

The Regional Dimensions of Innovation in Québec

Summary Report

Report Objectives

As part of ongoing work by the Conseil de la science et de la technologie on Québec's innovation system,²² the 2001 *Situation Report* explores the regional dimensions of innovation in Québec. Starting from the observation that network proximity plays an important role in determining a company's capacity to innovate, this report set out to establish a basic framework of analysis for exploring and better understanding the characteristics specific to the regional context of innovation in Québec. To this end, the situation report presents a brief comparative overview of regional policies in support of innovation in Québec, Canada, and abroad (Chapter 1) and proposes a trend chart model for establishing an initial diagnosis of the scientific and technological capabilities of Québec and its regions (Chapter 2).

Results of the Analysis of Regional Characteristics of Innovation

A Portrait of Regional Diversity in Innovation

Although incomplete in several respects (as noted later), the regional profile of innovation (regional fact sheets) produced for this report has proven highly useful in highlighting the scientific and technological particularities of each region. The results paint a highly diversified overall portrait that points to major interregional disparities in terms of the resources companies devote to innovation, the number of players in their immediate entourage involved in innovative activities (research centers, finance companies, educational institutions, government bodies, intermediaries, etc.), and the general social, economic, political conditions affecting their capacity for innovation (overall environment). By selecting the most significant indicators and grouping regions according to their main socioeconomic characteristics²³ into four major categories—Greater Montréal (Montréal, Montérégie, Laval, Laurentides, Lanaudière), the resource regions (Abitibi-Témiscamingue, Bas-St-Laurent, Gaspésie—Îles-de-la-Madeleine, Saguenay—Lac-Saint-Jean, Côte-Nord, Nord-du-Québec), the capitals (Québec City and Outaouais), and the intermediate regions (Estrie, Mauricie, Centre-du-Québec, Chaudière-Appalaches)—we arrived at a comparison of overall regional innovation capacity that shows the following (see the Summary Table) :

²² Council work on the issue of innovation in Québec debuted with the publication of the *Rapport de conjoncture 1998* entitled *For a Québec Innovation Policy*, and continued with the publication of eight advisory reports on various aspects of the Québec innovation system : *L'entreprise innovante au Québec : les clés du succès* (June 1998), *Des formations pour une société de l'innovation* (June 1998), *Innovation, A Sectoral Outlook* (January 1999), *Strengthening Innovation : The Priorities* (February 1999), *L'État acteur de l'innovation : La science et la technologie dans l'administration gouvernementale* (June 1999), *To Understand and to Innovate : Assuring Competitive Means for University Research* (November 1999), *Catalyzing Innovation : Transfer Centers and Their Funding* (January 2000), *Social Innovation and Technological Innovation : The Contribution of Research in the Social Sciences and the Humanities* (February 2000).

²³ This classification, inspired in part by the work of Canada Economic Development and Québec's Ministère de l'Industrie et du Commerce, is intended solely to facilitate analysis. Like all classifications, it is a more or less arbitrary division based on certain shared characteristics. The capitals (the Québec City and Ottawa regions) are characterized by a strong government and tertiary public sector presence; intermediate regions (Estrie, Mauricie, Centre-du-Québec, Chaudière-Appalaches) are characterized by the importance and diversity of their manufacturing activities; the Greater Montréal area (Montréal, Montérégie, Laval, Laurentides, Lanaudière) are characterized by their geographic and economic connection with Montréal; resource regions (Abitibi-Témiscamingue, Bas-St-Laurent, Gaspésie—Îles-de-la-Madeleine, Saguenay—Lac-Saint-Jean, Côte-Nord, Nord-du-Québec) are characterized by an economy based primarily on resource extraction and processing.

Socioeconomic Characteristics

A Significant Link Between Unemployment, Education Levels, and Population

- There is a significant link between unemployment, education levels, and variations in population. Resource regions generally have higher rates of unemployment, lower levels of education, and stagnating or declining populations, whereas the capital and Greater Montréal regions record better results in this respect.

Resources for Innovation

Technology Level and Knowledge Base

- The industrial structure in the Greater Montréal and capital regions is characterized by the presence of numerous high tech industries and jobs and an intense knowledge base, whereas the economy of the resource regions is associated more closely with traditional industries

R&D Efforts

- A significant gap in R&D efforts (spending and staffing) separates the Greater Montréal area from the resource regions. The regions of Greater Montréal generally lead the way for R&D, along with Estrie (intermediate region), whereas the resource regions trail the pack, with the exception of Saguenay—Lac-Saint-Jean.

Patent Applications

- The number of patent applications is high in the Greater Montréal, Québec City, and—a fact worth noting—Abitibi-Témiscamingue and Saguenay—Lac-Saint-Jean regions, but generally lower in the other resource regions.

Investments in Machinery and Equipment

- Levels of investment in machinery and equipment vary widely. Most resource regions rank high, along with the Greater Montréal area and the intermediate regions of Centre-du-Québec, and Estrie.

ISO-Certified Establishments

- Regional results are also quite diverse for the number of ISO-certified establishments. The regions of Montréal, Côte-Nord and Saguenay—Lac-Saint-Jean (resource regions), and Estrie, Mauricie, and Centre-du-Québec (intermediate regions) lead the rankings.

The "Gazelles"

- The proportion of "gazelles" (fast-growing SMEs) is generally higher in some of the resource regions (Côte-Nord, Saguenay—Lac-Saint-Jean, Bas-Saint-Laurent), Outaouais (capital region) and Centre-du-Québec (intermediate region).

Science and Technology Workers

- Science and technology workers are well represented in the capitals and most regions of the Greater Montréal area, but generally make up a smaller portion of the workforce in the intermediate regions and most resource regions.

Professional Development

- Employers generally spend more on professional development and training in the resource and Québec City regions than in the regions of Greater Montréal.

Export Rate

- Export rates are high in Outaouais (capital region), in Estrie (intermediate region) and in most resource regions, but much lower in the regions of Greater Montréal, with the exception of Laurentides.

Export-Related Jobs

- A significant proportion of resource region jobs are export-related, a situation less prevalent in the other regions, particularly the Québec City (capital) and Greater Montréal areas.

High Tech Exporters

- High tech exporters account for a higher proportion of the businesses in the capital regions and the Greater Montréal area than in the rest of Québec.

Cooperation Between Innovators

- University/Business Relations

 - University/business relations—which are measured on the basis of the proportion of industry funding for university research—are stronger in regions with a single type of university and where sponsored research in the natural sciences and engineering fields is common : Abitibi-Témiscamingue and Saguenay—Lac-Saint-Jean (resource regions), and Laval and Montérégie (Greater Montréal).
- Value of Contract Research

 - The average value of university research contracts from business is higher in certain regions of Greater Montréal (Laval, Montréal, Laurentides), the Québec City region (capital), and in Chaudière-Appalaches (intermediate region).
- Presence of Research Centers

 - Research centers operating in partnership with business (liaison and transfer centers, college technology transfer centers, government research centers, research and technology transfer consortiums) exist in the Montréal and Montérégie regions (Greater Montréal), the Québec City region (capital), the Saguenay—Lac-Saint-Jean and Bas-Saint-Laurent regions (resource regions), and Estrie (intermediate region), whereas the other regions have little or nothing in the way of such infrastructures (see table “Regional Distribution of Major Research Infrastructures and Support for Innovation”).
- Support for Innovation

 - Numerous bodies and agencies (high tech parks, incubators, technology watch centers, promotion agencies, business services, etc.) exist to support innovation, primarily in the Montréal, Montérégie, and Laval regions (Greater Montréal), the capitals, the Abitibi-Témiscamingue and Saguenay—Lac-Saint-Jean regions (resource regions) and Estrie (intermediate region—see table “Regional Distribution of Major Research Infrastructures and Support for Innovation”).

The General Science and Technology Environment

- University Science and Engineering Graduates

 - The proportion of university graduates in science and engineering (as a percentage of total graduates at the undergraduate and graduate levels) is higher in the regions of Greater Montréal (Montréal, Laval, Montérégie), Estrie (intermediate), and Québec City (capital).
- College Graduates with Technical Training

 - The proportion of college graduates with technical training (as a percentage of total graduates) is higher in most of the resource regions, in the Mauricie, and in Chaudière-Appalaches (intermediate region).
- Scientific Publications

 - The ratio of scientific publications per thousand inhabitants is much higher in regions with major urban centers, which is where the highest concentrations of institutional and industrial researchers are found (Montréal, Québec City, Estrie).
- Scientific and Technical Culture

 - The proportion of science and technology museums (as a percentage of all museums) is higher in the majority of the regions around Greater Montréal (Laval, Montérégie, Laurentides), in several resource regions (Gaspésie-Îles-de-la-Madeleine, Saguenay—Lac-Saint-Jean, Bas-Saint-Laurent) and in Estrie (intermediate region). More people are involved in amateur science in the capitals, most of the regions of Greater Montréal (Lanaudière, Montérégie, Laurentides), and certain resource regions (Abitibi-Témiscamingue and Gaspésie-Îles-de-la-Madeleine). The proportion of households connected to the Internet is higher in the capitals, in Estrie (intermediate region) and the majority of the regions of Greater Montréal.

SUMMARY TABLE

THE POSITION OF THE REGIONS—GENERAL RANKING

INDICATORS/RANKING	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th
Unemployment Rate* (1998)	CHA	MTR	LAV	QUÉ	LAU	CDQ	EST	LAN	OUT	MTL	MAU	BSL	CTN / NDQ	SAG	ABI	GAS	
Variation in population (1991–1998)	LAU	LAN	OUT	NDQ	LAV	MTR	EST	CDQ	CHA	QUÉ	ABI	MAU	BSL / CTN	MTL	SAG	GAS	
Level of postsecondary education—pre-B.A./B.Sc. (1996)	LAV	QUÉ	MTL	MTR	MAU / OUT	EST	LAU	LAN	SAG	EST	CTN	CDQ	CHA	BSL	NDQ	ABI	GAS
Level of university education—B.A./B.Sc. or higher (1996)	MTL	QUÉ	OUT	LAV	EST	MTR	MAU	LAU	SAG	CHA	BSL	ABI	NDQ	LAN	CTN	GAS	
Technology level—% of HT jobs (1998)	MTL	LAU	LAV	MTR	QUÉ	OUT	MAU	EST	BSL	CHA	LAN	GAS	CDQ	ABI	SAG	CTN	NDQ
Knowledge level—% of high knowledge jobs (1997)	MTL	QUÉ	NDQ	EST	LAV	MAU	OUT	SAG	MTR	CTN	ABI	LAU	CDQ	LAN	BSL	CHA	GAS
Corporate R&D spending per capita (1995)	MTL	MTR	LAV	LAU	SAG	EST	QUÉ	MAU / CDQ	CHA	CHA	ABI	OUT	LAN	CTN	BSL / GAS	GAS	NDQ
Company R&D employees per 1,000 inhabitants (1995)	MTL	MTR	EST	LAV	QUÉ	SAG	LAU	MAU / CDQ	CHA	CHA	ABI	OUT	LAN	BSL / GAS	CTN	GAS	NDQ
No. of patents per 100,000 inhabitants (1997–2000)	MTL	LAV	QUÉ	SAG	ABI	MTR	LAU	CHA	EST	CDQ	OUT	MAU	BSL	LAN	CTN	GAS	NDQ
Per capita investment in machinery and equipment (1998)	MTL	CTN	NDQ	CDQ	EST	SAG	MTR	ABI	MAU	QUÉ	LAU	BSL	LAN	CHA	LAV	GAS	OUT
ISO-certified establishments per 1,000 establishments	CTN	SAG	EST	MTL	MAU / CDQ	QUÉ	QUÉ	MTR	LAV	CHA	ABI	BSL	LAU	LAN	OUT	GAS	NDQ
Proportion of "gazelles"	CTN	SAG	OUT	CDQ	BSL	MTR	EST	LAU	MTL	CHA	QUÉ	MAU	LAN	GAS	LAU	ABI / NDQ	CDQ
S&T workers as % of active population (1996)	QUÉ	MTL	OUT	LAV	MTR	CTN	LAU	ABI	SAG	MAU	CHA	EST	LAN	BSL	NDQ	GAS	CDQ
Professional development spending as % of payroll (1998)	BSL	NDQ	CTN	QUÉ	GAS	ABI	MTL	SAG	OUT	CHA	EST	MAU	CDQ	LAV	LAU	MTR	LAN
Export rate (1995)	CTN	LAU	SAG	OUT	NDQ	EST	ABI	GAS	MAU	MTR	BSL	QUÉ	CDQ	MTL	CHA	LAV	LAN
Proportion of export-linked manufacturing jobs (1998)	CTN	NDQ	GAS	ABI	SAG	OUT	BSL	EST	LAU	MAU	MTL	MTR	QUÉ	CDQ	CHA	LAV	LAN
Proportion of high tech exporters (1998)	OUT	MTL	QUÉ	LAV	LAU	MTR	LAN	MAU	GAS	ABI	BSL	EST	SAG	CHA	CDQ	NDQ	CTN
Proportion of university research financed by industry (1997–1998)	ABI	LAV	MTR	SAG	QUÉ	MTL	EST	MAU	BSL	OUT	**	**	**	**	**	**	**
Value of university research contracts from business (1995)	LAV	MTL	QUÉ	LAU	CHA	BSL	SAG	MAU	MAU	MTR	OUT	ABI	LAN	EST	CTN	NDQ	CDQ
No. of scientific publications per 1,000 inhabitants (1995)	MTL	QUÉ	EST	LAV	BSL	MTR	CDQ	MAU	SAG	MAU	OUT	NDQ	GAS	LAN	CTN	LAU	CHA
University science and engineering graduates as % of total graduates (1998)	GAS	BSL	SAG	LAV	MAU	CHA	ABI	CTN	EST	QUÉ	OUT	MTR	LAU	CDQ	LAN	MTL	NDQ
College graduates with technical training as % of all museums (1998)	LAV	GAS	EST	SAG	BSL	MTR	LAU	QUÉ	ABI	MTL	CDQ	MAU	CTN	LAN	OUT	CHA	NDQ
% of population involved in amateur science (1999)	LAN	QUÉ	ABI	MTR	GAS	OUT	LAU	EST	MTL	LAV	MAU	NDQ	CTN	CDQ	BSL	CHA	SAG
Proportion of households connected to the Internet (1999)	MTL	QUÉ	MTR	LAU	EST	OUT	LAV	MAU	CHA	MAU	NDQ	SAG / GAS	CTN	LAN	ABI	CDQ	BSL

* For this indicator, the top-ranked region is the one with the lowest rate.

** Ranking inapplicable

<p>Greater Montréal : LAN, LAU, LAV, MTL, MTR</p> <p>Resource Regions : ABI, BSL, CTN, GAS, NEQ, SAG</p> <p>Capitals : OUT, QUÉ</p> <p>Intermediate : CDQ, CHA, EST, MAU</p>	<p>Abitibi-Témiscamingue (08)</p> <p>Bas-Saint-Laurent (01)</p> <p>Centre-du-Québec (17)</p> <p>Chaudière-Appalaches (12)</p> <p>Côte-Nord (09)</p> <p>Estrie (05)</p>	<p>Gaspésie—Îles-de-la-Madeleine (11)</p> <p>Lanaudière (14)</p> <p>Laurentides (15)</p> <p>Laval (13)</p> <p>Mauricie (04)</p> <p>Montréal (06)</p>	<p>Montréal (16)</p> <p>Nord-du-Québec (10)</p> <p>Outaouais (07)</p> <p>Québec (03)</p> <p>Saguenay—Lac-Saint-Jean (02)</p>
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Regional Breakdown of Main Research Infrastructures and Main Bodies Supporting Innovation							
Regions	Research Infrastructures*				Bodies Supporting Innovation	Training (Cégeps, universities, and relate establishments)	
	LTCs	CTTCs	GRCs				RTTCs
			Qué.	Fed.			
MTL	4	3	3	2	4	8	21
MTR	—	3	1	5	6	8	10
LAV	—	—	—	—	—	6	2
LAU	—	2	—	—	—	1	2
LAN	—	—	—	—	—	3	1
ABI	—	—	—	1	—	4	2
SAG	1	3	—	2	—	6	5
BSL	—	1	—	1	3	4	7
GAS	—	1	3	—	—	4	2
CTN	—	—	—	—	1	1	2
NDQ	—	—	—	—	—	1	1
QUÉ	2	1	4	4	6	12	7
OUT	—	—	—	—	—	5	3
MAU	—	3	1	—	—	8	4
EST	—	1	1	1	1	4	4
CHA	—	3	—	—	—	6	3
CDQ	—	2	—	—	—	2	2

* LTC : liaison and transfer centers; CTTCs : college technology transfer centers; GRCs : government research centers; RTTCs : research and technology transfer consortiums

** Bodies supporting innovation : high tech parks, incubators, technology watch centers, development corporations, business services, etc. (venture capital firms not included)

Greater Montréal : LAN, LAU, LAV, MTL, MTR	ABI : Abitibi-Témiscamingue (08)	GAS : Gaspésie—Îles-de-la-Madeleine (11)	MTR : Montérégie (16)
Resource Regions : ABI, BSL, CTN, GAS, NEQ, SAG	BSL : Bas-Saint-Laurent (01)	LAN : Lanaudière (14)	NDQ : Nord-du-Québec (10)
Capitals : OUT, QUÉ	CDQ : Centre-du-Québec (17)	LAU : Laurentides (15)	OUT : Outaouais (07)
Intermediate : CDQ, CHA, EST, MAU	CHA : Chaudière-Appalaches (12)	LAV : Laval (13)	QUÉ : Québec (03)
	CTN : Côte-Nord (09)	MAU : Mauricie (04)	SAG : Saguenay—Lac-Saint-Jean (02)
	EST : Estrie (05)	MTL : Montréal (06)	

Review of Regional Innovation Support Policies and Programs : Principal Findings

Our review of policies aimed at supporting the development of regional innovation systems (Chapter 1) and our survey of the main public programs supporting innovation in the regions (regional fact sheets) have allowed us to make several observations regarding the nature and relevance of government actions aimed at strengthening regional innovation capacity.

Dominant Foreign Practices

Empowering Local Stakeholders

- Knowing the potential for innovation generated by cooperation between business and stakeholders in local communities, many governments worldwide are paying increasing attention to the regional dimension of innovation. Increasingly, this has led to measures encouraging the use of regional socioeconomic infrastructures as levers to foster innovation. It has also promoted a view of regions as the strategic locus for implementing new forms of governance of innovation (based on a bottom-up approach). Under this concept, governments are providing less and less direct support for innovation and increasingly intervening indirectly by providing

regional stakeholders with the resources they need to develop their own innovation management structures and strategies.

Policies Adapted to Regional Needs

- Unlike universal measures designed for across-the-board implementation at the national level, recent policies are designed to modulate government intervention to take into account specific regional needs. These policies are more flexible and can be adapted to the wide variety of regional socioeconomic and industrial circumstances.

Policies With a Systemic Focus

- Recent policies are more and more diversified, are often used in combination, and are increasingly aimed at all regional stakeholders rather than a single category, reflecting a systemic conception of innovation. However, companies—and particularly SMEs—remain the main focus of government efforts because they are still the main generators of innovation. Measures to foster networking and increase learning opportunities are increasingly common.

Six Main Types of Initiative

- Regional innovation system development policies feature six main types of initiative : 1) spur cooperation among regional stakeholders in jointly defining an appropriate framework for innovation system development; 2) assist in setting up structures to mediate between companies and all those involved in innovation; 3) foster learning and sharing of knowledge between regional and inter-regional stakeholders; 4) facilitate access to strategic information for local businesses; 5) improve technical and industrial infrastructure in the region; and 6) help certain target regions to update their development potential in specific industrial sectors.

Main Guarantors of Success

- These initiatives are based, in varying degrees, on the main guarantors of regional innovation system success (Chapter 1) : stakeholder proximity; the quality of services provided by mediation agencies and their brokers; promotion of knowledge and know-how sharing at the transregional level; rallying stakeholders around a joint project in view of fostering trusting relationships and networks of cooperation; availability of qualified workers who meet regional industrial needs; the role of the government as a facilitator of innovation system development, with initiatives remaining the responsibility of companies and their partners.

Regional Initiatives in Québec

Lack of a Comprehensive Vision

- Strictly speaking, the Québec government has no overall vision, strategy, or coordinated policy for the development of Québec's regional innovation capacity. Historically, most initiatives in this area have been the result of ad hoc decision making, a series of disparate measures that never really coming together to form a whole.

Few Truly Regional Initiatives

- Generally speaking, Québec government intervention in the innovation field has been undertaken in an all-regions perspective, with most measures generic and universal in scope. Few initiatives are truly adapted to the particularities of individual regions. Some have been designed to reach objectives other than regional development (e.g., liaison and transfer centers). Others are modeled on interventions in urban centers and implemented in the regions without taking regional particularities into account (e.g., Carrefours de la nouvelle économie).

Centralized Measures

- Most measures to support innovation are designed and implemented by central authorities and rarely take special regional needs into account. Little latitude is left to regional stakeholders to define the priorities and the means to develop an innovation system that responds to their socioeconomic circumstances. Québec's policy to support local and regional development could have been a basis for such an undertaking, notably the strategic planning process, but no specific provisions on innovation have been adopted to date. In short, innovation-related instruments of intervention—i.e., adapting measures to regional needs and empowering local communities—are not included in the policy's decentralization goals.

Main Québec Initiatives

- Québec government measures to support innovation in the regions can be divided into seven main categories : liaison and transfer center activities (college technology transfer centers and liaison and transfer centers); provision of venture capital (through Innovatech corporations); tax benefits for high tech business groups (*Carrefours de la nouvelle économie*, information technology development centers, Cité du multimédia, Optics City, Centre national des nouvelles technologies de Québec) and tax incentives for particular sectors in target regions; technology watch operations; services offered by regional offices of the Ministère de l'Industrie et du Commerce and other sectoral departments; government research center operations; and business incubator services (Inno-Centre). To varying degrees, these measures cut across all the main types of initiatives described in the typology drawn from foreign examples, except for the category associated with “encouraging regional stakeholders to work together to jointly define an appropriate framework for developing an innovation system.”

Main Federal Initiatives

- Federal government measures to support innovation in Québec's various regions can be classified in three main categories : regional innovation assistance programs (Regional Initiative Program, Industrial Research Assistance Program); government lab and research center activities (there are 15 such facilities in Québec, including several whose mission is to contribute to innovation in business); and the services provided by the regional offices of Canada Economic Development. Based on the typology drawn from the foreign examples (Chapter 1), these measures can be grouped into four main types of initiative : “Support for cooperation among regional stakeholders to jointly define an appropriate framework for innovation system development” (Strategic Regional Initiatives); “Support for mediation structures and activities” (Industrial Research Assistance Program, Canada Economic Development, government research centers); “Support to foster learning and sharing of knowledge” (Industrial Research Assistance Program); and “Support for specific industrial sectors in target regions” (Strategic Regional Initiatives). In essence, this review of federal government intervention in Québec shows that initiatives often still reflect a national approach and are neither part of an integrated, systemic vision of innovation nor an explicit form of support for developing regional innovation systems.

Comparison of Regional Innovation Support Policies			
Main Types of Initiative	Examples of Foreign Initiatives	Main Federal Government Initiatives*	Main Québec Government Initiatives
Support for cooperation among regional stakeholders to jointly define an appropriate framework for innovation system development	<ul style="list-style-type: none"> Regional Innovation Strategies (RIS) Regional Innovation and Technology Transfer Strategies 	<ul style="list-style-type: none"> Strategic Regional Initiatives (SRI) 	—
Support for mediation	<ul style="list-style-type: none"> Centre Relais-Innovation (CRI) Regional technology diffusion networks 	<ul style="list-style-type: none"> Industrial Research Assistance Program (IRAP)** Canada Economic Development (technology advisers)** Government research centers (GRC) 	<ul style="list-style-type: none"> Liaison and transfer centers (LTC) College technology transfer centers (CTTC) Government research centers (GRC) Ministère de l'Industrie et du Commerce and other sectoral departments (advisers)
Support to foster learning and sharing of knowledge	<ul style="list-style-type: none"> Trans Regional Innovation Projects (TRIP) Regional Technology Transfer (RTT) Plato Program 	<ul style="list-style-type: none"> Industrial Research Assistance Program (IRAP—Innovation Insights component, Technology Visits program, Cooperative R&D program)** 	<ul style="list-style-type: none"> Carrefours de la nouvelle économie (CNE) Information technology development centers (ITDC)
Assistance to facilitate access to strategic information for local businesses	<ul style="list-style-type: none"> Trans Regional Innovation Projects (TRIP) Community Information Service on European Commission R&D Plato Program 	—	<ul style="list-style-type: none"> Technology watch centers Liaison and transfer centers (LTC) College technology transfer centers (CTTC)
Support for improving regional technical and industrial infrastructure	<ul style="list-style-type: none"> Massachusetts Technology Collaborative 	—	<ul style="list-style-type: none"> Inno-Centre Innovatech CTTC equipment acquisition assistance program
Support for specific industrial sectors in target regions	<ul style="list-style-type: none"> Bio-Region 	<ul style="list-style-type: none"> Strategic Regional Initiatives (SRI) 	<ul style="list-style-type: none"> Cité du multimédia Optics City Centre national de nouvelles technologies de Québec Regional tax incentives

* This table only includes innovation support measures specifically targeted at a region or group of regions.

** As indicated in Chapter 1, although these programs do not fully meet the selection criteria (they were not selected for the regional fact sheets), we have nonetheless chosen to mention them here due to their non-negligible impact on regional innovation.

Assessing the Trend Chart Model

Why a Trend Chart? The review of out-of-country policies shows that government intervention is increasingly based on an in-depth understanding of regional socioeconomic circumstances and the dynamics of regional innovation systems. Therefore, improved knowledge of the functioning and particularities of regional innovation systems is key to more effective targeting by the various levels of government.

A First Step In Québec, the government periodically produces regional socioeconomic and sociocultural profiles, but no specific initiatives have yet been taken to profile the regional characteristics of innovation on a regular basis. In this regard, the trend chart presented in the *2001 Situation Report* could be a first step in developing a more detailed framework for observing regional innovation capabilities and regional innovation system dynamics. Even though it has certain limitations, the chart does succeed in identifying a number of aspects that characterize innovation in each of the regions. The main shortcomings noted when drawing up the trend chart were the following :

First Section

- In the first section on the performance of Québec and its regions in the area of innovation, indicators were often chosen based on the availability of regional data, even though they were not necessarily the most representative of the main factors associated with the innovation model. Cooperation indicators (in the immediate company environment) are particularly underrepresented.
- In the same section, the regional data available for the various geographic areas studied (Québec, Canada, world) were not always fully comparable. As a result, we frequently had to rely on related variables or other comparative ratios at the regional level.

Second Section

- In the second section on the regional characteristics of innovation, the lack of regional data for a number of traditional indicators—data readily available at the national and international levels—made it difficult to assess the role and influence of the main factors of innovation, especially those illustrating the dynamics of innovation (cooperation indicators).
- For example, in the “resources for innovation,” category, there is no regional data on total R&D spending or the structure of R&D spending per initiator, with the exception of industrial R&D. For most of the selected indicators, it was also impossible to itemize data by sector of activity due to the lack of available statistics.
- As for “cooperation between those involved in innovation,” the data available only covers university-business relationships. No other data exists to allow us to assess other types of relationships between businesses and their surrounding communities.
- As for the “overall science and technology environment,” the main weakness is the lack of indicators for more precise measurement of available human resources (graduation rate), scientific production (publications), and government assistance.

The following table (main regional indicators to be perfected and produced) serves as a guide, summarizing the main shortcomings that need to be addressed (new indicators) to improve the trend chart model.

Principal Regional Indicators to be Perfected and Produced

Dimension	Principal Basic Indicators 2001 Situation Report*	Principal Indicators to be Perfected and Produced
Resources for Innovation		
1 R&D effort	1.1 Number of establishments active in R&D	1.1.1 Number of establishments active in R&D sector
2 Presence of S&T personnel	1.2 Company R&D spending	1.2.1 Company R&D spending per sector of activity
3 Technology acquisition	1.3 Company R&D personnel	1.2.2 Company R&D spending as % of total R&D spending
4 Marketing and exports	2.1 S&T personnel per category as % of the active population	1.2.3 Total R&D spending**
	3.1 Investments in machinery and equipment	1.2.4 Government R&D spending
	3.2 Proportion of SMEs using the Internet	1.2.5 University R&D spending
	4.1 Number of Canadian patents	1.3.1 Company R&D personnel per sector of activity
	4.2 Number of manufacturers who export	2.1.1 S&T personnel per category and sector of activity
	4.3 Number of export-related manufacturing jobs	3.1.1 Proportion of companies using advanced technology per technology category and sector of activity**
	4.4 Manufactured exports as % of total exports	4.1.1 Number of American patents obtained per sector of activity
		4.2.1 Number of manufacturers who export per sector of activity
		4.4.1 Manufacturing exports as % of exports per sector of activity
Cooperation Between Players Involved in Innovation		
5 Interbusiness relations	6.1 Proportion of regional university research funded by industry	5.1 Technological alliances between firms (regional, national, and international cooperation agreements) by sector of activity**
6 Company-university relations	6.2 Proportion of regional university research funded by foreign companies	5.2 Outside information sources by type of firm (customer, supplier, competitor, consulting)**
7 Company relations with government bodies	6.3 Value of university research contracts with companies	6.1.1 Proportion of regional university research financed by industry by discipline, sector of activity, and location of companies involved
8 Company relations with financial stakeholders		6.3.1 Value of university research contracts with companies by sector of activity
		7.1 Proportion of R&D spending by companies financed by the state, by sector of activity**
		7.2 Proportion of companies in each sector of activity using government agency services per category of agency and type of service**
		8.1 Itemization of venture capital by main industries**
		8.2 Increase in venture capital investment
General Science and Technology Environment		
9 Human resources and training	9.1 Education spending	9.3.3 Number of NSE graduates per major discipline
10 Base for scientific research	9.2 Continuing education spending	9.4.1 Number of college graduates in technical training per discipline
11 Legislative, regulatory, and fiscal environment	9.3 Number of university NSE graduates	10.3.1 Number of scientific publications per sector of activity and per discipline**
12 Scientific and technical culture	9.4 Number of college graduates in technical training	10.3.2 University-industry copublications**
	10.1 University research spending	11.1 Public funding for innovation per category of assistance**
	10.2 Number of university research professors	
	10.3 Number of scientific publications	
	10.4 Value of research grants and contracts per professor	
	12.1 Number of S&T museums	
	12.2 Proportion of the population (15 yrs+) involved in amateur science	
	12.3 Proportion of the population (15 yrs+) having read scientific books	
	12.4 Proportion of households with a computer	
	12.5 Proportion of households connected to the Internet	

* Most basic indicators in the Situation Report are paired with secondary indicators that use different ratios in order to weight the results and establish a common basis of comparison.

** The indicators to be produced are marked with a double asterisk.

Recommendations

Main Conclusions In summary, the *2001 Situation Report* reveals the following major findings :

- The regional profile of innovation highlights significant differences and disparities between regions in terms of the resources invested in innovation, the number of players involved in local communities, and general conditions affecting their capacity for innovation.
- Strictly speaking, the government of Québec has no comprehensive, organized strategy for regional development in the area of innovation.
- Foreign experience has demonstrated the need for a project that galvanizes and brings together stakeholders at the regional level and involves them in concrete, structuring activities.
- Generally speaking, Québec government interventions in the innovation field have been undertaken from an all-regions perspective. Few initiatives are truly adapted to the specific needs of each region.
- Most measures to support innovation are designed and implemented by central authorities. Regional stakeholder leadership in defining the priorities and the means to develop an innovation system is the exception.
- Innovation-related instruments of government intervention are not part of the decentralization goals—i.e., the adaptation of measures to regional needs and the empowerment of local communities—set out in Québec’s policy to support local and regional development.
- Although the Québec government periodically produces regional socioeconomic and sociocultural profiles, no specific initiatives have been taken to profile regional characteristics of innovation on a regular basis.

Objectives Targeted by the Recommendations in the *2001 Situation Report*

Three Fundamental Objectives In light of these findings, the *2001 Situation Report* targets three main objectives through its proposed recommendations and measures. First of all, it aims to have each region define its own needs and strategies regarding innovation. Second, it seeks to ensure that government initiatives are adapted to the needs of each region. And third, it suggests new tools for improving our knowledge of the functioning and characteristics of our regional innovation systems. Ultimately, innovation stakeholders in each region will build networks around shared, innovation-based projects and enjoy access to complete, up-to-date information to support their actions.

Objectives Based on the Policy to Support Local and Regional Development In essence, these objectives are rooted in the main principles of Québec’s policy to support local and regional development, particularly those aimed at—

- Ensuring that government policies, programs, and services are adapted to regional circumstances
- Empowering the regions by ensuring that they participate in decision making and in implementing objectives, priorities, and projects
- Improve government services available in the regions by streamlining and simplifying structures and programs

Therefore, on the basis of the objectives of the 2001 Situation Report and the central principles set out in Québec's policy to support local and regional development, we make the following recommendations :

Recommendation 1

That the Minister of Regions¹ ask each region of Québec to formulate an innovation development strategy

Means

1. Mandate each regional development council (CRD) to set up, with the assistance of Department representatives for the region, a steering committee responsible for planning the regional innovation system
2. Assign each steering committee the mandate to work with community stakeholders to formulate a development strategy consisting of a diagnosis of the region's innovation status and an action plan for developing a regional innovation system. More specifically, the role of each committee would be to
 - Establish a diagnosis of its own region's innovation status by using the trend chart indicators suggested in the *2001 Situation Report*, the innovation model used as a framework for analysis, and any other tools made available to identify the features of the innovation activities characteristic of the region and highlight their strengths and weaknesses
 - Assess, as part of the diagnosis, the degree to which the innovation promotion and development activities of local, regional, and interregional bodies are relevant, complementary, and exhaustive
 - Determine the usefulness of developing a multiregional strategy in cooperation with one or more other regions
 - Define, on the basis of this diagnosis, general orientations regarding innovation and formulate an action plan identifying avenues for development, regional priorities, and the main startup measures to be taken
3. Ask the CRDs to ensure that the makeup of each steering committee is representative of the main players involved in innovation, particularly businesses, universities, and colleges, but also government (municipal, Québec, and federal) as well as services (financial, professional, and technical) supporting innovation promotion and development

¹ The Minister of Regions or, for the Montréal area, the Minister of Municipal Affairs and the Montréal Region

Recommendation 2

That the Minister of Research, Science and Technology and the Minister of Regions² provide regional development councils (CRDs) with the support and supervision required to formulate innovation development strategies

Means

- 1 For reasons of coherence and efficiency, clearly announce their general orientations and specific intentions as to the results expected from the process
- 2 Provide regional development councils (CRDs) with the professional and technical resources (consulting services), tools (regional trend chart, regional project design and operationalization guide, examples of successful diagnoses and actions plans), and financial resources they need to draw up their strategies; if necessary, identify or set up a team of experts with the skills required to assist the steering committees in designing their regional innovation systems
- 3 For reasons of coherence and harmonization, invite all CRDs to work together within the Association des Régions to establish guidelines for the formulation of regional innovation strategies and to reconcile these strategies with strategic regional development plans.

Recommendation 3

That the Minister of Regions³ join forces with the Minister of Research, Science and Technology to assess and follow up on proposals set forth by the regions in their innovation development strategies

Means

- 1 Set up a committee composed of representatives of the Ministère des Régions, the Ministère de la Recherche, de la Science et de la Technologie, and the sectoral departments concerned in order to establish guidelines and assess applications filed as part of innovation development strategies
- 2 First ask the committee to draw up a general evaluation framework setting out the principles, objectives, and criteria to look for in assessing proposals presented by the regions as part of their innovation development strategies. For guidance, the committee should give priority to regional measures and initiatives that generally or specifically contribute to—
 - Supporting the development of a complete and coherent regional innovation system that reflects the needs expressed by regional stakeholders
 - Strengthening the advantages afforded by stakeholder geographic proximity in order to stimulate the development of a network for cooperation and dialogue on innovation

² The Minister of Regions or, for the Montréal area, the Minister of Municipal Affairs and the Montréal Region

³ *Idem*

- Developing or strengthening mechanisms for dialogue and partnership between businesses, especially SMEs, and regional actors in the local community
- Supporting interregional strategies that directly stimulate interaction, circulation of resources, information sharing, and cooperation between SMEs and other regional innovation system stakeholders
- Implementing targeted measures (events, projects, meetings, etc.) that encourage the development of regular, informal contacts between SME management and other regional stakeholders involved in innovation

Recommendation 4

That the Minister of Regions⁴ and the Minister of Research, Science and Technology take steps to simplify and enhance the coherence and effectiveness of innovation-related government intervention in all region of Québec

Means

- 1 Ensure interregional equity, balance and complementarity when setting the priorities and determining the means of intervention suggested in innovation development strategies
- 2 Clarify and strengthen the “horizontal” role and powers of the Ministère de la Recherche, de la Science et de la Technologie to allow it to oversee the coordination of all Québec government regional innovation policies and programs
- 3 Ensure better coordination of federal, Québec, and regional innovation policies in the aim of rationalizing, integrating, and simplifying government assistance structures and measures in Québec’s regions
- 4 To this effect, seek to harmonize federal policy with the orientations of the Québec policy in support of local and regional development

⁴ The Minister of Regions or, for the Montréal area, the Minister of Municipal Affairs and the Montréal Region

Recommendation 5

That the Minister of Research, Science and Technology, on the basis of the trend chart model presented in this document,

- **Develop an instrument to continuously monitor and evaluate regional strengths and weaknesses in the area of innovation**
- **Set up or coordinate research to better understand the innovation dynamic in each region of Québec**

Means

- 1 Work with the Institut de la statistique du Québec to develop new indicators to better understand and appreciate the evolution of regional innovation systems
- 2 In conjunction with regional steering committees, periodically produce a complete trend chart on innovation in each of Québec's regions
- 3 Develop analytical and forecasting tools to further our understanding of regional innovation system dynamics and assess government innovation initiatives
- 4 Conduct or commission research on all regional dimensions of innovation, especially research whose results are likely to improve our understanding of the main factors influencing the development of regional innovation systems in Québec