

**REGIONAL INNOVATION SYSTEM  
Saguenay-Lac-Saint-Jean Region**

**CASE STUDY**

**CANADA ECONOMIC DEVELOPMENT**

**June 7, 2004**

**TABLE OF CONTENTS**

**SUMMARY** ..... iii

**1. CONTEXT AND PROBLEMS** ..... 1

**2. SAGUENAY–LAC-SAINT-JEAN REGIONAL INNOVATION SYSTEM** ..... 3

**3. ANALYSIS AND ELEMENTS FOR STRATEGIC REFLECTION** ..... 9

**4. CONCLUSION**.....12

## **SUMMARY**

### ***Context and mandate***

As part of its yearly process of analysis and feedback aimed at profiling its intervention with respect to support for development of regional innovation systems in peripheral regions where economic activity is dependent on traditional sectors, Canada Economic Development for Quebec Regions (CED) commissioned a study on the Saguenay–Lac-Saint-Jean (SLSJ) resource region's regional innovation system.

This case study was conducted on the basis of documentary material provided by the Agency and seven semi-structured interviews carried out in May 2004 with representatives of the Agency's Alma business office (CED SLSJ), economic development agencies, research centres and enterprises from the region.

Far from being a formal, normative evaluation of the Agency's intervention, this case study aims instead to present the main elements of SLSJ's regional innovation system, in conjunction with the intervention by CED SLSJ aimed at supporting its development over the past 10 years.

### ***Problems***

SLSJ is Quebec's third largest region as well as the province's most populated resource region (3.8% of the Quebec population) and its most heavily industrial region (425 manufacturing firms and more than 18,500 workers in the aluminum, forestry and agrifood sectors).

Nonetheless, at the start of the 21st Century, in view of the lasting market forces which are tending to displace low value-added manufacturing activities to emerging countries, SLSJ is facing substantial economic problems, such as:

- ✓ accelerated population decline since 1991;
- ✓ unfavourable structural deviation in the regional unemployment rate of 3% compared with Quebec and 4.5% compared with Canada as a whole;
- ✓ regional economy based on harvesting of natural resources and primary processing activities in the aluminum, wood, and pulp and paper sectors;
- ✓ relative weakness of the regional economy with respect to diversification, secondary and tertiary processing activities, exports by SMEs and their level of technology.

However, the region enjoys a strong manufacturing and industrial tradition on which it can build to enhance its priority sectoral clusters, namely, aluminum, forestry and agrifood. To do so, SLSJ some 20 years ago initiated a process whereby the region gradually equipped itself with research and technology transfer centres as well as business service agencies that were catalysts for innovation. These elements today form the regional innovation system, which is built around a central core made up of the research and training activities of the University of Quebec at Chicoutimi.

### ***Elements for strategic reflection***

CED SLSJ's regional intervention strategy has covered several aspects of innovation over the past few years:

**REGIONAL INNOVATION SYSTEM**  
**Saguenay–Lac-Saint-Jean resource region**

---

- ✓ support for innovators' projects targeting integration of new technology;
- ✓ contribution to and support for the region to take charge of its own development;
- ✓ generation of spinoffs from the region's competitive advantages and main sectoral clusters.

Under these objectives, CED SLSJ, whose offices are located in Alma, at the region's geographical core, invested in more than 450 projects through the IDEA-SME and Regional Strategic Initiative (RSI) programs between April 1, 1995 and March 31, 2004:

- ✓ IDEA-SME: \$33 million for \$110 million in investment = 6,070 jobs created and/or preserved.
- ✓ RSI: \$63.2 million for \$218 million in investment = 1,570 jobs created and/or preserved.

The range of this intervention enabled CED SLSJ to act and invest at every stage in the continuum of innovation, from strategic planning to allocation of financial assistance to enterprises for projects to commercialize new technology or targeting the utilization and integration of new technologies/processes arising out of innovation activities.

All the stakeholders questioned consider, moreover, that CED SLSJ's intervention with respect to the regional innovation system has generally proved to be a powerful lever, both strategically and financially. Some of them even described it as indispensable.

Thus, CED SLSJ:

- ✓ in basing its intervention over the past 10 years on regional priorities stemming from a continual process of strategic planning:
  - ▶ by actively involving itself in strategic planning and/or co-ordination activities at the sectoral and regional levels;
  - ▶ by readjusting its focus in response to successful experiences, feedback from regional economic agents and lessons learnt;
- ✓ in building on regional research niches and competitive advantages; and
- ✓ in investing regularly, substantially and lastingly where market forces are not effective or the market is reluctant to invest (market absence, medium- and long-term horizon and/or excessively high risk) and in partnership/joint action with the other public players to support structuring investment in:
  - ▶ research infrastructure (producers of technical and scientific knowledge);
  - ▶ transfer, linkage and dialogue means/activities (catalyst effect via the social aspect of dissemination of technical and scientific knowledge); and
  - ▶ enterprises for projects targeting commercialization or integration of new technology or processes;

has met the highest standards of intervention generally recognized in the literature with respect to focus and execution of public policy/measures in support of development of innovation in a regional context. In this regard, the different components of CED SLSJ's intervention are consistent with exemplary practices in the field.

## **1. CONTEXT AND PROBLEMS**

The November 17, 2004 mandate of the Economic Development Agency for the Regions of Quebec (CED) is to promote the economic development of the regions of Quebec through intervention aimed at fostering the realization of and increase in their economic development potential proper, with a view to the enhancement of prosperity and employment in the long term.

This action is especially meaningful in the context of resource regions such as Saguenay–Lac-Saint-Jean (SLSJ) where the industrial structure is often dependent on traditional sectors linked to the proximity of abundant natural resources, which consequently are generally little inclined toward innovation.

SLSJ has a surface area of 104,000 km<sup>2</sup> (Quebec's third largest region after Nord-du-Québec and Côte-Nord) and is the province's most populated and most industrial resource region with its population of close to 282,000 (3.8% of the population of Quebec) and its 425 manufacturing firms employing more than 18,500 workers (15% of the region's labour force).

The region's economy is based on the harvesting of agricultural, forest and hydraulic resources, and has primarily developed around primary processing activities with respect to wood (6,000 jobs), paper (3,000 jobs) and aluminum (6,500 jobs) largely performed by such major corporations as Abitibi-Consolidated, Bowater Canadian Forest Products and Alcan, the region's largest employer.

Nonetheless, at the start of the 21st Century, in view of the lasting market forces which are tending to displace low value-added primary manufacturing activities to developing nations, SLSJ is facing substantial problems of a social, economic, technological and sectoral nature which are both cumulative and interrelated, such as:

- ▶ Marked demographic decline that has persisted since 1991, caused primarily by the exodus of young people. Thus, whereas SLSJ accounted for 4.1% of the population of Quebec in 1971, the region represented only 3.8% in 2002, for a 7% decrease in its relative demographic weight.
- ▶ Unfavourable structural deviation of some 3% in the regional unemployment rate compared with Quebec and close to 4.5% compared with Canada as a whole (eg., in 2002 the jobless rate stood at 12% in SLSJ, 8.6% in Quebec and 7.6% in Canada as a whole).
- ▶ Low level of diversification of the economy, which is dependent on and dominated by the presence of major corporations involved in primary processing of metals, wood, and pulp and paper, on which 15% of the region's manufacturing jobs depend. Moreover, the high salaries paid by these enterprises hamper the emergence of local entrepreneurship and SMEs, which cannot offer their employees the same conditions.
- ▶ Low level of product processing: while they are emerging in the wood (boards and beams) and aluminum sectors (equipment, transportation, high-end bicycles, sports articles), high value-added secondary (semi-finished products) and tertiary (finished products) processing activities remain inadequate to create jobs and represent a more marked attraction factor to draw young people to the region.
- ▶ SMEs' low level of technology: enterprises are often limited to the regional supply chain for their markets, and this indirectly lowers their propensity to increase their R&D activities, use leading-edge technology, innovate more than marginally, and capitalize on resources and networks located outside the region.

- ▶ Consequently, 85% of manufacturing jobs in the traditional sectors come from enterprises whose level of technology is rather low.
- ✓ Low level of exports by SMEs: the proportion of exporting enterprises is much lower than in Quebec as a whole, at 22.2% compared with 33.5%. With 86% of the region's SMEs having fewer than 50 employees, the great majority of the export volume comes from large corporations.
- ✓ More specifically, in terms of the region's priority sectors of activity, the main issues are:<sup>1</sup>

#### **Aluminum sector**

- ▶ Owing to the presence of multinational Alcan, which operates four plants there, the region boasts the world's largest complex of aluminum smelters, alone generating 43% of Quebec output and close to 4% of world output of first fusion aluminum.
- ▶ Nonetheless, these statistics hide an important issue and a powerful paradox:
  - The issue is that the intensity of global competition and the industry's modernization efforts have been leading to a gradual decline in employment in this sector for the past 20 years or so. For instance, more than 500 direct jobs vanished in early 2004 with the replacement of the Söderberg vats at Alcan's Arvida facility.
  - The paradox stems from the fact that (1) there is a flagrant disproportion between the scale of first fusion activity and that of higher value-added secondary and tertiary processing activities, and (2) despite the million tonnes of first fusion aluminum produced in the region, Quebec's aluminum manufacturers generally have to import their raw material to carry out their secondary and tertiary processing activities, which limits these activities' potential for growth. Consequently, aluminum processing activities currently account for barely more than 10% of all jobs in the sector in SLSJ.
  - The region has to complement and perfect the industry's supply chain and enhance the aluminum cluster by establishing, among other things, aluminum moulding and extrusion activities in the region.

#### **Forestry, wood, and pulp and paper sector**

- ▶ SLSJ is Quebec's largest forest region. It ranks first in Quebec with 21.5% of forest potential and 23.1% of processed wood.
- ▶ On the other hand, it is home to only 8.3% of Quebec firms (120 out of 1,460) involved in primary processing, representing a mere 12.5% of jobs (6,000 out of 48,000). On the primary and secondary processing front, the region has only 10.5% of the number of plants (161 out of 1,540) and 8.6% of jobs (2,000 out of 23,500) in Quebec.
- ▶ Alongside the aluminum sector, the region provides large industry with a resource on which it performs little processing. Whence the challenge of taking action with respect to

---

<sup>1</sup> Having very little to do with issues of development of innovation, the tourism industry, SLSJ's fourth largest economic activity, is excluded from this analysis.

processing by more closely targeting higher value-added segments to benefit from greater spinoffs in terms of the creation of new enterprises and new jobs.

### **Agrifood sector**

- ▶ As Quebec's leading blueberry producer, SLSJ accounts for 4% of the province's agricultural revenues and 3.6% of jobs in the agrifood sector. Over the past 15 years, the number of farms has plummeted by 31% in the region, whereas it fell by 23% in Quebec as a whole. Moreover, while cash receipts rose by 89% in Quebec, in SLSJ they were up a mere 68%.
- ▶ As to the processing of agrifood products, the region accounts for only 2% of the total value of shipments and employment in Quebec with its 120 establishments and 1,420 jobs. For \$1 in agricultural products, the region posts a ratio of \$1.60 of shipments, whereas across Quebec the figure is double, at \$3.20.
- ▶ Like the aluminum and forestry sectors, the region therefore intends to develop processing activities so as to give greater value to its products in niches not covered by the competition that are strategic and structuring for the development of regional agriculture.

## **2. SLSJ'S REGIONAL INNOVATION SYSTEM**

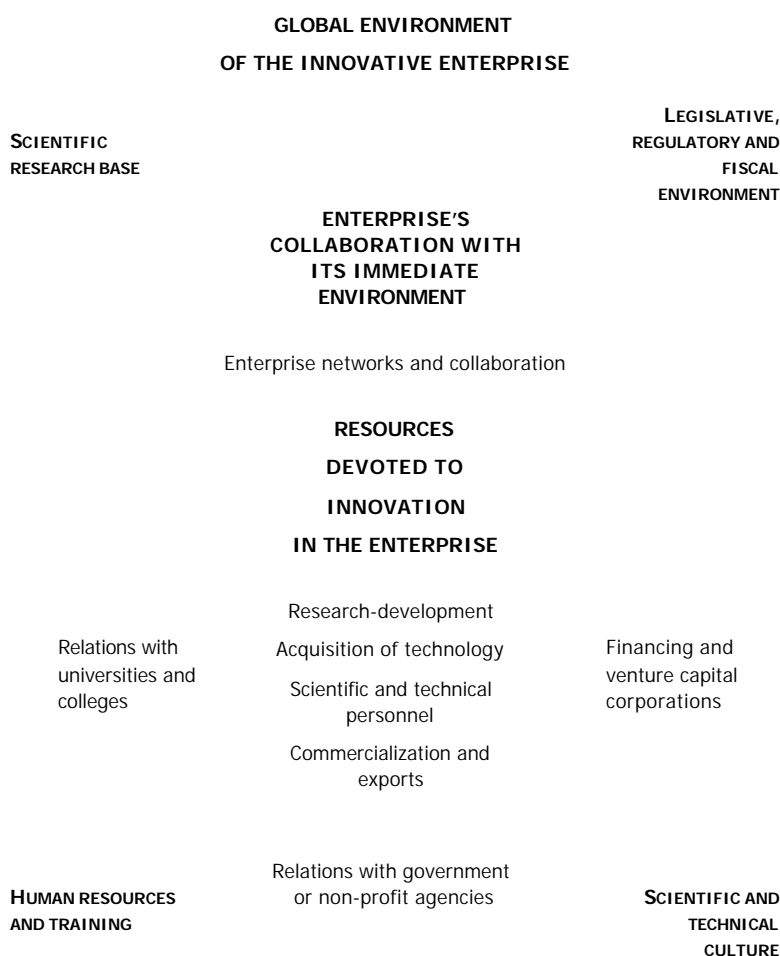
These economic, technological and sectoral issues eloquently illustrate the characteristics specific to the milieu in which CED's SLSJ business office in Alma conducts its intervention in partnership with local stakeholders in order to contribute to enterprise development and to enhancing economic conditions in SLSJ.

Highly conscious of these challenges, and wishing to capitalize on its industrial and manufacturing tradition, the region negotiated a significant transition in 1984 with a view to initiating the process of diversifying its economy and enhancing its priority sectoral clusters by placing innovation front and centre in its strategy.

As early as 1985, the region drew up a first assessment of regional scientific and technological activities and as early as 1995, the regional consultation and development council, *Conseil régional de concertation et de développement* (CRCDD), drew up a profile of research and of innovative manufacturing firms.

For this region, as for the others, this transition from an economy based on the harnessing of natural resources to a high value-added processing economy that is open to the world requires the development and long-term deployment of a regional economic development strategy building, among other things, on the presence of an active regional innovation system that yields results.

### The three levels of the regional innovation system



This model, developed by the Organisation for Economic Co-operation and Development (OECD) in the *Oslo Manual* (1992) and adapted by Quebec's science and technology council, *Conseil de la science et de la technologie du Québec*,<sup>2</sup> illustrates the regional innovation system concept schematically.

The core of the model concerns the enterprise and the resources it devotes to innovation in terms of R&D, acquisition and integration of technology and scientific and technical resources.

The ring around the core concerns co-operation activities and the interaction that innovative enterprises have with producers of scientific and technical knowledge, such as teaching and training institutions, public research centres, specialized intermediary organizations, financing and venture

---

<sup>2</sup>Conseil de la science et de la technologie du Québec, *Rapport de conjoncture 1998 : Pour une politique québécoise en innovation (Situation report 1998: For a Quebec innovation policy)*, December 1997, 73 p.

capital corporations, or even competing enterprises or (large or small) suppliers gravitating in their immediate environment. It is from these continual ad-hoc, dynamic interactions among all these players that innovation emerges in all its guises (from marginal process innovation to technological breakthrough). The outer ring covers the global environment in which the different innovation players operate.

SLSJ's regional innovation system, through the leadership and vision of regional stakeholders fuelled by an ongoing process of regional strategic planning, was gradually built up over the past 20 years around the research and training activities of the University of Quebec at Chicoutimi (UQAC). The regional innovation system today comprises several research organizations and research, technology transfer and business support infrastructure with which the latter can interact and collaborate to support and fuel their innovation activities.

These organizations and this infrastructure either specialize in regional sectoral clusters (aluminum, forestry, agrifood, etc.) or offer transverse competencies that cover all sectors of activity. Along the lines of the OECD model presented above, the regional innovation system is built around the following components:

- ✓ R&D infrastructure;
- ✓ business service organizations;
- ✓ teaching and training institutions;
- ✓ financing/risk capital corporations.

### **R&D infrastructure and centres**

#### University of Quebec at Chicoutimi (UQAC)

Founded as part of the University of Quebec network in 1970, UQAC is the regional engine of university research, ensuring that it covers the essential university expertise that can contribute to the development of the community it serves. As such, regional development is a transverse component in each of its five niches of excellence, two of which especially concern the aluminum and forestry priority clusters.

In terms of the production and industrial technology of aluminum, UQAC over time has developed close links with several universities and major industrial players in the field, such as General Motors and Alcan. The research focusses primarily on light metals, solidification and metallurgy of grey metal. UQAC currently has two industrial research chairs in the aluminum sector (see box) and houses several research centres and groups, including:

- ▶ University research centre on aluminum (*Centre universitaire de recherche sur l'aluminium*, or CURAL);

**General Motors-NSERC-UQAC Industrial Research Chair on Advanced Light Metals Technology for Automotive Applications:**

- ▶ The research program objectives include fundamental research on foundry process technologies; analysis of cast aluminum automotive parts; development of magnesium alloys for automotive applications; technology transfer and training of highly skilled personnel in the aluminum, magnesium and automotive industry fields.

**Chair on Aluminum Solidification and Metallurgy:**

- ▶ Its objective is enhanced performance of continuous and semi-continuous aluminum casting processes and the quality of the resulting products.

**REGIONAL INNOVATION SYSTEM**  
**Saguenay–Lac-Saint-Jean resource region**

---

- ▶ Solid-liquid separation research group (*Groupe de recherche en séparation solide-liquide*);
- ▶ Process and systems engineering research group (*Groupe de recherche en ingénierie des procédés et systèmes*);
- ▶ Competitive and real-time systems research group (*Groupe de recherche en systèmes concurrents et en temps réels*).

On the forestry front, the research conducted by UQAC concerns several fields, including forest dynamics, wood processing, bio-active natural products, aquatic ecosystems and environmental consulting. The research is carried out by the following bodies, among others:

- ▶ Research consortium on the boreal forest (*Consortium de recherche sur la forêt boréale*);
- ▶ Research group on heat processing of wood (*Groupe de recherche sur la thermotransformation du bois*);
- ▶ Research group on renewable resources in the boreal forest (*Groupe de recherche sur les ressources renouvelables en milieu boréal*).

Quebec aluminum research and development centre (*Centre québécois de recherche et de développement de l'aluminium, or CQRDA*)

Arising from a University of Quebec at Chicoutimi initiative and established in SLSJ in 1991 by the Quebec government, which in 1993 granted it liaison and transfer centre status, the CQRDA has the mandate to contribute to increasing economic spinoffs by actively supporting linkages among educational institutions and SMEs, and among firms associated with aluminum production and processing through its liaison, watch and R&D activities in order to achieve effective transfer of knowledge, knowhow and new technology.

In close interaction with Quebec and other Canadian universities involved in research on metallurgy and aluminum, the CQRDA has the objective of associating the potential of researchers from educational institutions and research centres with industrial development, fostering synergy among SMEs, encouraging the existing dynamics between aluminum producers and processors, stimulating the emergence of new uses for aluminum and supporting training within the aluminum industry, particularly in SMEs.

Since its creation, the CQRDA has taken on 480 research projects, contributed to taking to the commercialization stage 56 innovations stemming from those projects and collaborated in the startup of 11 enterprises operating in the aluminum field based on the completion of R&D projects. The value of projects completed totals more than \$73 million today.

Aluminum Technology Centre (ATC)

In operation since 2002 following an investment of close to \$60 million, of which \$25 million came from CED, the ATC is a research centre affiliated with the Industrial Materials Institute (IMI) of the National Research Council of Canada (NRC). Arising from the recommendations of the Canadian Aluminum Industry Technology Roadmap, drawn up in 1999 and funded by CED SLSJ, the ATC brings Canadian industry the expertise and technical support required to develop high value-added aluminum-based products and services.

**REGIONAL INNOVATION SYSTEM**  
***Saguenay–Lac-Saint-Jean resource region***

---

Currently comprising some 20 researchers (70-80 when it reaches maturity), this international-calibre centre performs R&D activities unique in Canada and the world in the fields of advanced manufacturing technologies for aluminum-based materials and simulation and instrumentation of processes aimed at processing aluminum into finished or semi-finished products.

Alcan's Arvida Research and Development Centre

Alcan's largest research centre worldwide performs research and development mandates in conjunction with the corporation's internal units, their clients and public institutions. The Centre employs 215 people, including close to 100 researchers and technicians.

Normandin Research Farm

Affiliated with Agriculture Canada's Soils and Crops Research and Development Centre located in the Quebec City region, the Normandin Research Farm has laboratories and 145 hectares of cultivated land used to investigate new ways of managing forage and cereal crops adapted to the region's weather and environmental conditions. Research is also done to evaluate the potential of regionally less well-known crops, such as canola and dry pea.

In addition, three college-level technology transfer centres conduct applied research and development, technical assistance and business information activities. They co-operate in the implementation of new technology and the establishment of innovation projects.

Agricultural research and development centre (*Centre de recherche et de développement en agriculture*, or CRDA) (Cégep d'Alma)

The CRDA's mandate is to contribute to development of the agriculture and agrifood sectors of tomorrow through technological innovation, testing and experimentation, the introduction, enhancement and processing of products and by-products, and the completion of technical assistance, innovation and technology transfer projects.

Automated production centre (*Centre de production automatisée*, or CPA) (Cégep de Jonquière)

The CPA's mandate is to help industry by transferring knowledge to it with respect to automated production in the pulp and paper, aluminum, agrifood, automotive and other sectors.

Quebec geomatics centre (*Centre de géomatique du Québec*) (Cégep de Chicoutimi)

The *Centre de géomatique du Québec's* mandate is to promote the use of geomatics in organizations as a management and planning tool and to support these organizations in their geomatization process through the development of organizational strategies, and research, adjustment, training, facilitation and technological watch activities. The Centre performs evaluation and technological experimentation work to provide its partners with neutral, independent information on the different existing technologies.

**Business service organizations**

SLSJ High Technology Centre (HTC)

The HTC's mandate is to foster innovation in SMEs through the creation of a network of innovative entrepreneurs, the introduction of services and coaching in advanced management and R&D, and the organization of linkage and awareness events aimed at increasing innovation. The HTC

previously operated on the incubation front, and this new mandate stems from the observations of the study on innovation in SLSJ manufacturing firms published in 2002.<sup>3</sup>

To this end, the HTC relies on a multidisciplinary team and a network of partners that it has built up over the years, such as research centres, college-level technology transfer centres, educational institutions and other similar organizations in Quebec. Moreover, it is twinned with, and enjoys the advantage of proximity to, the CPA, with which it shares accommodation on the Cégep de Jonquière campus.

Through its services, including technical assistance in the development/enhancement of products/processes, organization of innovation-related events, access to leading-edge technology and technology transfer, the HTC enables SMEs to update themselves rapidly, increase the use of advanced technology and carry out their innovation projects.

Over the years, the HTC has intervened vis-à-vis some 200 enterprises.

#### Entrepreneurship and spinoff centre (*Centre d'entrepreneuriat et d'essaimage (CEE-UQAC)*)

The CEE-UQAC's mission is to promote entrepreneurship and creation of enterprises vis-à-vis the entire UQAC university community. It also handles promotion of and support for entrepreneurial activities in SLSJ. Among the services offered are project evaluation, development of business ideas, personalized guidance for drawing up a business plan, management consulting with respect to enterprise startups, support for R&D activities and implementation of the technological internship program. These internships enable enterprises to benefit from the expertise of specialized graduates while allowing students to gain experience and enhance their competencies.

#### Metallurgy training and development centre (*Centre de formation et de développement en métallurgie, or CFDM*)

The CFDM is a non-profit organization whose mandate is to develop skilled manpower for the metallurgy industry and contribute to the development of enterprises oriented toward the processing of metals, particularly light metals. To date, the CFDM has collaborated in 50 or so projects, some of which have reached the commercialization stage. The CFDM makes available to industry an economical service whereby prototyping projects can be carried out effectively.

#### Réseau Trans-Al

Initiated in 1996 through the desire of certain local entrepreneurs to provide the SLSJ region with an organized network of aluminum processors in order to enhance enterprises' linkage and performance, this grouping of 100 or so aluminum firms and partners was incorporated in October 1999 with financial support from CED SLSJ, which further entrusted it in 1999 with co-ordination of the process of developing and implementing the Canadian Aluminum Industry Technology Roadmap.

#### SERDEX International

SERDEX's mandate is to assist SLSJ entrepreneurs in their development on the international front in order to foster the expansion of regional enterprises. Its activities consist in 1) raising regional entrepreneurs' awareness and initiating them into the opportunities afforded by export markets;

---

<sup>3</sup>Réjean Landry, Nabil Amara, Laval University, *Étude sur l'innovation dans les entreprises manufacturières du SLSJ* (Study on innovation in SLSJ manufacturing enterprises), March 2002, 157 p.

2) offering a program in export competency development; and 3) making available to entrepreneurs a network of contacts and professional expertise in Quebec, Canada and abroad.

Aluminum Valley Society (*Société de la Vallée de l'aluminium*)

To complement the tax incentives available for R&D and manufacturing production activities in Aluminum Valley, this society promotes it nationally and internationally vis-à-vis prospectors with a view to creating enterprises in or attracting enterprises to SLSJ to contribute to the growth of an industrial cluster in the aluminum sector.

**Educational and training institutions**

In addition to UQAC's university programs at the Bachelor's, Master's and doctoral levels, five college-level institutions and four school boards offer a full range of vocational and technical training programs to feed enterprises and organizations in the sectoral clusters.

**Financing/venture capital corporations**

Several corporations operate in the region, including the *Fonds régional de solidarité*, *Fonds régional d'investissement Desjardins*, *Innovatech Régions ressources* and Pluri-Capital, a private corporation based in SLSJ whose mission is the development and startup of corporate projects, along or in conjunction with industrial or strategic partners. Since its establishment in 1986, Pluri-Capital has invested in close to 100 corporate projects (90% of them at the startup stage), generated more than 2,500 new jobs and managed more than \$80 million in net assets distributed within manufacturing firms and new technologies.

This description of some key elements of SLSJ's regional innovation system is far from exhaustive, focussing primarily on those specifically concerning the aluminum, forestry and agrifood sectors. SLSJ also boasts several R&D activities with promising potential among enterprises and research groups in the mining, biomaterials and genomics sectors.

**Some conclusions on SLSJ's regional innovation system**

Following two decades of efforts from regional stakeholders, it has to be observed that the SLSJ region today enjoys a young, promising innovation support infrastructure on which entrepreneurs, enterprises and economic stakeholders can now build to develop high value-added regional sectoral clusters.

Nonetheless, the degree of progress and development of the sectoral components of the regional innovation strategy is most uneven. In fact, while the priority component of aluminum is well developed and integrated, the forestry component is much less developed and has just initiated a major process of strategic reflection, the first stage of which is completion of a study aimed at articulating a comprehensive development strategy (CED SLSJ has a seat on the steering committee and is funding part of this study). For agrifood, everything is still embryonic, but sector players are mobilizing through the *Table agroalimentaire* agrifood forum and the *Société des fabricants régionaux*, a grouping of regional manufacturers and producers working to enhance regional output (CED SLSJ recently opened the regional innovation strategy to the agrifood sector).

### **3. ANALYSIS AND ELEMENTS FOR STRATEGIC REFLECTION**

A regional innovation system, in order to generate enterprises and jobs offering high added value based on knowledge and integration of advanced technology, has to be built around the following three pillars: 1) producers of innovative technical knowledge, technologies and processes—R&D and technology transfer infrastructure and centres; 2) those asking for and using this technical knowledge and these technologies and processes—enterprises; and 3) catalysts and matchmakers: intermediary business service organizations whose mandate is awareness, training, spinoffs, linkages, and dissemination of knowledge in support of enterprises' innovation process.

Producers of technical knowledge and user-requesters represent the two driving poles of the innovation process between and around which, both upstream and downstream, public policy stakeholders such as CED SLSJ and catalyst organizations act. Their intervention is aimed at encouraging collaboration and dialogue between producers and requesters with a view to fostering the emergence of an organic regional innovation system that generates innovation in enterprises.

The success or failure of public intervention aimed at supporting innovation and in particular the emergence of a regional innovation system depend on several factors. Thus, the literature generally recognizes that to be effective, public intervention measures have to be based on a regional strategic planning approach, to take place in space left vacant by the market upstream and downstream of innovation and act in a balanced, sustained manner on the infrastructure and social components of innovation so that they reinforce each other. This offers a relevant framework for CED SLSJ's intervention in this area over the next 10 years.

According to the intervention guidelines advocated by the Agency, and in conjunction with SLSJ's specific characteristics, CED SLSJ's regional intervention strategy has several objectives with respect to innovation, including:

- ✓ Contribute to enabling the region and its economic agents to take charge of development by carrying out economic facilitation, research, and strategy and expertise development activities leading to business opportunities.
- ✓ Reinforce the region's economic structure by supporting enterprises' innovation and diversification projects aimed at integration of new technology and development of export markets.
- ✓ Enhance the region's competitive advantages by developing its main industrial clusters through increased processing of aluminum, wood and agrifood products and pre-competitive research applicable to industry

Under these objectives, CED SLSJ, whose offices are located in Alma, at the region's geographical core, invested in more than 450 projects through the IDEA-SME and Regional Strategic Initiative (RSI) programs between April 1, 1995 and March 31, 2004:

- ✓ IDEA-SME: \$33 million for \$110 million in investment = 6,070 jobs created and/or preserved.
- ✓ RSI: \$63.2 million for \$218 million in investment = 1,570 jobs created and/or preserved.

This intervention enabled the Agency to act and invest at every stage in the continuum of innovation, from strategic planning to the assignment of financial assistance to enterprises for projects to commercialize or integrate new technology or processes stemming from innovation activities.

**REGIONAL INNOVATION SYSTEM**  
**Saguenay–Lac-Saint-Jean resource region**

---

Among the range of growth-generating projects illustrating the extent of its intervention upstream and downstream of enterprises' innovation for which CED SLSJ was involved strategically and/or financially with regional partners over the past few years were:

- ✓ Creation of the Canadian Aluminum Industry Technology Roadmap to identify strategic needs in R&D in Canada's aluminum sector and support establishment of the ATC.
- ✓ Exceptional \$25-million funding for establishment of the ATC, in addition to the \$32 million in funding from the NRC.
- ✓ Structuring of *Réseau Trans-Al* in order to extend its linkage and inter-firm exchange activities in support of innovation across the province.
- ✓ CEE-UQAC, to cultivate the entrepreneurial base in the region and support technological internships in enterprises to support the emergence of innovation.
- ✓ Completion of the *Study on innovation in SLSJ manufacturing enterprises* conducted in 2001-2002 which led to several observations with respect to innovation in SLSJ manufacturing firms as well as several recommendations on priority action to be taken to improve the situation.
- ✓ The High Technology Centre (HTC), whose mandate was adjusted in response to the recommendations of the study on innovation in enterprises and aims to carry out awareness and training activities in support of innovation as well as to provide professional assistance for enterprises with respect to technology transfer.
- ✓ Drafting of the *Study on demand and supply in the information and communications technology field in SLSJ* carried out in 2002-2003 in order to profile the situation and identify growth opportunities.
- ✓ Development of a seminar by the HTC concerning all the issues associated with technology transfer, as a development tool for the establishment and expansion of SMEs.
- ✓ Organization of a forum in June 2002 through the HTC on Canada's Innovation Strategy, aimed at opening up the horizons on issues concerning the use of leading-edge technology and broadening entrepreneurs' network of contacts.
- ✓ Drawing up of a *Profile of research in SLSJ* (in progress): This study will identify the regional scientific and technological supply, integrate the listing of subjects of research (current and planned) carried out in the region, classify them in terms of whether they come under an emerging niche, a growth niche or a niche of excellence, and pinpoint trends, strengths, weakness and opportunities in this area that is crucial to development of the knowledge economy in SLSJ. Thus, this study will equip public, institutional and private research players and partners in SLSJ with a vision of development in support of development of the regional innovation strategy.
- ✓ Drafting of a *Study aimed at drawing up a global strategy for development of the wood cluster in SLSJ* (in progress). This study will make it possible to produce an overview of the wood processing industry in SLSJ, identify current and future opportunities in the value-added wood products field, identify development niches responding to the SLSJ region's characteristics in terms of markets, technology, new products, new manufacturing processes, labour, training, etc., and propose a series of means likely to elicit, develop and support regional initiatives in the wood processing sector in terms of research, technological transfer, testing and experimentation, commercialization and guidance of enterprises.

**REGIONAL INNOVATION SYSTEM**  
***Saguenay–Lac-Saint-Jean resource region***

---

- ✓ Several investments in new or established enterprises with a view to enhancing new technology or processes stemming from innovation activities conducted in the region—for instance, joint investment by CED (\$1 million) and NRC-IRAP (\$200,000) in Centre hydraulique Hydrep Inc.'s repair centre for the design of an aluminum equipment part for rail transportation and \$2.9-million investment in Alcan in September 2003 to set up an aluminum parts manufacturing facility for the automotive industry.

These examples of projects carried out by CED SLSJ provide eloquent illustration of the following elements:

- ✓ The intervention simultaneously targeted and sustained concerted strategic planning activities as well as 1) infrastructure and research centres, 2) innovative enterprises' projects, and 3) linkage, spinoff, partnership and information exchange activities that are the three crucial, cumulative, interdependent elements of the dynamic continuum of innovation.
- ✓ The range of intervention occurred both upstream and downstream of activities specific to innovation, a guarantee of success since this generates organic dynamics among the different elements of the innovation chain.
- ✓ The basis, scope and nature of CED SLSJ's intervention activities in support of development of the regional innovation strategy stemmed from, and are therefore synergistic and compatible with, the regional strategic planning process in which CED SLSJ participated fully over the past few years. Consequently, the intervention was constantly adjusted and structured in line with emerging needs considered priorities by regional players. Moreover, the process of planning and drawing up the business office's regional intervention strategy carried out in conjunction with the local milieu reinforces this synergy in carrying out intervention while generating a real regional partnership.
- ✓ CED SLSJ's work approach built on concerted, synergistic action enhancing the competencies and expertise of regional public or private sector stakeholders/partners creates a highly promising dynamic in terms of development of the regional innovation strategy, as evidenced for instance by the process that led to the creation and successful establishment of the ATC in 2002.

Furthermore, all the stakeholders questioned consider that CED SLSJ's intervention with respect to the regional innovation system generally proved to be powerful levers, both strategically and financially. Some even described it as indispensable.

In addition, stakeholders appreciate and confirm the crucial importance of being able to benefit from the flexibility and adaptability of a program such as the Regional Strategic Initiative as a tool for enhancing sectoral regional clusters. This flexibility has enabled CED SLSJ to intervene precisely where it was hard for all other regional stakeholders to do so, to the great benefit of development of the regional innovation system.

Finally, they consider that CED SLSJ's team of professionals is highly competent both in terms of strategic planning and in terms of execution and juxtaposition of deployment of Agency programs with those of other federal agencies in the field. Several mentioned that CED SLSJ acts as a special gateway providing access to all relevant federal stakeholders.

#### **4. CONCLUSION**

Thus, CED SLSJ:

- ✓ in basing its intervention for the past 10 years on the regional priorities emerging from a continual strategic planning process:
  - by being actively involved in planning and/or strategic co-ordination activities at the sectoral and regional levels;
  - by constantly adjusting its focus in response to successful experiments, feedback from regional economic agents and lessons learnt;
- ✓ in building on regional assets, research niches and competitive advantages;
- ✓ in investing regularly, substantially and lastingly where the market cannot or is reluctant to invest (market absence, medium- and long-term horizon and/or excessively high risk) in partnership with the other public players to support structuring investment in:
  - research infrastructure (producers of technical and scientific knowledge);
  - transfer, linkage and exchange means/activities (social aspect targeting dissemination of technical and scientific knowledge); and
  - enterprises for projects targeting commercialization or integration of new technology or processes.

has met the highest standards of intervention generally recognized in the literature with respect to focus and execution of public policy/measures in support of development of innovation in a regional context. In this regard, the different components of CED SLSJ's intervention are consistent with exemplary practices in the area.

While SLSJ's regional innovation system still has a number of years to develop before it reaches cruising speed, many stakeholders have observed over the past five years a definite acceleration in growth and activities surrounding the regional innovation system as well as growing interest from enterprises in activities specific to innovation.

Thus, the 20 or so years of planning and progressive investment in the regional innovation system are beginning to snowball. In the aluminum field, for instance, the key ingredients are in place, and attractive spinoffs are already materializing, witness the recent announcement (September 2003) by Alcan of the establishment of a first manufacturing facility for aluminum automotive parts in SLSJ. This visible, tangible result, which will generate several others (virtuous circle), shows that it is possible, for a resource region that acquires the means to do so, to negotiate successfully the switch to a specialized regional economy built on knowledge and innovation.

Economic transformation processes on the scale initiated by SLSJ take one, two or even several decades to be realized. Several crucial stages have to be successfully negotiated after the regional level of awareness is raised, including planning, construction and updating of a regional innovation system around which high value-added sectoral clusters will be built. It has to be observed that SLSJ's players, which include CED SLSJ, have successfully taken several major steps in this regard. Starting from the observation that the geographical proximity network within which enterprises operate is a major determinant of their capability to innovate, SLSJ enterprises will have more surprises to offer in the decades to come if they capitalize fully on their regional innovation system.