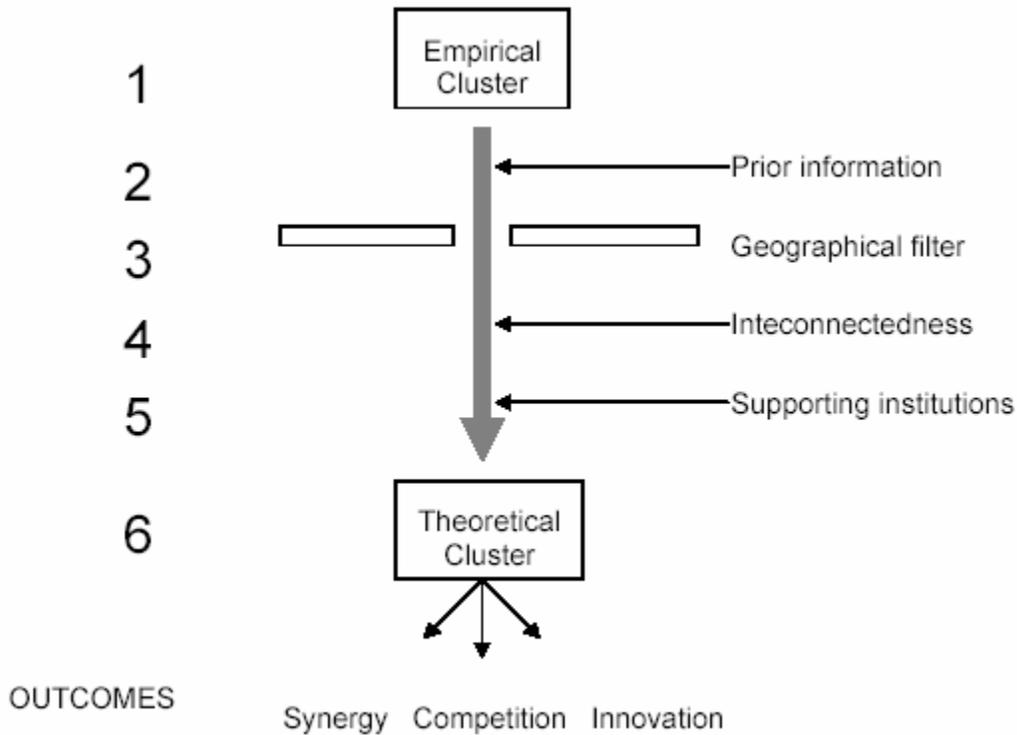
⁷ The following argument is drawn from Robinson, Constructive Confusion: Cluster Theory with Applications to Sudbury. http://inord.laurentian.ca/2_03/Constructive_Confusion_Dec9.pdf

For the Michael Porter of 1990, the notion of cluster is a national, not a geographic concept⁸. By 1998, however, Porter was consistently defining clusters in geographical terms:

“A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities.” (Porter 1998)

“Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate.” (Porter 2000)

Figure 1: The evolution of the Cluster Model



⁸ Porter did observe that “Emerging and established clusters were **often** concentrated in one or two geographic areas” (Porter 1990a p303) and “they **tend** to be concentrated geographically” (Porter 1990b) [my emphasis] however.

“Clusters are concentrations of highly specialized skills and knowledge, institutions, rivals, related businesses, and sophisticated customers in a particular nation or region. (Porter 2000)

Not only is the cluster of 1998 a geographical entity, it exhibits a great deal of structure, (interconnected, associated, linked, related) that was absent from earlier descriptions. It consists of entities of several types (companies, firms, suppliers, institutions, associations) and it is explicitly theoretical (commonalities, complementarities, cooperate, compete). Figure 1: The evolution of the Cluster Model illustrates the evolution implicit in the new description.

In 1990 Porter exploited only the first two elements shown in Figure 1 – the procedure for identifying empirical clusters and an element of judgment based on internal structures that were not specified. He then proceeded to discuss the national clusters at length deriving conclusions from his independent knowledge of industrial structure. By the late 1990s Porter had changed the way he used the term cluster from a procedurally driven empirical grouping to a theoretical entity defined by its structural features. He is talking about the theoretical entity when he says

“Clusters represent a new way of thinking about national, state, and local economies, and they necessitate new roles for companies, government, and other institutions in enhancing competitiveness.” (Porter 2000)

“Clusters represent a new and complementary way of understanding an economy, organizing economic development thinking and practice, and setting public policy.... A cluster approach to economic development encourages economic behavior that is pro-competitive.” (Porter 2000)

Through the 1990s Porter and other researchers continued to stretch the concept of a cluster to include features needed to explain the cluster. For example, since clusters of firms are frequently associated with research institutions, the idea of a cluster grew to include research institutions. This is like introducing the baobab tree into

the definition of an elephant herd because it helps to explain the presence of the herd. This migration of the term cluster has been a source of confusion⁹.

The criteria that the Sudbury cluster did not satisfy in 2002 were the late additions to the theoretical construct. By the time the cluster checklist was assembled, real clusters exhibit a level of self-organization and self-awareness. The Sudbury cluster is revealing precisely because the self-organization and self-awareness that has recently become part of cluster theory has been observed in the process of developing and has played a role in gaining the cluster recognition by policy makers.

In broad outline, the story is fairly simple. The “empirical” cluster had come into being largely unobserved. In the age of the cluster theory, however, essential public policy and investment with respect to labour market and research infrastructure depends on recognition as a cluster. Regional economic development therefore depends on recognition.

Both recognition and self recognition were blocked in part by the conceptions of clusters held by policy makers. Researchers based in the local university provided the first descriptions of the local economy in terms of a cluster. The federal development agency provided funding to test the model. Self awareness grew out of the combination of locally grounded research and government interest in promoting regional development by applying a cluster approach. Theory and the development of theory were inextricably intertwined with the development of a new regional entity.

Before describing the process, it is useful to provide some background on the nature of the cluster and its significance. Section 2 describes major features of the cluster. Section three presents a sketch of the emergence of self awareness. Section four concludes the paper with some pompous remarks.

⁹ Most writers have followed Porter in his migration. Swann and Prevenzer (1996, 1998) are exceptions in accepting the geographical restriction (3 in the figure) without accepting the transformation of the empirical entity into a full-blown theoretical construct.

2. Background

The significance of the Sudbury cluster can only be understood against the background of broad changes in the mining industry. Mineral demand continues to increase to grow, driven largely by the growing needs of the developing nations. China is the most significant influence, with a huge population with low but rapidly increasing incomes. Although per-capita metal consumption levels off in the later stages of development, developing countries have rising metal-intensities in consumption. Rapid increases in income in developing countries therefore will have disproportionate impacts on metal demand.

Growth in mining output is constrained by several factors. One is the increasing difficulty of finding large new high-grade reserves in a world which has been explored with increasing intensity and technological sophistication for a century. Another is the increasing resistance to the impact of mining in a world more and more concerned about environmental degradation (Canada's own Mining Watch Canada is one of the three opponents of mining development most feared within mining industry.). A third is the threat of rising energy costs, mining being an extremely energy-intensive process. There is also increasing resistance to mining for social reasons. The World Bank, for example, is currently considering whether to withdraw from supporting mining projects in the developing world because of the apparently detrimental economic, social, and environmental impacts.

Offsetting these trends is the rapid rate of technological change in mining. In Canada, for example, productivity has grown at roughly twice the rate in manufacturing. One consequence is that mining employment nationally has been dropping dramatically. In Sudbury alone, employment in the major mining firms in has fallen from over 27,000 to below 6,000, with no decrease in production,

As labour input decreases, the demand for inputs of technology, skill and capital expands world-wide. The demand for less environmentally damaging processes also increases the demand for new specialized products and management tools. The

transformation is reflected in Sudbury, where the decline in direct mining and smelting employment in since the mid 1970s has been offset in part by growth in the firms that supply the mining sector. Employment in the Mining Supply and Service sector in the city has risen, by some estimates, to more than 8000¹⁰. There are now over 250 MS&S firms located in a city not much larger than a research park.

The empirically observable clustering of supply firms in Sudbury is associated with Ontario's largest mining and smelting operations based on one of the worlds richest mining camps, the Sudbury Basin, where there was in 2002 more exploration activity than in all the rest of Ontario. The research capacity in the region is already significant: There are now thirteen mining- related research institutes or centres and five research chairs related to mining at Laurentian. The rate of formation of mining-related research centres has accelerated greatly since the late 1990s. Almost half of the research funding coming to Laurentian is going directly to Mining-related research. The presence of the University, the City, and the mines justified the provincial government's decision to move the OGS and MNM to Sudbury. The presence of the OGS attracted exploration companies as well as supporting the development of the Earth Sciences program at Laurentian.

Of the major sub-sectors of the mining industry in Ontario,

- 1. Finance,**
- 2. Exploration,**
- 3. Extraction,**
- 4. Smelting,**
- 5. Supply and Services,**
- 6. Education and research and**
- 7. Administration and Policy,**

¹⁰ Our partial survey, with a bias toward smaller firms, provides an estimate of approximately 5,500, which I take to be a plausible lower bound on sector employment. It is worth noting that North Bay, an hours' drive from Sudbury boasts 60 firms that supply the mining industry.

only the Financial sub-sector is not concentrated in Sudbury. Furthermore, for each sub-sector a substantial fraction of the provincial capacity is concentrated in Sudbury.

Figure 2 illustrates the subsectors of the mining industry and very roughly indicates the shares currently located in Sudbury. The major subsectors are shown as vertical bars, with the mining bar divided into extraction and exploration. The Sudbury cluster is shown as a horizontal bar including significant fractions of all but the financial sector.

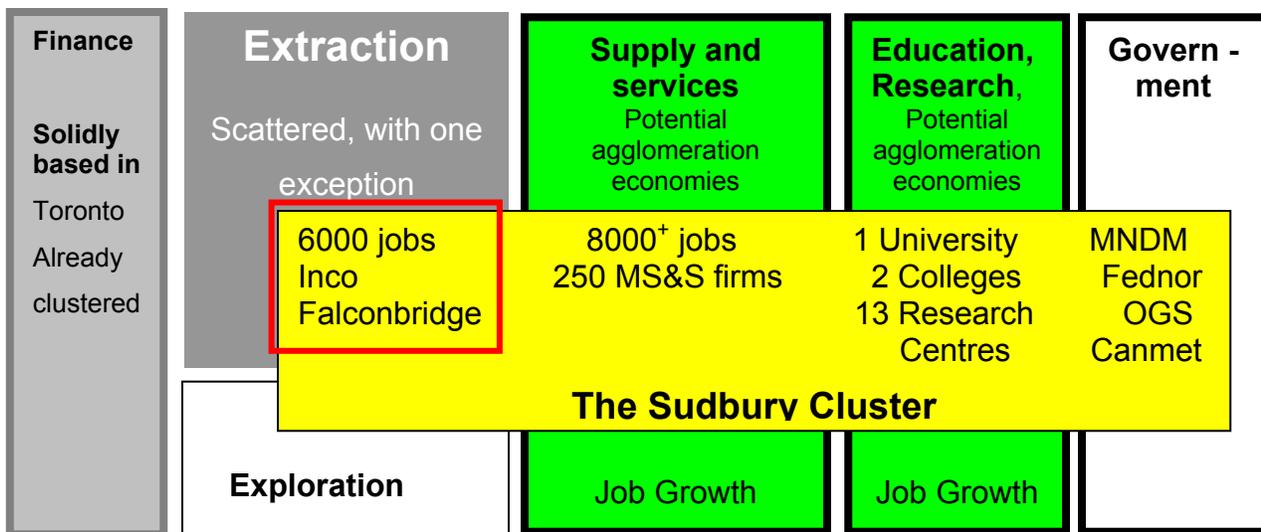


Figure 2: components of the mining cluster in Sudbury

The most significant fact is that the cluster includes the largest concentrations of most of the sub-sectors in the province and in most cases in the country. A 2001 report by Natural Resources Canada based on 1996 data found that 45% of the supply and services firms in Canada were in just three communities: Toronto, Vancouver, and Sudbury. By itself Sudbury matched Vancouver, a city with ten times the population, and had more than half of the number of firms in what was then the entire 416-647 region. Toronto in fact does not have a remarkably large number of firms when the population and the area are considered, and a large fraction of the firms it has are

concentrated in the financial sector. Sudbury, on the other hand, exhibited even in 1996 a level of concentration of supply and service firms unmatched in Canada.

Until very recently no firm-level data was available. We have completed now interviews with sixty-nine firms, one industry organization and five research centres. The results generally confirm our prior estimates of the size of the sector and population of firms involved.

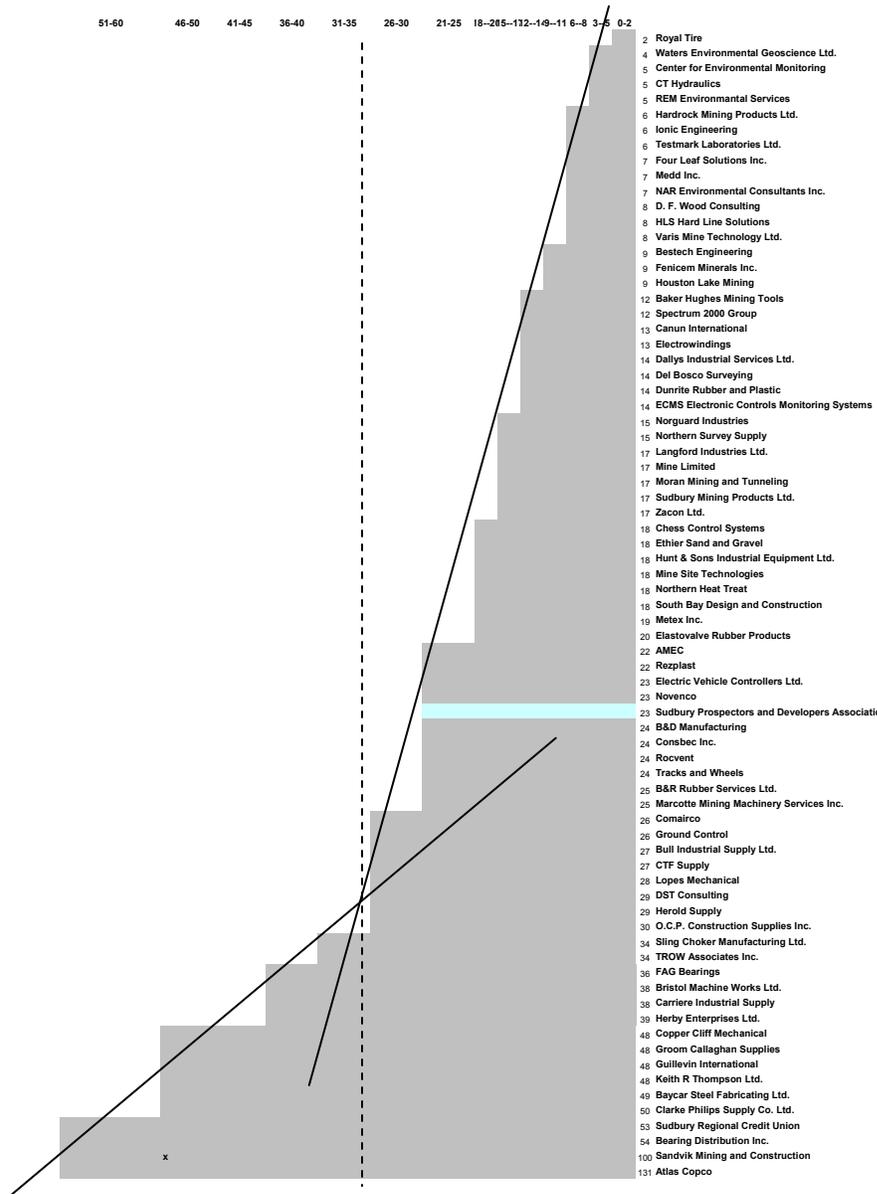


Figure 3: Ages of firms in the Sudbury MS&S sector.

Figure 3 age data from interviews for 75 firms in the MS&S sector¹¹. The figure suggests roughly linear growth with two segments. When the rapid downsizing began in the 1970s, the rate of formation of firms in the city increased. Surprisingly the rate of formation of firms that survive remained constant even as employment in INCo and Falconbridge leveled off in the late 1990's.

Table 1: Sales by type and destination

Average % of Sales	Local <100 km	Province	Canada	U.S.	Europe	Pacific Rim	Rest of the World
Mining Related Sales	38	14	10	4	2	1	4
Sales to other industries	17	8	2	1	0	0	0

Table 1 shows that the companies are very heavily dependent on the anchor firms, but that roughly half of the mining-related output is sold outside of the immediate region and 11% is exported from Canada. Other major customers are in forestry and construction. Exports are proportionally larger for mining related output than for non-mining related output..

Table 2 reveals that the classic aggregation factors are clearly present, at least in the minds of suppliers. Key suppliers and/or customers (primarily customers), infrastructure, a supply of workers with particular skills, specialized training institutions, and specialized research institutions are all seen as contributing to firm growth. It is significant that the specialized private sector agents perceive these factors as contributing to their firms' growth. A key determinant of growth for a cluster is whether businesses related to the cluster are attracted to it. To be attracted they need to know

¹¹ The sample includes between a quarter and a third of the firms in the MS&S sector. It is not entirely random, We believe that both the largest and the youngest firms are under represented.

the features that are relevant, and that in turn is likely to depend on whether local producers recognize the presence of the agglomerating factors.

Table 2: Influences on firm growth

FACTOR	Contributes	Inhibits	No Opinion
Co-location with other firms in the same industry?	25	26	24
Presence of key suppliers and/or customers?	61	10	4
Supply of workers with particular skills?	43	28	4
Government policies or programs?	32	26	17
Physical transport., communication infrastructures?	45	17	13
Availability of financing?	31	22	22
Specialized research institutions and universities?	40	24	11
Specialized training or educational institutions?	39	24	12
Other?	3	22	50

Co-location of others in the same industry is not cited as an advantage. In part this is simply because co-location brings competition, and in part it is because firms report that they gain information about competitors and potential product improvements through contact with customers. A competitor's location does not matter if the network has intermediaries. Our data suggest that firms are networked with other firms, but not directly. The network linkages are through customers, and more recently through associations with research institutions.

Table 3 reveals important features of the local labour market. Labour is mobile between firms in the MS&S sector, suggesting a strong market in this sector. The main source of skilled workers, and especially management, is other firms. Of all 75 firms

interviewed, 120¹² people have left to be hired by the same industry in the Sudbury area. Many firms mentioned hiring and training workers only to have employees leave to go to other firms, especially INCo and Falconbridge. When asked how easily key employees could be replaced from the local region if they were to quit, many stated severe difficulty. This suggests that a lack of skilled workers may be acting as a brake on growth despite the fact that the region is seen as having a pool of specially qualified workers. Labour shortages are a recurrent theme for the firms in the cluster despite the fact that Sudbury has among the highest unemployment rates and the lowest participation rates in Canada.

Table 3: Sources of new employees

	Other Firms	Post Secondary	Spec. Training Pgms	Ex-INCo/Falco
Management	29	13	9	10
Sci, Tech, Engr.	16	22	19	10
Marketing/Sales	20	14	6	7
Production	26	19	19	8
Freelance/Contract	12	9	9	7
Total	103	77	62	32

The growing knowledge intensity of the MS&S sector is suggested by Table 4. More respondents identified knowledge and technical advances as the most important inputs to their companies than any other factors.

Table 4: Important inputs

	Knowledge	Technical Advances	Raw Materials	Services	Data	Resources	Components	Other
Firms	32	23	13	15	7	8	12	10

¹² The figure of 120 is certain to understate the actual number, being based on interviews with a single respondent at each firm.

The majority of 'other' responses specified the employees within the company, reinforcing the importance of the local labour pool

3. The story

Mining employment began a precipitous decline in the mid-1970s. Over the next thirty years the principle employers in Sudbury, essentially a single industry town, cut their labour force by 80%. A series of consultants reports recommended various forms of diversification. None recommended that the community build on its strength in the mining sector¹³.

In the background cluster theory had emerged with its emphasis on specialization instead of diversification and the cluster approach had been made a part of the federal Liberal election strategy. By 2001 Industry Canada was funding attempts by communities to identify potential clusters. North Bay, a mere hour's drive from Sudbury had already completed an energetic cluster development process and declared itself as having a mining supply cluster. The town of Timmins had also completed a strategic plan which identified its mining cluster and mining related firms as the key to growth.

In Sudbury a series of workshops funded in part by industry Canada was launched with the goal of identifying the community's economic clusters. The first public meeting, October 10, 2001, identified four potential clusters: Tourism, Health/Bioscience, Education, and Mining and mining related industries. The order in the list significant. The first three proposed clusters were well represented at the meeting. The near-absence of the mining supply and services sector was seen by some as unfortunate, and a mining cluster was essentially added to the list on behalf of

¹³ See Robinson, *The Dog that Didn't Bark*, for a sympathetic account of the process that left a community unaware of its primary opportunity for economic development.

representatives who were too busy to show up or simply disillusioned with the endless public planning process.

The organizers paid two local economists, Dr. David Robinson and Dr. Claude Vincent \$2000 for a “State of the Economy” report. Their report presented social indicators for the community as a whole and was of no use in identifying promising clusters of firms. This was all the research on the structure of the local economy provided for the public meetings.

It may be that the organizers hoped for a study that would help identify potential clusters but neither party was clear about what would be required. It is striking that the process proceeded without systematic professional analysis. One reason is that there were no economists in the region working on the structure of the economy and no economists associated with the mining industry. The MS&S firms are for the most part small and without any representation, let alone capacity for economic analysis. Even the Ministry of Northern Development and Mines had no qualified economist.

On the other hand it is not likely that hiring consultants to apply best current practice would have been more effective. When on July 25, 2002, the Institute for Competitiveness and Prosperity visited the City to present the advice based on the clusters it had identified using the standard location quotient methodology for Sudbury: education and business services but not mining.

The second and third sessions, on December 4 2001 and March 14, 2002 brought in outside experts Mary Jo Waits of the Morrison Institute of Public Policy, Phoenix Arizona, and Steven Dempsey of the Greater Halifax Partnership, to described how the approach has been successfully applied in Phoenix and Halifax. The first time that the mining sector was proposed as the principle opportunity was at the March meeting. At this point Dr Robinson, acting as a volunteer now, emphasised the presence of mining companies, research capacity and administrative functions but still failed to identify the MS&S component.

It was the City's economic development officer, who pointed out during unrelated meetings that there was a collection of two to three hundred firms in Sudbury and North Bay that supplied the mining and the forestry sector. This was the observation that crystallized the vision of a MS&S cluster for Sudbury.

The only firm-level data available had been compiled with funding from Fednor to assist in the EDO in identifying the needs of local firms. The data had not been provided to economists at the University. The crucial roles of federal support and the on-the-ground knowledge of the EDO are significant. It is also significant that the synthesis was produced by an academic economist who had been drawn into events funded by Industry Canada to identify clusters. Theory directed funding from the centre, but to become effective it had to be taken up and applied at the community level by someone who was equipped to apply the theory and properly directed by someone with extensive direct knowledge of local businesses.

In May 2002 the Institute for Northern Ontario Research and Development (INORD) published on its website an assessment of Sudbury's cluster and the "cluster checklist" described above. The local newspaper published a critique of the work of the Institute for Competitiveness and Prosperity on the day that the head of the Institute presented the results for Sudbury in the city.

The rest of story is essentially political. A series of meetings was organized by regional Development Corporation to identify Sudbury's economic clusters. This was an entirely separate initiative from the sequence of Rountables described above. The first session, on September 10, 2002, using preparatory research by outside consultants Pickard and Laws had identified Education, and Natural Resources as current assets, and Tourism/retail and Health/Biotech as future assets, essentially the same list as had been identified by the earlier process. The vision of the newly "discovered" MS&S cluster was carried into subsequent meetings in November and eventually appeared as the "first engine of growth" adopted by the City government to move the MS&S sector to the head of the line.

The role of the university in the political process was crucial. The idea was promoted in the city sessions, against considerable opposition, by four senior members of the university: ex-Dean of Science and Engineering, Doug Goldsack, Head of Laurentian's Mining Innovations and Research Company, and Dr. Peter Kaiser, Director of Engineering Greg Baiden, and economist D. Robinson. Three of these had been leading the long and successful process of making Laurentian a center for mining-related research. Their participation in developing the city's economic development strategy was the beginning of a new coalition between the City, industry and the University. It also provided the impetus for a new drive for recognition of the university's economic role within the university.

While the city process was getting underway, the Institute for Northern Ontario Research and Development organized a Roundtable Promoting Sudbury's Mining Supply and Services Cluster. This was the first event to focus on the MS&S sector, and served primarily to introduce the concept to public servants in MNDM, the Ontario Heritage Fund Corporation, and the City. By the time the fourth New Economy Workshop was held on October 17, Robinson was presenting the case for focusing on the Mining Supply and Services Sector to the community at large¹⁴.

By early 2003, the MS&S cluster was gaining some recognition in the region, but was largely discounted outside of the region. Empirical evidence for the existence of the MS&S cluster rested on one city employee's interpretation of a federally financed survey. Other communities were claiming to have equivalent clusters, and the main organization representing the MS&S sector for Canada was located in Southern Ontario. In Sudbury the firms that supposedly made up the cluster had no voice and no organization. The only academic economist who had studied the local economy was convinced that there was a cluster "in itself," but it was not the self-aware, self-directed, private sector driven cluster "for itself" that policy makers were looking for.

¹⁴ The speech, which had been presented at the INORD Roundtable on the MS&S sector is available as "The dog that Didn't Bark" on the INORD website.

At this point two well known and highly respected businessmen with distinguished records of community activism took up the project. Sudbury had gone through several planning exercises over the preceding. The most successful had been co-chaired by the owner of one of the local newspapers, Michel Atkins, and by consultant/activist, Dick Destefano. In 2003, Destefano set out to develop an organization of MS&S firms. The organization was registered in December of 2003 as the Sudbury Area Mining Supply and Services Association (SAMSSA), SAMSSA is a purely private-sector organization committed to developing export opportunities for members in the MS&S sector in Sudbury.

Destefano developed SAMSSA based on his conviction that the cluster exists. SAMSSA has in turn helped local firms get contracts abroad that they would not have otherwise. Theory, made concrete by a community leader, led to the expansion of business.

Atkins meanwhile has created a new privately-owned quarterly trade journal, Sudbury Mining Solutions, to promote the MS&S sector. Like Destefano, Atkins organized the journal out of commitment to the community, and on the understanding that there is a cluster and a potential market.

It is significant that both men have staked their own money and time on a theory. Both were aware of the criteria in the checklist described above, and both were consciously gaming the public decision-making process. We have a case of cluster theory, working through an academic drawn into the process by federal funding, bringing into play conscious agents who intentionally create the cluster “in itself”.

The story is obviously not over¹⁵. The presence of SAMSSA and the Mining Solutions Journal have gone a long way toward making policy makers in MNDM and in Industry Canada take the MS&S cluster seriously. The Province of Ontario has set up a

¹⁵ A number of people who have played crucial roles have been left out of the story in order to emphasize the progress on the idea. If any are reading this, please know that you are not forgotten.

Mining Industry Coordinating Committee that now meets in Sudbury. The Federal development agency for Northern Ontario is lobbying to have a National Research Council Center of Excellence for Mining located in Sudbury. The university is considering setting out to become the centre for Canadian research and development in Mining. The nucleus of a cluster coordinating organization has developed.

4. Concluding remarks

This paper describes the early evolution of “cluster consciousness” in the Sudbury MS&S cluster. It is a messy story, in which theory and the process of doing research have affected the objects of the research. Furthermore, the subjects of the research have adopted the theories, partly to influence public agents who are known to be acting on the theories. Theorists within the community have battled theorist from outside of the community over the correct understanding of the local economy

Social theory in the presence of agents who know and use the theories that are under examination is necessarily strange. The fundamental assumption of most social theory – that the subjects are less aware than the researchers and theorists is simply false. The observed are observers and the observers are observed. Members of the community are playing strategically at the level of theorists and policy makers. The remark by John Maynard Keynes in the epigraph to this paper may help remind us that economic realities alone may not determine which clusters blossom.

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