

## Regional Development in Sparsely Populated Areas: The Case of Quebec's Missing Maritime Cluster\*

David Doloreux  
Research Chair in Canadian Francophonie  
School of Management  
University of Ottawa  
136 rue Jean-Jacques Lussier  
Ottawa, ON K1N 6N5

Richard Shearmur  
Canada Research Chair in Territorial Statistics and Public Policy  
INRS-UCS  
385 Sherbrooke East,  
Université du Québec  
Montreal, Québec, H2X 1E3

### Introduction

In the last decade, the idea of knowledge-based clusters has become very popular as a guideline for regional development policies aimed at stimulating regional industrial competitiveness and innovativeness. Policy interest in cluster development has been closely linked with the performance of a few 'successful' regions, those that have built their competitive advantage on particular kinds of localized learning, and which are functionally integrated within a territorially embedded, socio-cultural and socio-economic structure (Asheim and Isaksen 2002; Cooke et al 2000).

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Most cluster studies focus on growth regions (Cooke et al 2004; Doloreux 2004a; Doloreux et al 2004; Harrison et al 2004; Simmie 2001) and so-called knowledge-intensive industries<sup>1</sup> (Britton 2003; Isaksen 2004; Leibovitz 2004). Cluster-based policies often attempt to draw lessons from these successful regions that can be applied to lagging ones. However, it is not necessarily the case that the lessons learned from successful clusters can be applied to peripheral regions. For these, it may be the case that cluster dynamics do not develop because of the lack of relevant regional actors, the absence of sectors that have technological complementarities, and the lack of critical mass and density (Isaksen 2001). Another possibility is that these regions have few prospects for growth and development due to the lack of capacity to build organizations that can stimulate a firm's innovation and technological activity (Tödtling and Kaufmann 1999).

It is important to specify what the objectives of cluster development are. Indeed, within the context of regional development clusters are a means to an end, not an end in themselves. The usual objective of development policies, particularly in sparsely populated regions, is to maintain or promote employment growth<sup>2</sup> (CED 2005; Polèse and Shearmur 2002). This should be borne in mind, because much of the literature on clusters focuses on *how* a cluster develops and on *how* firms and institutions interact in order to maximize their competitiveness. The reason *why* a cluster should be promoted is often only implicit in the analysis. In this paper, we ask whether the promotion of clusters is necessarily beneficial or useful in order to promote employment growth in a policy context. The paper investigates regional development policy in Quebec's coastal region. This policy has deliberately attempted to apply the lessons learned from successful clusters to this large and sparsely populated region. The basic premise of this policy is that the region is specialized in industries linked to the maritime sector.

We are interested, in particular, in the following questions:

- Are certain basic pre-conditions of cluster formation met in Quebec's coastal region? Has regional policy been able to create such pre-conditions?
- What kind of institutional arrangements have policy makers attempted to implement in order to develop the cluster?
- Is there any evidence of a link between the maritime cluster identified by policy makers and employment growth?

A central underlying question concerns the appropriateness of applying a regional policy based on the cluster concept to Quebec's coastal region: does the concept as it is understood in the literature apply to the sectors and regions that have been selected?

1. These are industries with comparatively high R&D intensity and services that are large users of embodied technology and, comparatively, have many workers with higher education (OECD 2001). In short, these industries are high-tech manufacturing and knowledge-intensive services.
2. Employment is the key policy aim since it is through jobs that communities can survive. Clusters may of course generate increases in average local income, but this is a secondary benefit that is a complement to job maintenance and creation.

## Clusters and Regional Development

### What are Clusters?

Contemporary studies on clusters, in the context of urban and regional economic development, commonly focus on densely populated, so-called high-tech regions such as Silicon Valley in California, the Lombardy region in Italy or the Baden-Württemberg region in Germany (Cooke and Morgan 1998; Heidenreich and Krauss 2004; Saxenian 1994). Other studies have focused on clusters in growth regions, including not only capital regions but also major university centres, and knowledge-intensive sectors have often been analyzed (Britton 2003; Harrison et al 2004; Henry and Pinch 2000; Isaksen 2004; Leibovitz 2004; van den Berg et al 2001).

In the Canadian context, there has recently been a wave of interest in studying cluster formation. More specifically, the Innovation Systems Research Network has been set up to analyze and document clusters in different sectors and regions across Canada (Holbrook and Wolfe 2001, 2002; Wolfe 2003; Wolfe and Gertler 2004; Wolfe and Lucas 2004). One of the main objectives of this national study is to identify the presence of significant concentrations of firms in local economies and to understand the process by which these regional-industrial concentrations of economic activity are transitioning to more knowledge-intensive forms of production. Other studies have focused on particular clusters in Canada (Britton 2003; Doloreux 2004b; Harrison et al 2004).

According to Porter, clusters are defined as :

"a geographic concentration of inter-connected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies or common inputs. Finally, many clusters include governmental and other institutions - such as universities, standard-setting agencies, think tanks, vocational training providers, and trade associations - that provide specialized training, education, information, research, and technical support." (Porter 1998: 197).

The increased focus on regional clusters reflects a rediscovery by many academics of the importance of the region as a unit of analysis, and the importance of specific and regional resources in stimulating the innovation capability and competitiveness of firms. Successful clusters typically have strong, competitive business, appropriate research, and education facilities and supportive labor markets, infrastructure and policy environments. Together, it is recognized that these features often lead to greater levels of innovation and productivity growth (Cumbers and



MacKinnon 2004; Wolfe and Gertler 2004). These positive effects of cluster formation have attracted the interest of policy-makers who have seen in cluster dynamics a new policy tool with which to promote regional innovativeness (European Commission 2002). Although the rationale behind the quest for innovation is competitiveness, this is promoted in order to ensure that employment remains (or grows) locally: employment, which is the ultimate policy aim of regional development initiatives, is more rarely alluded to as a rationale for cluster promotion.

Given the policy interest in cluster promotion, two factors seem to be important in their development. First, agglomeration economies are one of the most important facets of cluster development (Malmberg and Maskell 2002). According to the traditional Marshallian conception (Marshall 1890), the advantages of agglomeration are rooted in the reduced costs that arise from the operation of three sets of economies: the growth of various intermediate and subsidiary industries which provide specialized inputs; the development of a pool of skilled labor; and the establishment of dedicated infrastructure and other collected resources (Shearmur and Polèse 2005).

Second, proximity between actors is important because it stimulates various exchanges of information and knowledge. This factor is not unconnected to the first, but has been emphasized in recent research. This research has documented in some detail how the innovative activity of firms is based to a large degree on localized resources such as a specialized labour market and labour force, subcontractor and supplier systems, local learning processes and spillover effects, local traditions of co-operation and entrepreneurial attitude, supporting agencies and organizations, and the presence of customers and users (Asheim et al 2003; Cooke et al 2004).

As stressed by Malmberg and Maskell (2002: 433):

"In such an environment, chances are greater that an individual firm will get in touch with actors that have developed or been early adapters of new technology. The flow of industry-related information and knowledge is generally more abundant, to the advantage of all firms involved."

Therefore, a local culture with specific routines, values, norms and trust can facilitate localized interactions and mutual understanding in the process of transmitting information and exchanging knowledge within the cluster (Lorenzen 2001).

The cluster approach presupposes, at the regional economic policy level, the adoption of a sectoral and collective business support system rather than a geographical and individual one. Successful clusters are built on a number of conditions (Porter 2003): (a) a critical mass of SMES in a predetermined geographical area, (b) a well-defined economic activity, (c) strong co-operative relations among member companies and between those companies and other actors such as universities and research centres, (d) availability of a complex range of services for companies and (e) a shared entrepreneurial culture. Successful clusters typically have strong, competitive businesses, appropriate research and education facilities and supportive labour markets, infrastructure and policy environments.

### Can Clusters Be Promoted by Regional Development Policies?

The perceived success of Silicon Valley, and other 'successful' regions, has stimulated a widespread interest by national and local governments in growing their own clusters. Policies targeting knowledge-based clusters have been apparent at all scales of governance, from supra-national organizations such as the OECD and the European Commission, to national organizations such as, for example, Nutek in Sweden and the National Research Council in Canada, to local authorities in various areas ranging from metropolitan hub cities to more sparsely populated areas. These ideas have penetrated policy thinking to such an extent that cluster-building has emerged as a major component of regional development strategies to improve the performance of urban and regional economies by strengthening the competitiveness of firms.

The question that arises is whether clusters can indeed be promoted. The 'rediscovery' of the region as an important scale for stimulating innovation and the competitiveness of firms (Asheim and Gertler 2004; Cooke et al 2000; Storper 1997) has prompted the argument that the region or locality is often a crucial part of the 'supply architecture' of technological and organization innovation (Cooke et al 2004). This observation is based on the fact that innovation is a social process, involving interactions between firms and other firms and organizations. Spatial proximity facilitates the sharing of knowledge and the capacity for localized learning by firms. It also offers a common regional culture and institutional framework to facilitate this learning (Cooke et al 2004; Doloreux 2004a).

The literature on clusters, however, is not clear on how a regional cluster policy is developed and how it should be implemented (Nauwelaers and Wintjes 2002). Isaksen (2001) argues that cluster policy can be of two types: (1) one that supports the growth of existing or embryonic regional clusters; and (2) another that allows the knowledge of how industrial development occurs in regional clusters to inform policy making in general. Koschatzky (2005) argues that a cluster policy is more appropriate for industries and technologies that are in an early phase of their life cycle in order to structure critical masses and spatially bound the localizing effect of 'tacit knowledge' and spillover demands. Glasmeier and Harrison (1997) claim that cluster policy development is more appropriate in areas where there is already an existing diverse economic base, which can support new markets and diversification. Consequently, cluster policy is often seen as contributing to city growth or high-tech sectors (Aradóttir 2004). Tödtling and Trippel (2004) observe that regional cluster policy cannot be applied in a similar way across many types of regions, and that there is, therefore, no 'best practice' regional cluster policy which could be applied and generalized to any type of region.

The studies reviewed above have tended to concentrate on the definition, identification and internal dynamics of clusters, but not on the policy objectives behind the promotion of clusters, nor on the wider regional consequences of cluster presence. To the extent that clusters are actively promoted, the *implicit* policy aim is usually to stimulate local competitiveness in order to promote local employment growth (CED 2005; Polèse and Shearmur 2002). Surprisingly, the



*explicit* policy aim is often the creation of a cluster (and increasing the innovativeness and competitiveness of local firms), without specifying why this should be beneficial for the region (Fromhold-Eisebith and Eisebith 2005). Thus, cluster creation becomes an end in itself rather than the means to an end.

There are two key policy questions that can be asked in the light of these remarks. First, is the cluster concept applicable in sparsely populated peripheral areas? Such regions are often made up of numerous small communities, a few larger towns, and long distances between settlements (Polèse and Shearmur 2002). However, most of the examples used to justify and illustrate the cluster approach are taken from well connected cities or from densely populated areas: one of the underlying conditions for successful cluster development is the presence of agglomeration economies stemming both from the co-location of networked firms and from economies associated with knowledge spillovers, a shared workforce and common infrastructure. By definition this condition does not apply in peripheral areas. Therefore, not only is it of interest to investigate how clusters are promoted in remote regions, but also to question whether the very idea of a cluster is applicable there.

The second question, more general in nature, is *why* are clusters promoted? If clusters are promoted in a regional context because it is believed that clusters encourage innovation and competitiveness, this is not sufficient to justify the disbursement of public funds. Ultimately, regional policy aims at promoting regional development, which often implies the creation and retention of jobs (Martin and Tyler 2000). Thus, from a regional policy perspective, a cluster policy that does not lead to employment stabilization or growth cannot be deemed successful. Furthermore, if this ultimate policy aim is accepted, then another question must be asked: is cluster promotion necessarily the best way to promote employment growth in all regions? By focusing too exclusively on cluster formation, and not on these ultimate policy objectives, other more promising policy initiatives (particularly in peripheral and sparsely populated areas) may be being ignored.

In the rest of this paper we examine Quebec's maritime cluster policy in the light of these questions.

### Quebec's Coastal Region: Economic and Geographic Characteristics

The area identified in policy documents as Quebec's coastal region is extensive (see Figure 1). It includes three administrative regions, Bas St. Laurent, Gaspésie and Côte-Nord. These regions are so vast that statistics pertaining to their physical size are almost irrelevant since settlement is principally strung along the St. Lawrence estuary and (for the Gaspésie) the Baie des Chaleurs. This represents about 1800 km of coastline along which could be found, in 2001, 414 000 people and 161 000 jobs, half of which are in Bas St. Laurent (Table 1). In common with most peripheral regions in Canada the coastal region has been in stagnation or decline

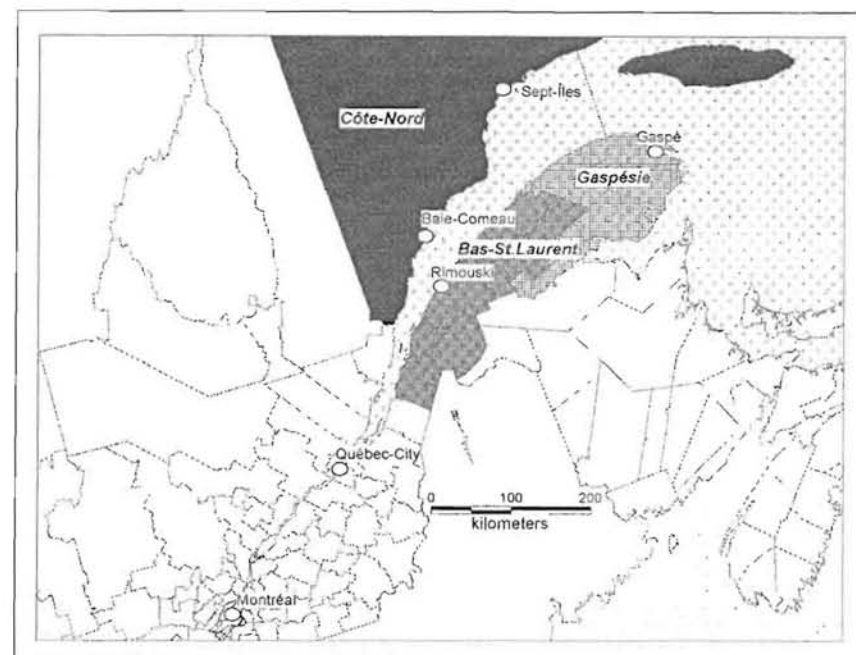


FIGURE 1 Québec's Coastal Regions

TABLE 1 Main Economic Indicators of Québec's Coastal Region, 2004

	Bas St. Laurent	Côte Nord	Gaspésie/ Îles-de-la- Madeleine	Quebec
Area (km <sup>2</sup> )	22 185	351 523	78 172	1 667 441
Population, 2004	202 122	96 497	96 943	7 542 760
Population growth, 1991-2004	-2.5	-6.0	-9.5	4.5
Activity rate (%), 2003	58.5	60.1	54.5	66.0
Unemployment rate (%), 2003	10.1	13.7	17.5	9.1
Employment 2003	88 k	50 k	37 k	3 650 k
Primary (%)	10.9	6.1	8.6	2.7
Industry (%)	17.8	22.9	9.2	22.9
Services (%)	71.3	71.0	78.3	74.4
Total industrial 2001	345	94	131	15,191
High-value-added sectors (%)	1.3	0	1.0	2.4
Medium value-added sectors (%)	33.7	44.4	28.6	41.3
Low value-added sectors (%)	65.0	55.6	70.4	56.3
Average R&D expenditures/habitant (CAN\$) 2001	\$8	\$3	\$1	\$3,897
Firms that are exporters (%) 1995	43.1	78.2	48.7	39.6
Number of patents between 1999-2001 (per 100 000 inhabitant)	2	1	--	2 005

Source: Institut de la statistique du Québec, various years.



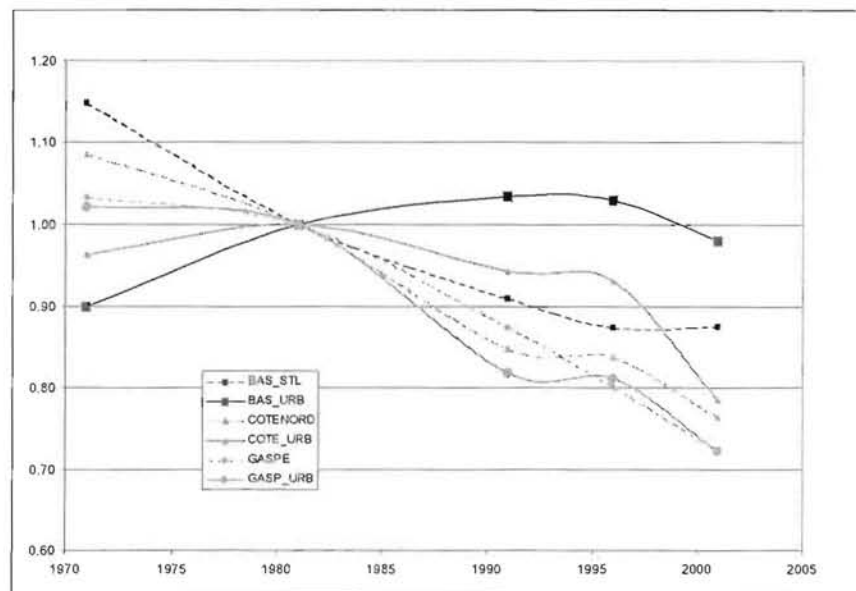


FIGURE 2 Regional Employment Trends Relative to Those of the Province of Québec, 1971-2001 (Index 1981=1.00)

since the early 1980s. Relative to Quebec as a whole, all components<sup>3</sup> of this region have lost employment since the early 1980's except for urban areas in Bas St.Laurent which grew faster than the provincial average until the late 1990s (Figure 2). This is the only zone -- within the wider coastal region -- to have benefited from absolute employment growth since 1990.

Each of the three administrative regions is different. Bas St.Laurent is situated relatively close to Québec city (its western part is within 120km of the province's capital) and is on the Trans-Canadian highway towards Atlantic Canada and Halifax. As such the region benefits from good access to certain services and government departments, and can also take advantage of good transportation links with the rest of Quebec, Canada and even the US. Over half of the entire coastal region's population and jobs are situated in this administrative region. The coastal region's only university is located in Rimouski, Bas St.Laurent's administrative centre, and important education facilities such as the maritime research institute (ISMER) and the maritime technical college are also located there. From the perspective of economic development, Bas St.Laurent is the least remote of Quebec's peripheral regions and should be best able to capture economic activity (Polèse and Shearmur 2002), as witnessed by the concentration of economic

activity there and by its relatively good growth profile (Figure 2).

Gaspésie is a large peninsula: its administrative centre is 600km to the east of Rimouski and about 900km from Quebec City. As well as experiencing strong out migration (Table 1) the region's economy has been losing ground relative to Quebec's at considerable speed (Figure 2). This can partly be explained by the collapse of the fisheries upon which part of its economy rested, but also by productivity increases and resource exhaustion in its other industries (forestry, wood products and mining). The very low density of its population and its position away from main transport routes has meant that the region has found it extremely difficult to diversify.

Côte-Nord, whilst relying principally upon mining, aluminum production and forestry as an economic base, is undergoing similar population and employment trends as Gaspésie. The region has been in decline relative to Quebec since the early eighties and absolute losses in employment have been recorded since the early nineties. Its location away from transport routes and at a considerable distance from markets has also precluded diversification away from traditional resource-based industries.

These Quebec coastal regions have attracted considerable attention from provincial and federal governments: various development policies have been implemented over the years -- and particularly since the early 1970s -- in order to diversify its economy and reverse the trends just described (Polèse and Shearmur 2002). However, except for Bas St.Laurent, these trends seem inexorable and have not been obviously affected by policy measures. Indeed, it is not just lack of local capacity, entrepreneurs, finance or innovation that is holding these regions back. Fundamental changes are occurring in Canada's, and indeed the world's, space economy that place a premium upon access to large cities and to national and international networks (Bourne 2003; Castells 1996). This premium is evident in many ways: for employers, access to a diversity of clients and suppliers, access to transport infrastructure (such as international airports), and access to a diverse labor market are key factors. For employees subjected to an increasingly unstable labor market there is a higher likelihood of finding alternative employment in a large city. These advantages are independent from the cluster dynamics and knowledge spillovers that can make proximity to cities even more attractive in some sectors.

Thus, Quebec's coastal region is subject to wider trends that suggest that any development policy will be hard pressed to succeed. The region's geography and position relative to major markets and transport routes is also unfavorable. However, in this unfavorable context, if a development policy is to be implemented, it appears reasonable to develop one that focuses upon the region's unique feature (at least in the context of Quebec) -- its coastline. In the next section we describe the cluster strategy that has been put in place.

3. We distinguish between the urban (agglomeration of over 10 000 people) and rural (no agglomeration of over 10 000 people) parts of each administrative region in order to identify potential agglomeration effects.



### Emergence of a 'Political' Cluster in Quebec's Coastal Region

The purpose of this section is to discuss the strategies that are intended to promote a maritime 'cluster', and to assess their effectiveness.

During the late 1990s and the first years of the new century, the national government identified technology clusters as engines of technological and economic development. In 2002, the federal government launched its 10-year innovation strategy. In its quest to promote innovation, the Government of Canada aims at developing research and innovation, technological expertise, and at facilitating the access to venture capital financing.

The strategy pursues two objectives: to ensure competitiveness and innovativeness in the Canadian economy.<sup>4</sup> It aims to achieve these objectives by:

"...developing technology clusters where Canada has the potential to develop world-class expertise, and identify and start more clusters. The government will invest in the necessary infrastructure, research and multi-stakeholder partnerships to realize Canada's potential to be globally competitive in such areas as biopharmaceuticals, photonics, nano-technology, network security, high-speed computing, medical diagnostic, functional genomics, nutraceuticals, fuel cell technology, proteomics, and ocean and marine technologies." (Government of Canada 2001: 76-77)

Of particular relevance in a regional policy context, the Canadian innovation strategy aims to strengthen the innovation performance of communities by:

"...providing findings to smaller communities to enable them to develop innovation strategies tailored to their unique circumstance. Communities would be expected to engage local leaders from the academic, private and public sectors in formulating their innovation strategies. They would need an existing innovation base to act as an anchor. Additional resources, drawing on existing and new programs, could be provided to implement successful community innovation strategies, i.e. to support entrepreneurial networks, local sources of financing, skills development, infrastructure." (Government of Canada, 2001: 77)

As part of the Federal government's priorities, the sector of ocean and marine technologies was identified as one of the key technological clusters that will make a significant contribution to innovation. This cluster is targeted as a key priority for the development of Quebec's eastern areas.

In parallel to the Federal innovation strategy, in 2002 the ministry Fishing and Oceans launched an 'oceans strategy'. This is intended to guide the co-ordination

4. The reason for promoting competitiveness and innovation (presumably to ensure the continuation of employment and of a high standard of living for Canadians) is not made explicit.

and management of ocean activities. Three policy objectives have been identified: understanding and protecting the maritime environment; supporting sustainable economic opportunities; and promoting international leadership. It is the second objective that relates to ocean and marine technologies. The initiatives supported by the second objective have four key features:

- To support measures to improve the governance and management of maritime industries;
- To encourage new and emerging opportunities for ocean industries and oceans-related coastal development;
- To promote co-operation and co-ordination to support and promote business development in the oceans sector;
- To share experience, promote compliance and build capacity.

The economic sectors targeted for this development are: fishing, maritime transport, aquaculture, exploration and oil and gas exploitation, leisure and commercial fishing and ecotourism. One of the primary mechanisms for implementing this new strategy has been the recent creation of the 'Marine and Ocean Industry Technology Roadmap', a plan that defines the economic and technological development strategy to be pursued. The main objective of the Technology Roadmap is to identify future technology markets and emerging technology opportunities and scope out the most effective methods of entering them.

Policies along similar lines are being discussed not only at the federal level, but also within Canadian regions. The provincial government launched the report *Summit on Innovation in Bas-Saint-Laurent* (2002) in order to stress the development of maritime and ocean technologies and to pinpoint the maritime sector as one of the sectors that can be seen as an engine for regional and technological development in Quebec.

At the same time, the *Ministère de Développement Économique, Innovation et Exportation et Régional et de la Recherche* (MDEIE – a provincial ministry) introduced a strategy to promote maritime science and technologies. It can be regarded as a response to the policy framework set up by the federal government. The publication *Plein Cap sur la Mer* stresses the priorities of the national strategy on innovation and oceans. On this basis, the MDEIE proposed that the maritime cluster extend to three regions along the St Lawrence Estuary, namely Bas St-Laurent, Côte-Nord and Gaspésie/Îles-de-la Madeleine. This decision was based on the fact that this is where the maritime sector is most active, owing in large part to the strategic position of these regions along the St Lawrence estuary and a high concentration of research activities related to the fishery, oceanography, aquaculture as well as maritime and intermodal transportation. The primary objective is to create a regional innovation strategy in Quebec's coastal region (as constituted by these three regions) and subsequently support the development of a maritime cluster. For this, the strategy recognized the obvious success of various organizations, including a federal government institute, a college, and two university institutions that have developed a range of research activities related to maritime and ocean technologies.



The recommendation of the national and provincial policy documents - to promote a maritime cluster in Quebec's coastal regions - was subsequently incorporated into the regional innovation strategy. Thus, the recommendation has been given a political impulse at the regional level: maritime and ocean technologies are to be the engine for the development of Quebec coastal region's technological capacity. The explicit policy aim is the development of technological capacity, with no specific reference to why this should be of importance to the region. As we have already noted when discussing cluster policies more generally, the underlying objectives of the policy are not spelled out. However, the principal economic problem faced by Quebec's coastal region is employment decline: thus, although this needs to be inferred,<sup>5</sup> it is clear that job creation is a major objective of this cluster policy. Specific details of the policy implemented in Quebec's coastal region will be discussed in the next section.

### Quebec's Coastal Maritime Cluster Policy

#### Knowledge Support Institutions

The knowledge-support institutions in Quebec's coastal region are a crucial aspect of the maritime cluster policy. Within the region, there is a fairly large number of specialized technology transfer institutions and intermediaries aiming to support innovation in SMEs and to help the local diffusion of technologies. Despite a comparatively low level of innovativeness and technology, the Bas St-Laurent region has a number of research institutions specialized in maritime and ocean technologies. It can reasonably be argued that the region, its institutions and many of its SMEs have some of the basic cluster ingredients, and the potential to generate an environment for innovation.

Two main types of institution active in the field of science and maritime technologies within the cluster can be distinguished: (1) governing agencies; and (2) knowledge-support organizations. Table 2 provides an overview of these organizations.

At the heart of these organizations is the Technopole maritime du Québec (TMQ) agency. Created in 1999 as a regional strategic initiative and financed by Canada Economic Development (the federal regional development agency for Quebec), TMQ is working to create a stimulating environment for the development of maritime science and technology, and to ensure that the coastal regions become key players at national and international levels. Very briefly, the objectives of TMQ are: first, to support initiative and encourage firms to become more innovative in maritime products and services; secondly, to gather maritime sector stake-

5. Employment creation is an explicit part of Canada Economic Development's mandate (CED 2005), and this is the agency which is promoting the cluster at the federal level. This inference is therefore not unreasonable: however, by not explicitly making the link between cluster formation and employment creation there is a danger that cluster formation itself becomes a policy objective.

TABLE 2 Knowledge-Support Institutions in the Maritime Cluster

	Bas St-Laurent	Côte Nord	Gaspésie/ Îles-de-la-Madeleine
Education and training	- Université du Québec at Rimouski - Institut Maritime du Québec	--	--
Research institutes	- Institut des sciences de la mer - Institut-Maurice Lamontagne	--	--
Public technology transfer networks and R&D facilities	- Innovation Maritime - Centre interdisciplinaire de développement en cartographies des océans	--	- Centre spécialisé des pêches - Centre collégial de transfert des technologies des pêches - Centre aquacole des pêches - Station technologique maricole - Centre technologique des produits aquatiques
Private non-lucrative research centres	- Centre de recherche sur les biotechnologies marines	- Centre de recherche Les Buissons	- Centre aquicole marin

holders and promote inter-firm collaboration and international collaboration; thirdly, to promote expertise, directed towards incubation and support for technology-based firms, including support for the creation of new firms, and support in the later stages, such as advice on management. Employment creation is not specified as an objective: however, the mandate of Canada Economic Development is

"to promote the economic development of the regions of Quebec, paying special attention to those experiencing slow economic growth and inadequate employment, with a view to the enhancement of prosperity and employment in the long term" (CED 2005: 2).

Thus, even if the local agency that underpins much of the maritime cluster policy does not explicitly mention employment creation as an objective, the wider regional policy context into which it fits is very clearly one of employment creation. Innovation, technology and cluster creation are seen as a means to an end by Canada Economic Development.

Local knowledge-support organizations make up the core of the learning and innovation process in the maritime cluster. They play an essential role in facilitating the local ability to acquire and transfer knowledge. Among such organizations are educational institutions, research institutions, public technology transfer networks and R&D facilities, as well as private research centres.

In terms of education organizations, one university institution (Université du Québec à Rimouski) and one college (Maritime Institute of Quebec -- in Rimouski) have grown to become major actors in the maritime cluster. These organizations have developed a range of educational and research programs related to maritime and marine activities. Programs at master and doctoral levels are offered



in maritime resource management and oceanography, while the maritime institute offers technical education programs in navigation, transport logistics, among other subjects. A range of R&D services has been developed covering all stages of applied and experimental research related to marine technologies. Two major research centers also contribute to the maritime cluster: the *Institut des sciences de la mer* (ISMER) located on the campus of the Université du Québec à Rimouski, and the Maurice-Lamontagne Institute (MLI – near Rimouski) which is part of the Fisheries and Oceans Canada network. It is one of the most important maritime research centers in the world operating in French. Together, these education and research institutes account for more than two-thirds of all R&D expenditures in the coastal region and involve more than 500 scientists in the field of marine and science technologies.

Among knowledge-support organizations, we also include public technology transfer networks and R&D facilities. The following ones stand out more particularly: *Innovation maritime* (Rimouski/ Bas St-Laurent), *Centre aquacole marin de Grande-Rivière* (Gaspésie), *Centre collégial de transfert des technologies des pêches* (Gaspésie), *Centre technologique des produits aquatiques* (Gaspésie), *Station technologique maricole* (îles de la Madeleine) and the Interdisciplinary Centre for the Development of Ocean Mapping (CIDCO - Rimouski). They are non-profit organizations that aim to support the industry and the community in general, with training, R&D and business support in ocean science and technology. More specifically, these organizations provide general information and technological support. They also play a role in the process of knowledge transfer between technology suppliers and firms. They are expected to focus on business needs with regard to specific technological problems, but most of them are physically located either in the university or the college. These organizations are all funded by the national and provincial governments.

Finally, there are three private research centres which play an important role in the maritime cluster: first, the *Centre de recherche sur les biotechnologies marines* (CRBM - Rimouski) which was started in September 2002, and is technological incubator. Second, the *Centre de recherche Les Buissons* (Côte-Nord) started up in 1993 and employing 20 people. The Centre plays a role in carrying out R&D activities in forest and marine resources, investigating aspects such as agronomic inputs. Third, the *Centre aquicole de Grande-Rivière* is a research centre specialized in aquaculture. This centre aims to develop and improve the basic techniques for fish breeding, shellfish, amongst other things, in the open sea as well as in basin conditions.

This review of the knowledge-support institutions in Quebec's coastal region leads to two observations. The first has to do with the activities covered by these institutions. Although most of their activities are related to the production of technology, it is striking to observe that there is no strategy for them to participate in the development of new technology based firms in the region nor to encourage their staff to spin-off their own firms. The second observation relates to the uneven distribution of knowledge-support institutions in the Quebec coastal region. While the maritime cluster extends over three large administrative regions, the major education and research institutes are concentrated in the Bas St-Laurent region,

TABLE 3 Overview of Maritime Firms in Québec's Coastal Region

	Bas St-Laurent	Côte Nord	Gaspésie/ Îles-de-la- Madeleine	Maritime cluster
No. of companies	33	10	53	96
No. of employees	3602	729	3232	7563
Average employees size	115	65	552	74
Companies with < 10 employees	15	2	27	44
Mean year company opened	1989	1988	1986	1987
Firms generating revenues outside Quebec	25	6	28	59

principally around Rimouski. Only a small number of minor research and technology transfer institutions, mainly specialized in aquaculture are scattered in Gaspésie/Îles-de-la-Madeleine regions, while there is only one research center in Côte-Nord.

### Current Status of the Maritime Industry in Quebec's Coastal Region

The maritime industry in Quebec's coastal region has developed through a great variety of different types of activities. The industry comprises several sectors, such as those related to maritime technology, shipbuilding, fishery and marine products and marine biotechnology. The core of this industry is formed by companies producing products such as ships and maritime transport services, as well as fish and seafood products. There are several companies in areas related to the maritime sector but that are usually included in different industrial categories. Based on the identification of 14 maritime related NAICS codes, a total of 96 companies were classified into six main categories.

Table 3 provides basic numbers for the maritime industry. It comprises the 109 firms, together with supporting institutions and infrastructure (described above). The maritime industry encompasses about 7,563 workers representing approximately 4.9 % of the coastal region's labour force.

If this group of firms constitutes a cluster, it is tiny by world standards: it contains fewer than one-tenth the number of firms found in major Nordic clusters with maritime specialization (Vittanen et al 2003), but is comparable to other 'clusters' found in the Canadian economy, such as the ICT cluster in New Brunswick (Davis and Shaefer 2003) and the optics/photonics cluster in Quebec city (Kérouack et al 2004). However, Quebec's coastal region with 5.4 % of Quebec's population and around 56.0 % of Quebec maritime workers, comprises a large share of Quebec's maritime activity.

As can be seen in Table 4, the largest employers are by far seafood product preparation and packaging and marine science and technology. Concentration of these activities is most marked in the Gaspésie/Îles-de-la-Madeleine and Bas St-Laurent. Bas St-Laurent is most heavily specialized in marine science and technology, compared to Côte Nord and Gaspésie/Îles-de-la-Madeleine which



TABLE 4 Distribution of Firms and Employment by Industrial Branch and Region

	Sectors in the maritime cluster			
	Bas St-Laurent	Gaspésie- Îles-de-la- Madeleine	Côte-Nord	Québec maritime
Enterprises				
Aquaculture	0	5	0	5
Seafood product preparation and packaging	6	30	8	44
Ship and boat building	3	5	0	8
Machinery, equipment and supplies	7	7	1	15
Marine science and technology	13	2	1	16
Marine products	4	4	0	8
Total	33	53	10	96
Employments				
Aquaculture	0	57	0	57
Seafood product preparation and packaging	259	2380	684	3323
Ship and boat building	515	488	0	1003
Machinery, equipment and supplies	883	266	25	1174
Marine science and technology	1922	17	20	1956
Marine products	23	24	0	47
Total	3602	3232	729	7563

specialize in seafood product preparation and packaging. This is not surprising considering that the Bas St-Laurent specialization in maritime services is due to the presence of research institutions, such as ISMER and MLI, as well as different technology transfer organizations. The other two regions, on the other hand, have direct access to natural resources and, therefore, a distinctive advantage in exploiting them. Shipbuilding and maritime machinery and instruments are also 'key' sectors in the maritime industry and are mainly concentrated in Bas St-Laurent and Gaspésie/Îles-de-la-Madeleine, but the latter is mainly driven by large companies. Finally, aquaculture industries account for only 4 % of firms in the maritime industry.

There is clearly a group of firms and institutions in Quebec's coastal region that can loosely be defined as a maritime cluster. How loose, though, is this cluster? From a geographic perspective it is hard to justify the term when applied to 8000 jobs strung along 1800km of coastline. If the 'cluster's' evolution since 1980 (relative to its evolution in the whole of Quebec) is examined, there is no evidence of agglomeration economies: these would be evidenced if the sectors involved<sup>6</sup> had grown faster in the coastal region than in the rest of Quebec (Figure 3), and this is not the case. This is an important point, since it shows that there is

6. The sectors analyzed in Figure 2 are a selection that acts as an indicator of maritime employment (see annex 1). They do not strictly replicate the selection of firms or branches in Tables 2 and 3, but there is considerable overlap.

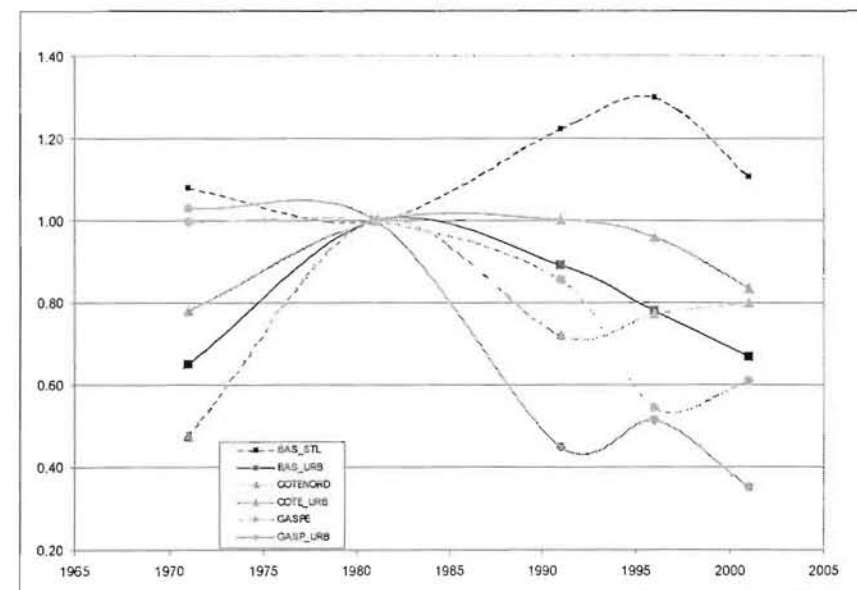


FIGURE 3 Evolution of Employment in the Maritime Cluster in Each Region Relative to its Evolution in the Province of Québec, 1971-2001 (Index 1981=1.00)

little or no spontaneous dynamism of the sector in the area studied: on the contrary, maritime sectors have tended to grow faster in the rest of Quebec than in the coastal region. In such a context, the cluster policy must overcome two considerable hurdles. The first hurdle is to put in place institutions and support mechanisms to enhance activity in the cluster if and when it emerges in the region: many such institutions are already in place, as we have seen. The second hurdle is to overcome the attraction of alternative locations for companies and organizations in this industry: this policy aim is considerably more difficult, bearing in mind the wider spatial dynamics evident in the Quebec and Canadian economies.

Some justification for a policy focused on maritime sectors can be found if these sectors' evolution is compared to that of total employment in each administrative region (Figure 4). Relative to total employment growth in each administrative region, (except for urban areas in Bas St-Laurent and Gaspésie) sectors in the maritime cluster have tended to grow faster. They have thus tended to outperform the rest of the local economy, especially in the late 1990s. However, in the context of general decline illustrated in figure 1, this good performance relative to the local economy must be interpreted with caution. Indeed, although this recent good performance provides an explanation for the selection of these sectors as the focus for regional cluster policy, the question as to whether a cluster policy is appropriate in the first place is not answered. The problems of geographic dispersion and of the better performance of the sector elsewhere in the province remain unresolved.

A final question to address is whether jobs in the 'cluster', even if they are not



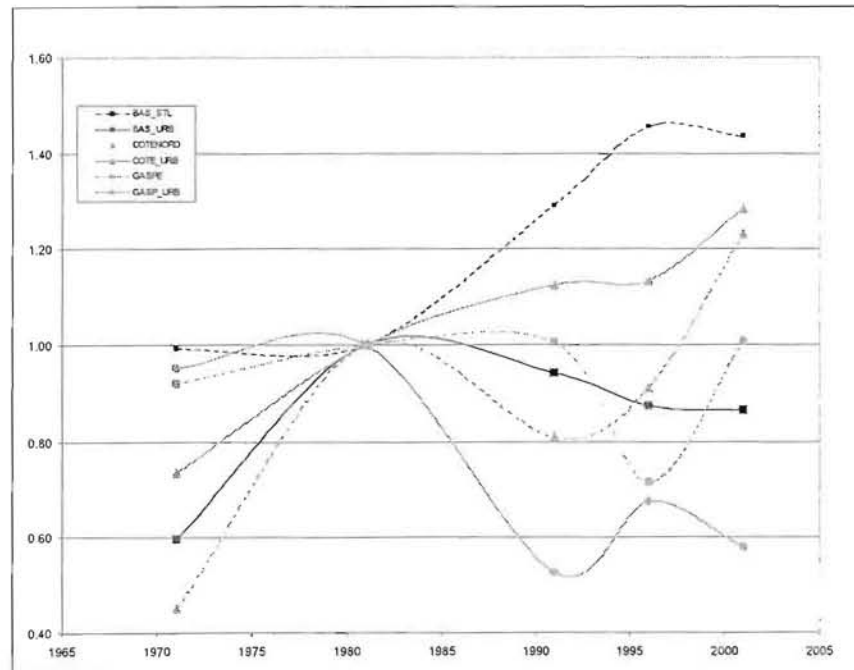


FIGURE 4 Evolution of Employment in the Maritime Cluster Relative to the Evolution of Total Employment in Each Region /1971-2001 (Index 1981=1.00)

numerous, are of high 'quality'. Indeed, it is possible that the 'cluster' includes high proportions of research intensive occupations, or that the proportion of research intensive occupations has grown rapidly as the 'cluster' has developed over the years. Table 5 shows that, in 2001, 17.5 % of jobs in the industry were in scientific and engineering occupations in the Bas St.Laurent, 12.5 % in the Côte-Nord and 5.2 % in the Gaspésie. Except in the Côte-Nord (where, in any case, our indicator of industry employment is not very reliable – see Appendix 1), this percentage has progressed between 1971 and 2001. However, the percentage of scientific and engineering occupations within these sectors has progressed at a similar rate in Québec as a whole, and even Bas.St.Laurent has proportionally fewer such jobs than the rest of Québec. This shows that, within the maritime 'cluster' as defined by policy-makers, employment tends to be less research intensive than in similar sectors outside the 'cluster'. This can be explained by the fact that many of the establishments included in the policy-cluster are in the fish and maritime products sector (Table 4), and very few are in the maritime technology sector. Notwithstanding the relatively low percentages of research intensive jobs, the slow proportional progression of such jobs over the thirty year periods demonstrates the difficulty with which technologically oriented activities can develop in peripheral regions (Isaksen 2001; Polèse and Shearmur 2004).

TABLE 5 Percentage of Scientists and Engineers\* in Cluster, 1971-2001

	1971	1981	1991	2001
Bas-St.Laurent	11.0%	13.4%	16.9%	17.5%
Côte-Nord	15.3%	8.1%	14.7%	12.5%
Gaspésie/Îles-de-la-Madeleine	1.0%	1.7%	3.9%	5.2%
Québec	19.2%	21.6%	26.8%	26.2%

Note: \* = see Appendix 1 for definitions

### Public Strategies in Quebec's Coastal Region: The Regional Strategic Initiative

The question of whether or not a cluster policy is appropriate for Quebec's coastal region does not appear to have been central to the decision making process. As we have shown, the maritime cluster policy is part of a wider process that seeks to harness the concepts of clusters and regional innovation systems to further regional economic development. Notwithstanding the presence of certain institutions and firms that may loosely be called a maritime cluster, the analysis of the previous section suggests that one can not reasonably speak of maritime cluster covering Quebec's coastal region unless one redefines what is meant by 'cluster'. This has not prevented the implementation of specific regional policies to support this 'cluster', one of the principal ones being the federal Regional Strategic Initiative (RSI).

The RSI was launched in the late 1990s by the Federal government in response to the national priority to increase innovation in different sectors and regions across Canada. The RSI is, to some extent, similar to certain experiences outside Canada in terms of regional innovation policies, in particular those formulated by the EU such as *Regional Innovation Strategies* or *Regional Innovation and Technology Transfer Strategies*. The main objectives of this program are to increase a region's technological capability, and to foster the use of the most appropriate technologies and their adoption by SMEs. Another objective is to contribute to the renewal, enhancement and establishment of projects or initiatives that have a significant impact on the development, competitiveness and outreach of economic sectors and communities, through the emergence or reinforcement of innovative environments.

With a view to enhancing economic development and employment growth, *Canada Economic Development* (CED) has put in place initiatives aimed at contributing to the development and upgrading of regional knowledge bases. One of the most important results of the RIS was the creation in 1999 of the *Maritime Innovation Agency* (TMQ), to which CED has given significant financial support. TMQ received a total of \$1 million from the CED for the production of a business plan and to establish the organization itself and a further \$2.5 million in financial assistance, including \$2 million under the RSI program to develop and acquire an integrated maritime information infrastructure.

In addition, CED, through the RSI, has funded the implementation of several other organizations aimed at enhancing the regional technological base in the



maritime sector. These organizations are the *Centre Interdisciplinaire de cartographie des océans* (CIDCO), *Centre de recherche sur les biotechnologies marines* (CRBM), and *Biotechnologies Océanova*. The financial support given to these organizations aims to boost maritime related technology and R&D activities in the region. Moreover, CED funds the implementation of several projects, centred on R&D and feasibility studies for the creation and monitoring of organizations and their development in the maritime cluster. They also refer to training services and knowledge-diffusion activities. The main recipient organizations are the *Institut Maritime du Québec* and *Technopole Maritime Innovation*.

It is important to remark here that the main contributions through the RSI program are for the enhancement of the maritime sector's knowledge-based infrastructure. Of the \$18 million available in the RSI program, more than \$11.6 million were directed to enhancing the technological infrastructure related to the maritime sector: it is assumed that this will ultimately further CED's mandate of promoting employment growth. A review of specific interventions shows that this fund has mainly enhanced the knowledge-based infrastructure of the Bas St-Laurent, while the two other administrative regions, Côte-Nord and Gaspésie have not been directly impacted by the RSI program. As to the impact and repercussions on firm development, it is still too early to say.

It should be noted that, in parallel to the RSI, the provincial government has recently (in 2005) launched the ACCORD program.<sup>7</sup> This program has similar objectives to the federal one, its principal aim being to build, in each region of Quebec, a regional productive system, by identifying and developing niches of excellence that will acknowledge regional specific industrial expertise. In the coastal region, this program also focuses on promoting a maritime cluster.

## Conclusion

In this article we have attempted to explore the rationale behind applying a cluster policy to Quebec's coastal region in the context of regional development. To do so we have described the policy context at the federal, provincial and local levels, and have also examined the geography and performance (in terms of employment) of the cluster.

Our analysis leads us to conclude it is far from clear that a cluster policy is appropriate for furthering the development of Quebec's coastal region. Quebec's maritime cluster policy has been implemented under a wider policy brief that seeks to encourage innovation and local synergy amongst firms everywhere in Canada. However, although employment creation is an important aim of regional development policy, it is often not explicitly referred to in the context of innovation and cluster development. There is thus a disconnect between the important policy lessons that can be learned from the analysis of clusters (which teach us about

7. *Action concertée de coopération régionale de développement*, or concerted action for regional development cooperation

knowledge use, synergy, and interaction between firms and institutions), and the aims of regional development policy (which are economic development – and specifically employment creation). The danger of elaborating a development policy in such a way is that the policy in question may turn out to be a solution in search of a problem: in this case, we seem to have a well thought out cluster strategy in search of a missing cluster.

One of the major problems in applying cluster strategies to peripheral and sparsely populated regions is that the literature on clusters and on innovation networks has emanated principally from cities or from densely populated areas. Even in these areas it is sometimes problematic to bridge the gap between underlying concepts and the reality of economic development. In remote and peripheral areas this is all the more difficult because many of the basic preconditions for a cluster to function are absent. These preconditions – many of which are to do with geographic and demographic factors that are not amenable to policy intervention – cannot always be generated endogenously: sometimes it may be useful to recognize that a region is in decline or does not encompass all the elements to develop into a dynamic cluster, and that an appropriate strategy is to manage the decline in such a way that local communities and populations can adjust. This does not exclude the possibility that new niches may be emerging within an overall context of decline: but it does suggest a more nuanced policy approach than the application of off-the-shelf ideas about innovation and clusters to regions where the concepts are of rather remote relevance to the fundamental development challenges that are being faced. If less attention were paid to implementing cluster policies, and more attention were paid to the ultimate policy aim of employment creation, then it is possible that more imaginative and appropriate policy options would be considered. The mistake of policy makers has sometimes been to apply a solution (in this case, the creation of clusters) without considering the problem to which it is applied.

Two main conclusions can be drawn from the study. The first one relates to the concept of cluster and the extent to which it can be promoted in scarcely populated regions. From a theoretical standpoint there is no reason to believe that a cluster strategy that relies, by definition, upon a degree of proximity between actors and upon many of the concepts associated with agglomeration economies can function in a region such as Quebec's coastal region that covers an area greater than England but with only 1% of the population. Even if Britton (2003) and others are increasingly demonstrating that clusters are not necessarily bounded by physical proximity, it remains true that 'unbounded' clusters rely on ease of access and face-to-face contact between actors. Sparsely populated regions are not equipped to offer the frequency, volume and hence economy of interaction between different locations to enable an unbounded cluster to function. Therefore, unless a cluster policy is developed in such a way that it focuses upon an agglomeration within a sparsely populated region it is difficult to see how it can work.

The second conclusion relates to the policy dimension of a cluster. Is it pertinent – or appropriate – to promote clusters as a tool which can be generalized across different sectors and entire regions? Despite attempts made by policy makers to be inclusive in their definition of Quebec's maritime cluster, the actual



location of many of the cluster's most dynamic elements suggests that the reservations expressed in this article are in fact already being taken into account. In practice, many of the institutions and establishments that underpin the cluster are located in Rimouski and, more generally, in the Bas St-Laurent. Of the three administrative regions concerned, this is the best located relative to markets, relative to a large city, and relative to transport routes. It is also the region that has displayed the fastest employment growth over the long term and the region with the highest proportion of scientists and engineers. Even if the idea of a cluster covering Quebec's entire coastal region is not theoretically justifiable nor, in our opinion, practical, a more modest cluster located in and around the university town of Rimouski seems feasible. Notwithstanding the stated policy aims, the *de facto* spatial distribution of cluster initiatives suggests that this is already happening. Thus, despite our critical appraisal of the cluster policy and of the surrounding rhetoric, the actual implementation of the policy in and around Rimouski makes sense. The problem lies in the fact that many resources are also being expended in other locations where the policy is not justifiable (but where there is political pressure for authorities to do something to help the local economy).

This poses a dilemma for policy makers. Concentrating resources may make sense from a theoretical viewpoint, but the political dimension of the policy cannot be neglected. One of the underlying purposes of the cluster policy in its regional development context is to demonstrate to communities throughout Quebec's coastal area that, despite the overwhelming structural changes that are depressing the regions' economies, the government is implementing a state of the art development strategy. To admit that, if it works, it will only have an effect upon one or two of the vast region's principal cities could be considered counter-productive. This may explain the considerable distance between the policy rhetoric (to implement an all-inclusive cluster strategy for Quebec's coastal region) and the observed reality (the strengthening of a small cluster in and around Rimouski).

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## Appendix

### Sectors Used in Figures 1, 2 and 3

Fishing (NAICS 114)  
 Sea products (NAICS 3117)  
 Ship building (NAICS 3366)  
 Professional and scientific equipment (NAICS 3345, 3346, 3391)  
 Maritime transport (NAICS 482)  
 Support services for maritime transport (NAICS 4883)  
 Architects and engineers (NAICS 5413, 5414, 5417)  
 Colleges and universities (NAICS 6113 to 6116)

In 2001, the employment totals for this group of sectors in Quebec's coastal region are :

Bas St.Laurent :	3710 jobs
Gaspésie :	5020 jobs
Côte-Nord :	2405 jobs

These sectors are not a perfect match for those in tables 3 and 4. However, they are an *indicator* of jobs in the marine cluster, and should be viewed and interpreted as such. The overestimation of such jobs in Côte-Nord is due to the fact that many jobs in the professional and scientific equipment and engineering categories are linked to the mining and aluminium industries: in many respects it can be argued



that there is no such thing as a maritime sector on the Côte-Nord. In Gaspésie and Bas St.Laurent, most of these jobs are connected with the maritime cluster.

### **Definition of Scientific and Engineering Employment**

Scientific and technical jobs have been defined according to the 1971 and 1991 Standard Occupational Classification (SOC) of Statistics Canada. It should be noted that the 1971, 1981 and 1991 definitions are different from the 2001 definitions. Every effort has been made to ensure comparability, but definitions were fundamentally overhauled in 1991.

For 1971, 1981 and 1991: classes G21 and G23, 1971 SOC.

For 2001 : classes C, E0, E211, E212, E213, 1991 SOC.