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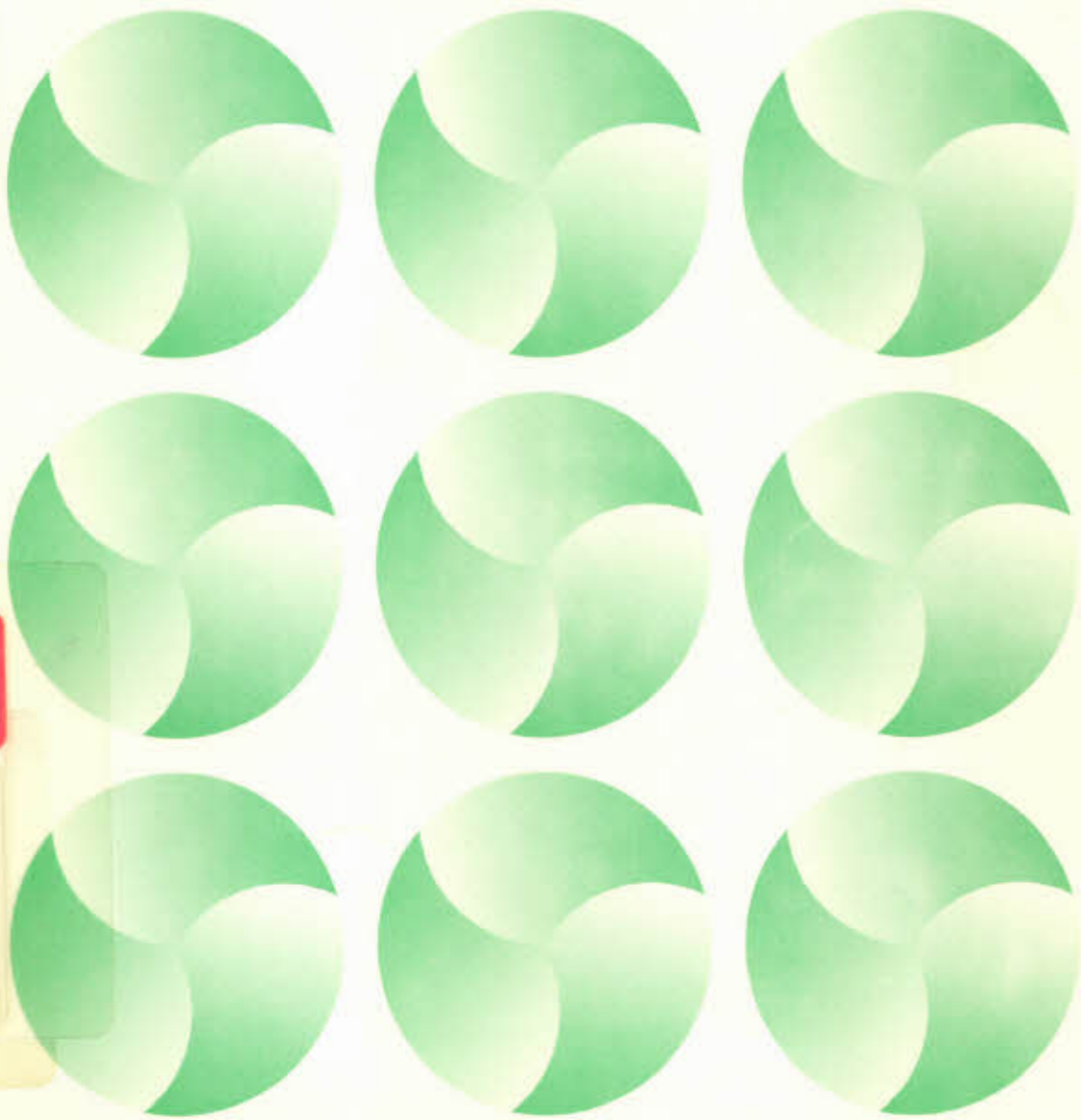

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LOCAL DEVELOPMENT PAPER NO. 14

Development Indices: A Quebec Regional Comparison

by

François Lamontagne and
Christyne Tremblay

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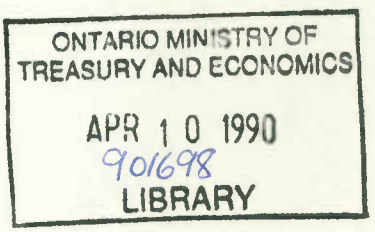

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Abstract

Recent research on the problem of persistent socio-economic disparities has established the importance of examining disparities within the major regions of Canada. The purpose of this paper is to develop the analytical method and tools needed to study these differences at the level of small regions. In order to do so, it focuses on the administrative regions of the province of Quebec and constructs for them a series of development indices that include both social and economic indicators. This approach stands in marked contrast to the more traditional type of research, which relies primarily on income and unemployment measurements to assess the extent of regional disparities.

The paper first groups together the development indices that describe, respectively, the performance, capacity, vitality, and institutional character of regions. These indices are then standardized and the regions are rated using an approach recently developed for assessing small regions. This method allows the strengths and weaknesses of regions to be identified and comparisons to be drawn between small regions on the basis of a wide range of indicators. No attempt is made to determine causal relationships between the various variables and measurements of economic development.

The final ranking of regions demonstrates the important role of urbanization in regional development. Central regions generally out-perform the more peripheral zones, in terms of both economic performance and capacity to sustain development. These results, however, must not be generalized too far, since some peripheral regions rank very highly in specific indices. The results strongly suggest that the potential for development exists in most regions of Quebec. The problem is the wide variation in human and financial resources and infrastructures among regions.

The analytical comparison reported in this study clearly illustrates the importance of expanding the coverage of the main variables employed in the regional development equation. It also suggests that regions and communities across the country may find development indices an appropriate self-assessment tool for measuring initiatives aimed at specific regional development objectives. But if such indices are to be more widely adopted, the statistical base will have to be considerably broadened.

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FOREWORD

The purpose of the Economic Council's project on Directions for Regional Development was to look at situations in which local communities had assumed more responsibility for their own development, and to see what lessons could be learned from these experiences. Fourteen case studies were undertaken, while a number of Issue Papers examined subjects of general concern to communities and development practitioners. The research was deliberately designed to be different from work typically undertaken by the Council in the past. The primary task was to collect instructive evidence, and to verify it where possible by drawing upon existing evaluation studies. The authors were not expected, for example, to undertake the extensive data collection needed to do cost-benefit studies. Rather, they were asked to capture the diversity of the local development experience in Canada.

The results of the research are being reported in a special collection of Local Development Papers. Recent and forthcoming releases in this collection are listed at the end of this document. An overview of the findings from these cases and Issue Papers will be presented in a paper entitled Developing Communities: The Local Development Experience in Canada.

A subsequent phase of the project will analyze the context within which local development initiatives take place and evaluate their actual and potential impact on reducing regional disparities.

This Paper presents one of the Issue Papers produced by the Directions for Regional Development project under the direction of Dal Brodhead.

Like the case studies, these Issue Papers arose out of the project team's research and consultations with community development workers, government officials, women's groups, business people, non-profit organizations, and many others across Canada. A unique feature of the project was its regional orientation through the use of three regional consultants who played a major role in the development of the case studies and issue papers and in the consultation process. Equally important were the numerous joint research ventures undertaken with a wide range of regionally based partners.

Our work in the first part of the project suggests that programs sensitive to the needs of individual communities and based on some type of partnership between government and local groups may make a contribution to economic development in Canada's diverse regions. In particular, our research suggests that communities have an important role to play in identifying development priorities and the particular skill requirements of individuals and local businesses. They also indicate that such "bottom-up" strategies can be assisted by a Local Development Organization (LDO), whose mandate is sufficiently broad and constituency base sufficiently large to enable it to take a long-term development perspective. An important feature of "bottom-up" community development

strategies is their focus on community capacity-building aimed at increasing local self-reliance and innovation.

The issues on which we have chosen to focus illustrate a number of the ways in which Canada's communities have mobilized their available human, financial, and material resources to help assure a future for themselves. We believe that the resulting papers will be of value both to community and regional development practitioners and to regional policy-makers at all levels of government.

François Lamontagne is an Economic Council researcher with the Regional Development project; Christyne Tremblay was also working at the Economic Council at the time this study was undertaken.

Judith Maxwell
Chairman

INTRODUCTION

In a context of unlimited needs but limited resources, one of the most important questions involved in the process of allocating public resources for regional development purposes is the proper criteria to use. Besides the fundamental issue of the political choice involved in allocating resources according to criteria of equity or efficiency, two other considerations have taken on particular significance. First, it is important to determine which regions and which projects most merit regional development assistance. Informed choices would be easier if there were a way of assessing the potential and the problems of these regions. A second key issue is how to assess the effect of these development policies in terms of efficiency, effectiveness and socio-economic impact. Both these issues necessarily require the appropriate measurement tools; this study will focus on the first.

This paper will propose an alternative approach to the study of regional disparities, one inspired by recent work carried out in Quebec and elsewhere in North America. First, a framework and the necessary tools to analyze the current state of economic development in small regions (or micro-regions)[1] will be developed through the construction of sub-regional development indices. The usefulness and applicability of our proposed approach will then be tested empirically using the administrative regions of Quebec as an example. What is new in this research is that the analytical framework is broader: the identification and measurement of regional disparities are no longer restricted to the concepts of employment and income and the focus is clearly on micro-regions. Thus development indices can serve not only to improve the knowledge of regions and communities about the factors and obstacles involved in regional

development, but can also offer development agencies a more sophisticated tool for targeting their initiatives.

A review of the literature reveals that there has so far been little effort to formulate an approach to the study of regional potential and regional problems that takes into account both the sub-regional level and the broader context of development as a whole. Decisions on which regions will be selected for development assistance are often made on the basis of income disparities and unemployment statistics, under-estimating the importance for regional development of factors such as the environment and the availability of amenities. Given the ever-increasing complexity of the socio-economic and political environment and the rising number of non-economic actors and factors involved, such a perspective, in our opinion, is worth investigating. It is now recognized that people do not want to live in or move into regions or communities characterized by unpleasant environments or a scarcity of amenities. What are needed, then, are broader analytical methods incorporating both economic and social measurements of welfare.[2] Development factors such as amenities and the environment might also be incorporated into the analytical framework. The relative failure of conventional development policies to narrow inter-regional gaps and the lack of information on intra-regional disparities make this quest all the more urgent.

Several recent studies and research reports have pointed out that disparities within regions can be wide (sometimes wider than inter-regional disparities) and thus urgently need special attention.[3] In accordance with a view that stresses the role of the community and social infrastructure as a basis for development, a micro-regional approach seems more appropriately suited than a regional one. But recognizing the role of communities in regional development is not enough:

analytical instruments suited to community needs and the community level must be developed. Furthermore, it is important to recognize that development starts at the bottom (at the community or micro-regional level) rather than at the top.

The first section of the paper discusses the basic theory and methodology of the approach. The primary goal of this section is to develop an analytical framework for studying micro-regions in the Quebec context. This section also looks at some of the criticisms leveled at development indices in the past. The second section of the paper presents a detailed account of the results obtained in a comparison of Quebec administrative regions. By constructing development indices for each of these regions, it is possible to draw a number of comparisons and to broaden our knowledge of disparities at the micro-regional level. This section also presents a succinct analysis of the results. In particular, an effort is made to determine the relationship between indices and the development status of the micro-regions. In this way, it is hoped that the elements of regional structure that contribute the most (and the least) to growth and development may be identified.

OBJECTIVES

This study is basically an attempt to explore new avenues in the search for solutions to regional problems based on the local development approach. Thus it complements work already underway as part of the Economic Council's larger Regional Development project. It should be made clear from the outset that this research does not seek to identify the causes or to trace the evolution of development (or under-development) as it now exists in the small regions of Canada. The theoretical framework and scientific methodology involved in such an exercise would be beyond the scope of this project. The primary objective of this

study is *to develop an analytical framework and the necessary tools to identify the potential and current state of development in small regions.* Thus particular attention will be paid to the latest research on regional and sub-regional disparities and to the relationship between disparities and economic development.

Certain specific objectives follow from the preceding orientation. The study will first attempt *to identify and adapt to the Canadian context those components of a regional system which are crucial to regional development.* This task will be based on a brief review of the literature and should serve to broaden our knowledge of the links between the various disparity measurements and the current state of development at the local and regional levels. By identifying the factors that contribute the most (and the least) to development in the context of an increasingly global economy, we will be in a position to single out the indicators that best describe the limits and possibilities involved in the task of improving a region's economic performance. Second, our research will aim *to verify the applicability of the proposed framework by drawing comparisons between several small regions according to the selected economic development indicators.* Finally, by analyzing the results of these comparisons, we should be able *to formulate recommendations that can be used to orient regional development policies..*

1. Review of the literature

1.1 THE CONCEPT OF ECONOMIC DEVELOPMENT

Because the concept of development is central to the debate, it is necessary to provide a general definition that can adequately serve our research objectives. Development, in the sense used here, is distinct from growth. Economic growth may be defined simply as increasing production, productivity and income per capita.[4] Economic development, on the other hand, involves changes in the relationship between the various inputs; it implies changes to the production process and all the elements of the system that are involved with it, whether they are economic or not:

> Although it includes economic growth as one of its essential aspects, [development] goes far beyond this to encompass the complex of interdependent changes in society as a whole, which carry society forward according to prevailing value-judgments.[5]

At one extreme, growth may actually impede development, by increasing income inequality, for instance. This can easily occur in a context of increasing economic concentration and wealth concentration, both at the regional and local levels. Because we are emphasizing small regions, the concept of local development needs defining. A brief review of the literature (see following section) reveals that relatively little theoretical and definitional work has been done in the field of local and regional research. The definition proposed by Coffey and Polèse appears satisfactory, however:

> We define *development* as a process of economic growth accompanied by a structural shift, that is both long-term and irreversible [....] Local development is [...] locally induced economic growth, occurring within the context of the existing free market system. [...] In essence, local development, as we define it, refers to a particular form of regional development in which endogeneous or local factors play a principal role.[6]

These endogeneous or local factors are increasingly attracting the attention of researchers interested in regional development. For example, small business's role in job creation, the potential of the service economy to stimulate growth in small regions, the strategic importance to development of financing and human resources, all figure increasingly prominently in the recent literature. Given the current context of tight federal government budgets (and, to a lesser extent, tight provincial budgets), these factors are likely to attract closer attention, since there is a strong probability that regional development funds will shrink, leaving regions and communities to fend for themselves and take their own development in hand. These factors have ushered in a new round in the development policy debate. In what follows, we examine these factors in more detail.

1.2 THE THEORY OF LOCAL DEVELOPMENT

After reviewing the abundant literature on regional issues and in light of our adoption of small geographic units, we became convinced of the need for a local development-based analytical framework. The fact that this approach concentrates on small-scale systems means that it has significant (and increasing) relevance to regional science theory. It also represents a departure from the more traditional ways of thinking which, while continuing to underlie most academic and political discussion, have not produced anything significantly new for some time.[7] The relative failure of regional development policies over the last 25 years -- policies usually based on traditional modes of thinking -- suggests that it is high time new approaches were tried.

Writers on regional development are increasingly adopting a local perspective, where the accent is placed squarely on small-scale systems. The increasing use of this approach as a basic framework is due in part to its simplicity and the

availability of numerous empirical studies (Coffey and Polèse, 1985; Coffey and Runte, 1986; Joyal, 1985; Julien, 1984; Martin, 1986). The popularity of this approach may also be attributed to renewed interest in local development within political, academic and community circles as a result of a growing focus on entrepreneurship and the role of small- and medium-sized business in job creation. On the other hand, the value of this analytical framework as a tool for analyzing regional disparities has not yet been demonstrated. The multi-faceted nature of the concept has given rise to complementary research of many different kinds, all sharing the use of the micro-region as a spatial reference.

At the same time, it must be recognized that the local development approach does not constitute a homogeneous school of thought, but is rather a catch-all term for a variety of approaches that share a micro-spatial orientation. Among the best-known of these points of view are the community approach (Association for Creating Enterprisers, 1986; McLeod, 1986; Newman et al., 1986), the informal economy (Joyal, 1985, 1987; Ross and Usher, 1986), and the somewhat less homogeneous approach based on development through entrepreneurship (Côté, 1986; Coffey and Polèse, 1985). The appeal and growing popularity of the entrepreneurship concept undoubtedly stem from the recent recognition of a very close link between job creation and small business, despite the fact that small business can also be responsible for significant job losses (Birch, 1979; Department of Regional and Economic Expansion, 1986; Ministère québecois de l'Industrie et du commerce, 1986)..

These approaches share a number of characteristics: a focus on small business and job creation, the social aspect of development, the concept of local control over rural development and planning, and the important role of financial and human resources in development. These considerations also served, in part, to guide the

choice the development indices used in this study. Before presenting the empirical results, however, the limitations and advantages of using this type of analytical instrument are discussed in the following section.

1.3 DEVELOPMENT INDICES

Indices have been used to compare the status and process of development in various regions on the basis of a variety of indicators. Development indices have also been employed to explain the basic factors and mechanisms of development in regions and nations. This last task has traditionally involved the use of analytical tools such as multiple regression and factorial analysis, the relative usefulness of which will be discussed later. It is not surprising, then, that sociologists and (to a lesser degree) economists have been trying for some 20 years now to construct development indices, particularly for comparing the level of development in "developing" nations with that of industrialized countries. Judging by the relative lack of economic literature on development indices, however, it appears that economists do not feel comfortable with this approach, since it deals with sociological, as well as economic, factors.

1.3.1 THE INHERENT ADVANTAGES OF DEVELOPMENT INDICES

A review of the literature on development indices reveals that a fair body of research exists in this area. Following the classification system suggested by Hicks and Streeten (1979), four separate approaches may be distinguished: (1) measurement of gross national product (GNP) and related approaches; (2) social indicators; (3) social accountability systems; (4) composite development indices. The essential difference between these approaches is the particular emphasis placed on comparisons of development between different units and on explanations of development in order to establish causal links. The choice of

approach and orientation depends primarily on the objectives, context and theoretical basis of the research.

In accordance with the specific objectives of the present research and in light of the inherent limits of certain approaches (discussed in the next section),[8] we have concentrated on constructing composite development indices. The merit of this approach is that it provides a unique method for drawing comparisons between different regions in terms of their development potential and status. There are, however, drawbacks to this approach; these are discussed in Section 1.3.3. An overview of the literature in this area reveals that a number of techniques have been used to construct indices of this kind:

- factorial analysis (Eberts and Young, 1971; Shin, 1977; Wish, 1986)
- taxonomic analysis (Harbinson et al., 1970)
- equivalent weighting, using average correlation coefficients (UNRISD, 1972), standardized variables (Lui, 1980; OPDQ, 1988a), or ranking by absolute value (CED, 1987; Wilford and Larson, 1979)
- use of preference functions (Berger et al., 1987).

These various techniques all have their advantages and disadvantages. Their usefulness relies heavily on the quality and quantity of information available and on the research objectives. It may be instructive, first of all, to review the respective advantages of these techniques. The wide variety of applications for development indices should also be made clear by this review.

Particularly during the 1970s and 1980s, vast numbers of studies adopted a sociological approach to comparing regions and countries from the point of view of level of development. Berger et al. (1987), Larson and Wilford (1979) and Lui (1980) all attempted to define and measure a composite quality-of-life indicator. Eberts and Young (1971), Shin (1977) and Wish (1986), on the other hand, used

factorial analysis to measure the explanatory power of a variety of indicators on development in various regions and nations. The work of these authors also revealed something of the interaction between sociological and economic variables. Eberts and Young concluded, for example, that, despite a certain degree of statistical association between them, the correlation between sociological and economic variables was weak.[9] Their analysis is useful for our purposes, because its comparison of cities in New York state presents some intriguing parallels with the present study. This analysis also suggests that statistical inference is an appropriate tool for assessing the interchangeability of different development measures.[10]

A study by the United Nations Research Institute for Social Development (UNRISD, 1972) proposes a quantitative approach to development that closely links the economic and social components. According to the theoretical framework of this study, development is, by its very nature, a system of interdependent variables whose degree of interrelation may be measured by statistical analysis. The authors thus suggest that variables exhibiting high degrees of correlation may be used as development indices. Similarly, Eberts and Young rejected variables with only weak statistical correlation to the others.[11]

A study conducted in United States by Harbinson et al. (1970), which follows the methodology used in the UNRISD study, represents an important contribution to the economic analysis of development indices. This quantitative study explores a variety of instruments and statistical techniques with a view towards ordering, classifying and comparing the development status of various inter- and intra-national regions. In particular, the study uses correlation to establish the relationships among the various indicators, multiple regression to establish causal links between the GNP and a series of socio-economic indicators, and,

finally, taxonomic analysis[12] to classify regions and countries. This latter technique is closely related to the composite development index approach. Intercorrelation coefficients are used to choose which indices will be included in the composite index. The authors suggest that variables with high degree of correlation should be retained, a conclusion that supports the approaches of Eberts and Young (1971) and Harbinson et al. (1970).

In the Canadian context, development indices have two purposes: (1) identification and analysis of regional disparities, and (2) implementation of regional development policies.[13] In the latter case, the federal government's Department of Regional and Economic Expansion has used indices to match the allocation of program funds to the development status of particular regions. It must be recognized, however, that the use of development indices in Canada is still not common and has been subject to strong criticism (see Section 1.3.3).

The Quebec government's Office de planification et de développement du Québec (OPDQ) has made development indices a major policy-making tool for its regional development initiatives to assist small regions in difficulty (the "municipalités régionales de comté" or "regional municipalities"). In a recent policy statement (October 1988),[14] the OPDQ presented the results of a comparative analysis of regional municipalities, which proposed the creation of an aggregate index comprising nine socio-economic indicators. For each indicator, a standardized index was calculated according to the average and the standard deviation. An aggregate index could then be computed to provide a basis for comparison and to rank regions according to their degree of economic hardship. This represents a most interesting approach, since it is relatively simple to apply and addresses some of the criticisms levelled at equivalent-weight methods. Unfortunately, the

OPDQ's work is of somewhat limited applicability since it was based on only nine socio-economic indicators.

1.3.2 THE "DEVELOPMENT REPORT CARD"

A recent study takes a radically new approach to the problem of regional disparities. The primary goal of the *Development Report Card*[15] devised by the Corporation for Enterprise Development (CED) is to present "a new yardstick for measuring the economic health of each of the fifty states in the Union and for exploring their ability to generate sustained and widely shared growth."[16] The study uses a varied series of development indices and four composite indices to compare 50 American states. This methodology has the merit of being relatively uncomplicated and of allowing a wide range of regional characteristics to be identified. Each index looks at a different aspect of the economy:

i) The Performance Index: this group of indicators measures the efficiency of an economic system in creating jobs, income and a favourable socio-economic environment for its residents. It also assesses the "vigour" of the system at a given time and its attractiveness in terms of quality of life and equity. This series includes aggregated indices for employment, income, job quality, equity and quality of life.

ii) The Business Vitality Index: the second group of economic indicators tries to determine the capacity of a system to adapt to economic cycles, competition, business downturns and major structural changes. It is interesting to note that this index is oriented towards small and medium-sized business; this reflects recent observations that job creation depends heavily on these economic units. The vitality indicator series is divided into two categories -- competitiveness and

entrepreneurial energy. The latter category includes indicators reporting the behaviour of small and medium-sized business.

iii) The Capacity Index: there are many kinds of resources and conditions that contribute to the economic framework of a region. Numerous studies have examined the relative contribution of these inputs and identified related obstacles to growth. This third group of indicators attempts to quantify the presence of these various elements; its indicators include human resource capacity, financial resource capacity, physical infrastructure and amenities.

iv) The Policies Index: this last group of indicators focuses on the dominant role played by governments in economic development. Measuring their activities poses some problems, however, because it is difficult to estimate the extent of intervention. This is why the *Development Report Card* restricts itself to simply indicating whether or not such programs and policies exist, rather than trying to measure their size and impact.

The construction of these four sub-indices and a composite index that aggregates all four was based on an in-depth study of the literature on economic development factors and obstacles to growth. The DRC's underlying theory of development is based on two inter-related themes:

- development depends essentially on human resources, and
- the key to long-term economic health is to invest in the talents and ideas of the population.[17]

The method used by the *Development Report Card* to formulate composite indices relies on a simple classification by absolute value of each of the indicators involved. First, the indicators are ordered and assigned a rank (from 1 to 50, for

each of the 50 American states) according to their relative performance. The final composite index is obtained by adding together these ranks and reclassifying according to the results. By assigning a constant weight to each indicator, we avoid the worst problems that plague all relative weighting techniques. By virtue of its simplicity, this system also possesses the advantage of being easy to understand and apply.

1.3.3 THE INHERENT LIMITATIONS OF DEVELOPMENT INDICES

One of the inherent limitations of using indices to make comparisons is that it is not possible (as it is with certain statistical methods) to establish causal links. Development indices give little indication of growth potential or promising avenues for maximizing development because they are essentially static in nature and because there is no way of knowing their relative contribution to the economic development of a region. The recent report of Canada's Task Force on Regional Development[18] also pointed out other drawbacks related to the use of indices:

- regions may not represent the most appropriate territorial unit to which to apply a development index;
- because of the complexity of the data requirements for constructing them, indices are not easy adaptable;
- indices will always be subject to problems associated with data errors, data comparability and availability, and statistical practices;
- overly complex indices may be misinterpreted.[19]

Hicks and Streeten (1979) and Silber (1983) enumerated the methodological difficulties involved at a more fundamental level, underlining the limits and problems connected with constructing development indices that encompass both sociological and economic factors. Their main conclusion was that traditional indicators, such as the gross national product (GNP), have clearly limited

usefulness as indicators of regions' development status. First of all, there are difficulties involved in establishing causal relations between dependent and independent variables (Kellman, 1976), and, second, there is a serious lack of good statistics. Echoing the sociological studies referred to earlier, the Harbinson study and others criticize the use of GNP and per capita income as development measurements on the same grounds. The difficulties involved in establishing causal relations between highly correlated indices is another problem.[20]

The development of composite indices, for its part, is hampered by the problem of assigning relative weights to the constituent indicators. A review of the literature reveals that there is no consensus on how to assign relative weights. UNRISD (1972) used the average degree of correlation between indicators to determine relative weights. This approach has been criticized by Hicks and Streeten (1979) on the grounds that assuming a normal statistical distribution of indicators is unrealistic.[21] Larson and Wilford (1979), CED (1987) and Harbinson et al. (1970) chose to assign equal weights to each indicator. This approach, too, has been criticized; the extent of the gaps within a given indicator are not taken into consideration. However, the limitations involved in assigning equal weights are, in our opinion, less serious than the problems involved in the other methods of weight assignment. Hicks and Streeten concluded that it is difficult to find a satisfactory solution to this problem:

> The chances of an acceptable system of weights being developed [...] are extremely small. Despite considerable research on composite indices, no one has come close to developing a rational weighting system. It is difficult even to suggest directions for future research.[22]

Berger et al. (1987) made use of a more complex methodology to construct a composite quality-of-life index from a series of indicators that were unequally weighted according to consumer preference and commodity functions. But

because of its emphasis on urban areas and quality-of-life indices, this approach, although attractive from the standpoint of methodology, is not well suited to analyzing rural areas or to handling a wide range of indicators, since a large number of statistical series is required. Above and beyond the problems involved in assigning relative weights, Hicks and Streeten (1979) point out some other important limitations of this approach:

> Despite the potential attractiveness of having a single index of socio-economic development, there is little theoretical guidance to govern the choice of indicators, the correct scaling of component indices, or the appropriate weights. Moreover, an index that relies only on ranking neglects the distance between ranks.[23]

On another front, the contradictions between certain studies should be pointed out, particularly those that use correlation measurement to select indicators and to assign weights. For example, Eberts and Young (1971) and Hicks and Streeten (1979) hold that development indices exhibiting a high correlation among themselves might be considered redundant. Harbinson et al. (1970), on the other hand, elected to eliminate variables that were only weakly correlated to the others in favour of strongly intercorrelated variables. Hicks and Streeten feel that such contradictions are due to differences in sources of information, the type of indicators used, and sampling and interpretation techniques.[24] These apparent contradictions make it difficult to select a single methodology that meets a wide range of needs. In such a context, the best approach is likely to adapt a method according to the specific objectives and particular context of the research.

The method based on attribution of equivalent weights and classification by absolute value (CED, 1987; Wilford and Larson, 1979) is also not without its problems. According to this approach, ranks are assigned to each index for each region according to real data or ratios. Each index is composed of a series of sub-indices and indicators[25] that are ordered according to the same procedure. Some

limitations to this approach must be noted. By not specifying a relative weight for indices, their relative importance is lost. For example, which index used in the *Development Report Card* is more important: "performance" or "capacity"? And within the "capacity" index, is the "technological innovation" sub-index more important than the "entrepreneurial awareness" sub-index? What relative weights should be assigned to each? Moreover, as Hicks and Streeten (1979) point out, rank-based indices ignore the actual distance between the ranks and the extent of deviation; we believe this represents a major difficulty. Another limitation stems from the fact that the results generated by these indices are strongly influenced by the choice of variables.[26]

These drawbacks led us to develop a method that combines equivalent weighting (CED, 1987) with standardized variables (OPDQ, 1988a). This approach meets our criteria for simplicity and ease of understanding and use, and represents an acceptable methodological compromise. The following section discusses this approach in greater detail.

2. An analytical framework adapted to the Quebec context

The work of the Corporation for Economic Development (CED) provided much of the initial inspiration for the development of our our series of development indices. Our indices, like those used in the *Development Report Card*, are designed to answer the following questions: (1) is the economy doing a good job of providing the region's inhabitants with opportunities for a better life (for example, in terms of job security); (2) are the enterprises located in the region vital to its growth and survival; (3) what is the economy's capacity to sustain growth and expand opportunities; and (4) what local initiatives have been taken to encourage socio-economic growth and development. However, there are significant differences between the indices developed by the CED and those used in our study. These differences stem primarily from the different context, the availability of statistics, and the methodology adopted.

2.1 THE QUEBEC CONTEXT

Although the *Development Report Card* serves as the basic model for our approach, it must be pointed out that the particular features of Quebec and its regions impose certain methodological constraints. In particular, the definition of basic statistical units[27] and the availability of statistics at the regional level represent important parameters that must be taken into consideration. One of the significant differences between the *Development Report Card* and our indices that influenced the choice of indicators is the respective size of the territorial units used.

The *Development Report Card* makes comparisons between the American states, some of which have more that 23 million people; the average population for the regions of Quebec is 650,000.[28] Because of this difference, we were cautious

when comparing indicators affected by scale economies and agglomeration effects, e.g., indicators related to the presence of head offices and the location of highly specialized tertiary services. Differences in the political and social systems of the two countries involved is another factor. In the United States, legislation potentially affecting regional development, in such areas as banking, the environment, taxation and business assistance, varies from one state to another. This is not a factor in the Quebec regions. The "policies" indicator developed for our analysis comprises only four indicators (compared to 31 for the *Development Report Card*), as a result of the difficulty we had in identifying indicators that reflected regional differences in development policies.

The polarizing effect of the Montreal region (which accounts for more than half the province's total population) is another factor which led us to weight most indicators according to population. There are marked contrasts between Quebec's administrative regions, in terms of both relative demographic size and social and industrial structure. Accordingly, statistical variations linked to scale economies and agglomeration effects play an important role (in favour of Montreal and, to a lesser extent, Quebec City) and so may influence how regions are classed by their development indices. Weighting indices according to demographic size is a simple (although incomplete) way to correct for these variations.

2.2 ADAPTING THE METHOD

The above considerations led us to adopt an approach that uses standardized indicators to make comparisons between regions, similar to the approach developed by the OPDQ (1988a) and to the selection of indices of the *Development Report Card*. This approach has the advantages of being very simple to apply and of allowing general comparisons to be made between regions on the basis on their

development indices. It is also hoped that these indices will make it easier to identify the weaknesses and obstacles connected with small-region development.

The method described above was used to construct composite development indices. These were based on 54 socio-economic indicators,[29] grouped into 4 indices as in the *Development Report Card*: the "performance," "capacity," "vitality" and "policies" indices. The choices made in the *Development Report Card* guided the selection of variables, but regional characteristics and data availability in Quebec's administrative regions were taken into account.[30] The indicators selected are in accord with recent research investigating the use of diversified indicators to describe the development process in micro-regions. The issues of enterpreneurship, local financing, infrastructure and human resources, for example, were important considerations in the indicator selection process.

Because of the relatively large number of variables used, it was impossible to obtain all the statistics for the same time period. In the case of annual data, we did our best to obtain the most recent data. Despite our efforts, some series date back to the 1981 Census, although most are for the 1986-87 period. This does not necessarily pose a problem when regions are being compared on the basis of a single statistic, but caution must be exercised in comparing series from different periods.

There are some noticeable differences between this methodology and that used in the *Development Report Card*; this study's methodology is closer in spirit to that of the OPDQ (1988a). Where the *Development Report Card* simply assigns a rank to each indicator on the basis of its absolute value, we elected to assign each indicator a standardized index adjusted to reflect the gap between it and the provincial average. This approach takes into account the distance or gaps between regions, and thus addresses one of Hicks and Streeten's (1979)

fundamental criticisms of equivalent-weight and absolute-value classification systems. This method also provides a common base for comparing the development of regions. The standardized index Z for a region i and a variable j is defined as follows:

$$Z = \frac{x_i - \mu_j}{\sigma_j}$$

where: x_i represents the real value of variable j for a region i;
μ_j represents the weighted mean of variable j; and
σ_j represents the standard deviation of variable j.

We have used a weighted, rather than an arithmetic, mean because of the wide variation in region sizes. The average μ_j for regions x_i to x_n is calculated by weighting the values for each region according to their respective populations, as expressed in the following formula:

$$\mu_j = \sum_{i=1}^{n}\left(\left(\frac{pop_i}{pop_Q}\right) \times x_i\right)$$

where: pop_i represents the population of region i;
pop_Q represents the population of the province of Quebec; and
x_i represents the real value of variable x for a region i.

Standard deviation is also calculated using weighted averages. Using standardized indices makes it possible to compare different indices on a relatively equal basis. If our variables followed the normal statistical distribution curve, approximately 66 per cent of all values for one particular variable would fall between -1 and +1 (i.e., a standardized standard deviation). Of course, strict conformity to a normal distribution curve is not to be expected; nevertheless,

according to our calculations, most of the values indeed fall between -1 and +1 (see Tables 1, 3, 5 and 7). Thus "standardized" values of variables will also lie between -1 and +1, meaning that their weight in the aggregate index formula will be more or less the same.

We have also reversed the sign of standardized indicators for which values above the mean would be considered an unfavourable indication. For example, the sign of the "crime rate" variable was reversed, since a rate above the Quebec average is clearly a bad sign. Thus, for any given index, a positive sign always indicates a favourable situation or above-average performance relative to the provincial mean. This becomes an important point when indicators are combined into sub-indices and then into an aggregate index. The sub-indices (which represent sets of indicators grouped together along the lines of the *Development Report Card*), as well as the aggregate index, are calculated by simply adding up their standardized indicators.

It is important to recognize the implications of the decision to assign equal weights to all indicators. Within the present framework, this choice means that the indices with a large number of indicators will carry more "weight" in the aggregate index. Thus the "capacity" index, because it comprises 22 of the 54 indicators used in the development indices, has more than twice as much weight as the "vitality" index, which has only 10 indicators. Care must thus be exercised when analyzing the aggregate development index to keep in mind that there is an inherent bias because of the different number of indicators included in the four indices (performance, vitality, capacity and policies). The question of weighting is, in the end, a judgment call that depends on the intended use of the indices, just as does the selection of which variables to include in the indices. For example, a municipality that is primarily interested in entrepreneurial development could

assign relatively more weight to the indicators making up the vitality index (or whatever index has been constructed for the purpose).

3. Results and analysis

Chapter 3 presents the results of our analysis of the Quebec regions using standardized indices calculated according to the methodology laid out in the preceding chapter. The first section of this chapter presents the indices one-by-one and describes some groupings similar to those in the *Development Report Card*. A final classification is then proposed and briefly discussed. This section will remain primarily descriptive, since comparative indices do not allow causal links to be drawn between indicators. The second section explores some implications of previous observations. In particular, some tentative strategies will be suggested for addressing the regional weaknesses identified by the development indices.

3.1 PRESENTATION OF DEVELOPMENT INDICES

3.1.1 PERFORMANCE INDEX

This series of indicators draws regional comparisons according to the opportunities available to the residents to better their living and working conditions. It comprises the traditional indicators of income and employment, as well as sub-indices relating to quality of work, equity, and quality of life. In total, 18 variables go into the making of these five indices.[31] Regional "performance" is thus meant to be taken in the widest sense and includes indicators of economic efficiency (employment growth, unemployment rate, income levels and growth), equity (GINI coefficients, number of families under the poverty line, etc.) and redistribution (number of families receiving social assistance, social services per capita). Table 1 shows the ranking of regions for each of the indicators included in the performance index.

Table 1

Performance index - Standardized indicators
Quebec regions

	Employment				Income					Qua. work			Equity		Quality of life			
Region	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18
01*	0.14	-2.16	-2.45	0.36	-1.74	1.07	-1.99	-2.43	-1.65	-0.75	-1.15	0.70	-0.76	1.94	0.34	0.45	-2.03	-0.10
02	1.39	-0.95	-0.56	0.89	-1.28	-1.07	-0.47	-0.45	-0.95	0.90	-1.15	0.50	-1.40	1.16	-1.50	-1.66	-1.49	-0.57
03	-0.39	-0.38	0.59	0.57	-0.26	0.93	-0.15	0.36	-0.22	-0.68	-0.58	-0.15	-0.09	1.15	0.04	0.30	-0.62	0.38
04	1.02	-0.46	-0.35	0.10	-1.05	0.14	-1.31	-0.59	-0.73	-1.02	-0.19	0.61	-0.50	0.53	-0.01	0.72	-0.01	-0.89
05	0.59	-0.35	0.38	0.57	-0.94	0.29	-1.09	-0.18	-0.33	-1.29	-1.15	-0.63	0.24	0.10	-0.62	0.00	-0.04	-0.57
06	-0.21	0.38	0.15	-0.36	0.54	-0.07	0.49	0.26	0.46	-0.05	0.58	0.23	-0.13	-0.75	0.30	-0.01	0.49	-0.10
07	0.60	1.01	-0.47	0.31	0.06	0.57	-0.26	-0.74	0.12	0.63	0.19	1.41	0.64	-0.10	-1.07	-0.62	0.72	2.44
08	1.72	-0.60	-0.24	2.45	-0.67	0.36	-0.31	0.22	-0.88	1.16	-1.73	-1.95	-0.71	0.81	-1.66	-0.95	0.49	-0.10
09	-1.08	0.65	-0.88	0.42	-0.73	-2.07	0.72	-0.85	-1.63	1.31	-0.58	-0.78	-2.08	0.17	-1.12	-1.77	0.52	-0.57

Source: See Appendix B; author's estimates

Description of variables

P1: Employment growth, 1984-86
P2: Participation rate, 1986
P3: Unemployment rate, 1986
P4: Average unemployment spell, 1986
P5: Earned income per capita, 1986
P6: Income growth, 1981-86
P7: % of family incomes < $20,000, 1981
P8: Percent. social assistance recipients, 1987
P9: % of persons below poverty line, 1985
P10: Average weekly wage, 1985
P11: Job-related deaths/1000 workers, 1986
P12: On-the-job injuries per 1000 workers, 1986
P13: Gini coefficients, 1985
P14: Benefits paid to single-parent families, 1987
P15: Life expectancy for men , 1980-82
P16: Life expectancy for women, 1980-82
P17: Infant mortality, 1984
P18: Social workers per capita, 1983

* 01 = Bas St-Laurent/Gaspésie
02 = Saguenay/Lac St-Jean
03 = Québec
04 = Mauricie/Bois-Francs
05 = Estrie
06 = Montréal
07 = Outaouais
08 = Abitibi-Témiscamingue
09 = Côte-Nord/Nouveau-Québec

Tables 1 and 2 show that economic recovery since the 1982 recession has been strong in some regions and less so in others. Overall, the most highly urbanized and industrially diversified regions performed the best. The strength of the Outaouais in combating unemployment and in labour market participation (as measured by the participation rate) contributed its strong showing. This region also stands out in terms of employment and job security. The regions of

Mauricie/Bois-Francs and Estrie, which may be considered among the most developed, fell below the Quebec average. As a result of their less-competitive commodity-based manufacturing sectors, these regions are still suffering from the effects of the 1982 recession. Lower wages, more frequent on-the-job accidents, and poor results in some quality-of-life indicators also helped to push these two regions below the provincial average.

Table 2

Performance index - Sub-indices and total
Quebec regions

Regions	Employm	Income	Quality of work	Equity	Quality of life	Total
Bas St-Laurent/Gaspésie	-4.11	-6.74	-1.20	1.18	-1.34	-12.21
Saguenay/Lac St-Jean	0.77	-4.22	0.25	-0.24	-5.22	-8.66
Québec	0.39	0.66	-1.41	1.06	0.10	0.80
Mauricie/Bois-Francs	0.31	-3.54	-0.60	0.03	-0.19	-3.99
Estrie	1.19	-2.25	-3.07	0.34	-1.23	-5.02
Montréal	-0.04	1.68	0.76	-0.88	0.68	2.20
Outaouais	1.45	-0.25	2.23	0.54	1.47	5.44
Abitibi-Témiscamingue	3.33	-1.28	-2.52	0.10	-2.22	-2.59
Côte-Nord/Nouveau-Qué.	-0.89	-4.56	-0.05	-1.91	-2.94	-10.35
Province	0.00	0.00	0.00	0.00	0.00	0.00

Source: See Appendix B; author's estimates

It is somewhat surprising that the Montreal region, generally considered the most dynamic in the province, falls below the Quebec average under the "employment" sub-index. The full impact of Montreal's industrial revival has apparently not yet been felt, and several manufacturing sectors in the region suffer from poor productivity (OPDQ, 1988b). Generally speaking, peripheral regions[32] lag behind in all areas, with the exception of the Abitibi-Témiscamingue region. This region's good job-creation record is likely due to its healthy mining

industry, which has benefited from the flow-through shares program. This program is credited with helping to put mining exploration back on its feet; this industry accounted for over $500 million in 1987.

The performance of the peripheral regions in terms of equity and quality of life was average for the most part, with the exception of Bas St-Laurent/Gaspésie. These results probably reflect the inconsistent effects of income distribution instruments, such as welfare and employment support programs. Weakness in the areas of job creation and income maintenance is the result of lower industrial diversification in these regions, making them more vulnerable to the effects of investment and consumption cycles and commodity-price fluctuations.

3.1.2 CAPACITY INDEX

The capacity index represents a more indirect way of measuring regional development, because it reflects regions' potential in terms of human and financial resources, physical infrastructure and commodities. The three sub-indices are constructed from 22 socio-economic variables. The capacity index takes the presence of resources into account, without providing any information on how they are used. The available data on financial resources are clearly inadequate, and so the indicators used for this sub-index must be used with caution.[33] Nevertheless, there are some interesting observations to be made from Tables 3 and 4.

Table 3

Capacity index - Standardized indicators
Quebec regions

	Human resources							Financial resources				
Region	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
01*	-1.01	-1.18	0.71	1.40	0.60	2.14	0.54	-1.30	-0.15	-1.12	-1.47	0.32
02	0.71	-1.03	0.51	1.05	-0.20	0.43	0.29	-1.05	-0.69	-1.25	-1.46	1.19
03	1.08	0.00	0.05	-0.34	-0.60	-0.71	-0.04	-0.40	1.58	-0.09	0.13	-1.32
04	0.83	-1.01	-0.21	0.27	0.00	0.36	0.13	-0.85	1.52	-0.29	0.12	-0.76
05	0.36	-0.32	-0.02	1.60	1.00	0.00	0.25	-0.70	0.23	-0.05	0.25	0.73
06	-0.20	0.43	-0.29	-0.29	-1.60	-1.14	-0.04	0.60	-0.48	0.38	0.30	0.52
07	-1.44	-0.14	0.59	-0.43	-0.20	0.79	0.75	-1.00	-0.31	-0.24	-0.73	1.52
08	-0.88	-1.32	0.52	0.86	1.40	0.00	-0.58	0.05	-0.67	-1.26	-0.70	0.50
09	-1.27	-1.57	2.55	1.08	0.60	0.57	-2.58	-1.50	-1.36	-1.81	-1.58	-0.88

	Amenities									
Region	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22
01*	-0.70	-0.73	-0.05	-1.70	-0.56	0.72	0.92	1.90	-0.74	1.52
02	-1.00	-0.83	-0.30	-1.90	1.11	1.06	-0.18	0.50	-1.14	0.94
03	0.00	0.47	0.70	-0.90	-0.67	0.28	1.74	0.68	1.66	0.78
04	-0.90	-0.83	-2.05	-1.10	0.78	-0.28	-0.03	0.72	-1.07	1.08
05	0.30	0.50	0.30	0.90	-0.11	0.00	1.38	0.95	-0.52	0.77
06	0.20	-0.03	-0.05	0.70	-0.11	-0.39	-0.82	-0.68	-0.04	-0.59
07	-0.80	-1.77	-0.85	-0.10	-0.11	0.56	-0.41	0.32	-1.30	-0.75
08	-1.10	-0.67	-0.45	-1.20	1.78	2.44	1.18	1.27	-0.58	0.79
09	-1.20	-1.23	-1.30	-1.80	1.33	-0.39	-0.18	-0.23	0.00	0.94

Source: See Appendix B; author's estimates

Description of variables

C1: Scholastic achievement rate, 1986
C2: University graduates per capita, 1983-84
C3: Public exp. per student, school bds, 1981-82
C4: Public exp. per student, colleges, 1981-82
C5: Student-teacher ratio, pre-college, 1984-85
C6: Student-teacher ratio, college , 1984-85
C7: Student-teacher ratio, university, 1984-85
C8: Number of patents per 1000 residents
C9: Cash deposits per capita, 1983-85
C10: Retirement income per capita, 1982.
C11: Investment income per capita, 1982.
C12: Loan/assets ratio, caisses popul., 1985
C13: Physicians per capita, 1983
C14: Hospital employees per capita, 1982-83
C15: # of hospital beds per capita, 1982-83
C16: Number of daycare places per capita, 1984
C17: Numb. of libraries / 1000 residents, 1984
C18: Number of movie theatres per 1000, 1984
C19: Traditional cultural facilities/1000, 1984
C20: Socio-community facilities per 1000, 1984
C21: Distribution of cultural subsidies, 1987
C22: Crime rate per 1000 residents, 1986

* 01 = Bas St-Laurent/Gaspésie
02 = Saguenay/Lac St-Jean
03 = Québec
04 = Mauricie/Bois-Francs
05 = Estrie
06 = Montréal
07 = Outaouais
08 = Abitibi-Témiscamingue
09 = Côte-Nord/Nouveau-Québec

Table 4 suggests that Estrie and Quebec City display a strong potential for sustained economic growth and offer their residents an environment (in terms of amenities, educational facilities and financial resources) slightly better than the Quebec average. Quebec City's strong showing is primarily the result of its lead in human and physical resources and amenities. Relatively speaking, this region boasts a greater number of college and university graduates, spends more on technological research and development, has the highest student-teacher ratio, and enjoys ample supplies of all amenities. These advantages suggest that this region's development potential is high. In Estrie, hospital capacity ranks high, educational infrastructure is well developed, and financial resources are better than the provincial average.

Table 4

Capacity index - Sub-indices and total
Quebec regions

Regions	Human resources	Financial resources	Amenities	Total
Bas St-Laurent/Gaspésie	1.90	-2.42	0.58	**0.06**
Saguenay/Lac St-Jean	0.71	-2.21	-1.74	**-3.24**
Québec	-0.96	0.30	4.74	**4.08**
Mauricie/Bois-Francs	-0.48	0.59	-3.68	**-3.57**
Estrie	2.17	1.16	4.47	**7.80**
Montréal	-2.53	0.72	-1.81	**-3.62**
Outaouais	-1.08	0.24	-5.21	**-6.05**
Abitibi-Témiscamingue	0.05	-2.13	3.46	**1.38**
Côte-Nord/Nouveau-Qué.	-2.12	-5.63	-4.06	**-11.81**
Province	0.00	0.00	0.00	**0.00**

Source: See Appendix B; author's estimates

Not all peripheral areas fare poorly. Bas St-Laurent/Gaspésie, for example, slightly leads the Quebec average under all "capacity" indicators, thanks to its human resources and amenities. It actually out-performs the more developed Mauricie/Bois-Francs, Montreal and Outaouais regions in this respect. The last region rates poorly under the capacity index as a result of its poor performance under the "human resources" sub-index and very poor performance under "amenities," and also scores particularly poorly in terms of education and hospital and socio-cultural equipment. The attraction of the neighbouring Ottawa-Carleton region and its role as a supplier of services has likely contributed to this situation. It is interesting to note, however, that this region also placed highly under the performance index. There are a number of possible explanations for this apparent contradiction.

First, it is possible that there is no direct relation, during a particular period, between a region's capacity and resource base, on the one hand, and its economic performance, on the other. It may be that the adverse effects of a weak resource base take a certain length of time to be felt. It will be interesting to see what the economic performance of the Outaouais will be like in a few years. Second, it is possible that the Outaouais's strong performance is linked mainly to factors that have little direct bearing on the structural capacity of the region to support development. The favourable economic climate at the national level and the region's dependence on the forestry, pulp and paper and chemical industries (which all appear to be doing well in the present economic climate) support this line of reasoning. A third possible explanation for this apparent contradiction is inherent weaknesses in our choice of indicators.

The first-place showing of Quebec City under the "amenities" sub-index indicates that a distinction could be made between what we might term "political

infrastructure" and "market infrastructure." One might conclude that the reason Quebec City is well-off in terms of amenities is its status as a provincial capital, which leads to relatively higher level of public investment in infrastructure (or, more properly, political infrastructure). This argument does not stand up, however, in light of the fact that, between 1978 and 1985, public capital expenditures remained, on the average, below what one would expect on the basis of the demographic weight of these regions.[34] Thus the explanation for Quebec City's high amenities ranking must lie elsewhere.

3.1.3 THE VITALITY INDEX

The vitality index reflects the important place accorded to entrepreneurship and small and medium-sized enterprise (SME) in recent research on regional development. SME is often considered to possess the kind of flexibility and vitality needed to weather business downturns and economic cycles,[35] even though the SME failure rate is quite high. The index comprises 10 indicators divided into two sub-indices -- competitiveness and entrepreneurial energy. Our measure of competitiveness includes variables such as out-of-region exports, sectoral investments, and added value. Entrepreneurial energy is measured by indicators such as the relative importance of SME in the economy, professional training, and the proportion of self-employed workers in the labour force. These indicators represent an indirect way of measuring a region's competitive edge.

Table 5

Vitality index - Standardized indicators
Quebec regions

	Competitiveness					Entrepreneurial energy				
Regions	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
01	1.16	0.07	-0.66	-1.13	0.02	-1.11	2.18	0.03	1.61	2.19
02	1.15	0.11	0.85	-0.43	1.47	-0.69	0.17	-1.40	-0.43	-0.29
03	-0.66	-0.02	-0.38	0.08	0.36	-0.79	0.87	0.36	0.59	-0.35
04	0.60	0.05	1.04	-0.16	0.05	-0.85	0.78	-0.12	0.98	-0.36
05	0.33	0.14	2.34	-0.55	0.63	-0.96	-0.17	-0.17	-0.43	0.03
06	-0.22	-0.17	-0.19	0.02	-0.11	0.69	-0.35	0.13	-0.28	-0.03
07	-0.05	-0.05	0.08	1.15	0.77	-1.08	0.44	-0.90	0.28	-0.40
08	1.48	1.81	-0.28	-0.04	-0.29	-1.07	0.65	-1.33	-0.98	0.85
09	1.48	2.16	0.08	2.21	-2.15	-1.11	1.04	-1.81	-1.61	1.41

Source: See Appendix B; author's estimates

Description of variables

V1: % man. goods exported, Quebec, 1984
V2: Public/private invest. by ind., primary, 1986
V3: Public/priv. invest. by ind., second., 1986
V4: Public/private invest. by ind., tertiary, 1986
V5: Added value, SME, 1986
V6: High-growth man. ind., empl. per 1000, 1986
V7: SME growth rate, 1987
V8: Number of SME In economy, 1987
V9: Entrepreneur/taxfiler ratio, 1982
V10: Days of training per 1000 residents, 1987-88

The indicators listed in Tables 5 and 6 show some rather surprising results and some marked contrasts between regions. Montreal, for example, is the only region that lags overall behind the provincial average. Real estate investment (which totaled more than $18 billion in 1986) tended to favour other regions over Montreal. The Outaouais and Estrie regions saw their shares of total investment rise from 2.2 to 5.2 per cent and from 2.8 to 5.3 per cent, respectively (OPDQ, 1988a). Mauricie/Bois-Francs also consistently exceeded the provincial average under "vitality." The outstanding features of this region are vigorous growth, a strong SME sector, and a tendency to attract high-growth enterprises.

It is surprising to note that Bas St-Laurent/Gaspésie ranks last under competitiveness, yet first under entrepreneurial energy. This region's poor showing in terms of competitiveness may be due to investment weakness in secondary and tertiary industries and a lack of dynamism in its manufacturing structure.[36] Entrepreneurial energy does not seem to be entirely absent, as indicated by its showing under SME growth, the self-employed worker/taxpayer ratio, and professional training. These three indicators may reflect the fact that the economy in this region is seasonal and depends heavily on fishing and individual transfers to maintain personal income levels. Many workers look for something else to do during the off-season, which explains the high level of professional training and the high self-employed worker/taxpayer ratio. Accordingly, the ability of our indicators to accurately measure entrepreneurial energy could probably be improved.[37]

Table 6

Vitality index - Sub-indices and total
Quebec regions

Regions	Competitiveness	Entrepren. energy	Total
Bas St-Laurent/Gaspésie	-1.65	6.01	**4.36**
Saguenay/Lac St-Jean	2.46	-1.95	**0.51**
Québec	-1.41	1.47	**0.06**
Mauricie/Bois-Francs	0.73	1.28	**2.01**
Estrie	1.93	-0.74	**1.19**
Montréal	0.02	-0.53	**-0.51**
Outaouais	0.82	-0.58	**0.24**
Abitibi-Témiscamingue	1.61	-0.81	**0.80**
Côte-Nord/Nouveau-Qué.	2.67	-0.97	**1.70**
Province	0.00	0.00	**0.00**

Source: See Appendix B; author's estimates

The Estrie and Mauricie/Bois-Francs regions both place quite well. These regions were severely affected by the 1982 recession but have since made strong recoveries. In Estrie, capital expenditures in the manufacturing sector doubled in 1986 to $513 million. Mauricie/Bois-Francs has also experienced a boom in residential and industrial construction.[38] It is surprising that Quebec City (including the sub-region of Beauce) does not rank highly among "entrepreneurial" regions. Beauce has a reputation for entrepreneurial dynamism and a burgeoning SME-based economy.[39] It is possible that more disaggregated statistics, by making it possible to differentiate Beauce from neighbouring Quebec City, would have produced a different picture of the Beauce region. It is also possible that because the phenomenon of entrepreneurship is so poorly understood, it is not captured adequately by the indicators selected.

Another interesting result is the clear dominance of peripheral regions under the V1 indicator (manufactured goods exported from Quebec). Here, the four peripheral areas outscore all the other regions of Quebec. These results suggest that the interior industrial structure of Quebec is highly differentiated spatially between, on the one hand, resource-based regions that export raw and semi-finished materials, and, on the other, urban areas where the majority of production is in the form of services. In fact, of course, regions cannot really be categorized so casually. Still, the V1 indicator results point to a very clear geographical division in terms of exports. Additional research could no doubt shed more light on this question.

3.1.4 POLICIES INDEX

The policies index is designed to measure institutional initiatives to encourage regional growth and development. We feel the selected indicators reflect the

differences in the explicit and organized efforts of regions to develop their territories. The tax burden, urban planning and development, the presence of development corporations and "computer literacy" initiatives all reflect such efforts. This index also attempts to take into account the trend for regions to take charge of their own development. The concept of local autonomy is, of course, difficult to describe in quantitative terms, although it is more and more a subject of research.[40]

Table 7

Policies index - Standardized indicators and total
Quebec regions

Region	Po1	Po2	Po3	Po4	Total
Bas St-Laurent/Gaspésie	0.69	-0.65	2.63	0.33	**3.00**
Saguenay/Lac St-Jean	0.39	-0.19	0.63	1.40	**2.23**
Québec	0.20	-0.51	0.63	0.66	**0.98**
Mauricie/Bois-Francs	0.57	-0.65	-0.25	0.99	**0.66**
Estrie	0.33	-0.37	-0.50	-0.91	**-1.45**
Montréal	-2.53	2.46	-0.50	-0.41	**-0.98**
Outaouais	0.16	-0.22	-0.50	0.66	**0.10**
Abitibi-Témiscamingue	0.65	-0.74	-0.50	1.24	**0.65**
Côte-Nord/Nouv.-Qué.	-0.21	-0.27	-0.25	1.24	**0.51**
Province	0.00	0.00	0.00	0.00	**0.00**

Source: See Appendix B; author's estimates

Description of variables
Po1: Municipal tax burden per capita, 1984
Po2: Town planning and urban development expenditures per capita, 1984
Po3: Development corporations per 1000 residents, 1986-87
Po4: Computer literacy rate, student/computer ratio, 1985-86

It is interesting that all the so-called peripheral regions place above the Quebec average. Regions' tax burdens, with the exception of Côte-Nord/Nouveau-Québec, seem correlated to the degree of regional urbanization. Montreal comes in last under this indicator, behind the Côte-Nord/Nouveau-Québec, Outaouais and

Quebec City regions. The size of the tax burden in Côte-Nord/Nouveau-Québec likely reflects the high cost of maintaining public services in this remote location under severe weather conditions.

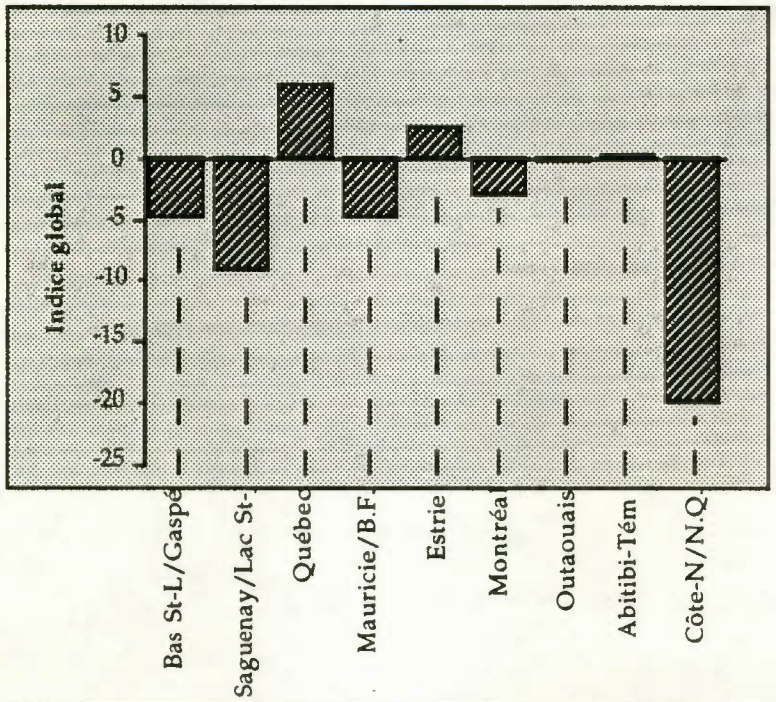
As reported in recent research, community involvement and municipal initiatives in the area of economic development are becoming increasingly important phenomena. Available statistics, however, do not adequately reflect these phenomena. We recognize that the indicators used to construct our policies index are imperfect; the fact they are so few may partially explain the nature of the results obtained. Contradictions aside, the ranking of the so-called peripheral regions is definitely surprising, and it may be that a larger number of indicators or simply better indicators would have produced a different ranking than that reported here.

3.1.5 AGGREGATE DEVELOPMENT INDEX

The totals of the regions under the four indices allows us to calculate an aggregate index using the same method as used to construct indices from standardized indicators. This aggregate index allows more general comparisons to be drawn between the various regions. Since standardized indicators were used, the final ranking indirectly gives us a picture of the actual gaps between regions. For example, a region with a very low negative aggregate index will be in a worse position than another with a higher, though still negative, index.

Chart 1

Aggregate index
Quebec regions



Source: See Appendix B; author's estimates

It is interesting to note, on the basis of the totals for each index, that several regions score very differently under different indices. For example, Bas St-Laurent/Gaspésie ranks poorly under the performance index, yet places much higher under the policies index. Similarly, the Outaouais tops the list in terms of performance, but fares poorly under the capacity index. Montreal, Quebec City and Saguenay/Lac St-Jean also exhibit similar contrasts. This might suggest that there is little direct link between indices and their constituent indicators. However, simple correlation analysis was used to determine whether there were any statistically significant links between indicators. This analysis confirmed that only a minority of indicators exhibited strong correlation, although a larger number showed significant correlation.[41]

It is also apparent that the urban regions of Quebec City and Estrie outperformed the majority of regions. Estrie's fine showing can be attributed to its excellent rating under the capacity index. The fact that the component indicators of the index are weighted more or less equally and that the capacity index has a larger number of indicators clearly worked to Estrie's advantage. Quebec City, on the other hand, fared well because of its above-average performance under all four indices. It is worth noting that Montreal, despite being more highly developed and industrially diversified, ended up with an aggregate index below the Quebec average. The peripheral regions also ranked down the list, particularly Côte-Nord/Nouveau-Québec and Saguenay/Lac St-Jean. It would thus appear that all the central regions of the province with attractive amenities, an educated workforce, and adequate infrastructure enjoy a head start over the others.

3.2 IMPLICATIONS FOR REGIONAL DEVELOPMENT POLICIES

The construction of development indices as reported in this study has some interesting implications for regional development policies. The development indices presented in this study constitute a useful guide upon which to base regional development policies. For example, different levels of government may follow the methodology proposed in this paper to select those indices that will best help guide their development strategies.

3.2.1 A REGIONAL SELF-ASSESSMENT TOOL

The desire of communities and regions to assume responsibility for their own development seems to have grown stronger in the face of the relative failure of government policies to foster development in disadvantaged regions and the financial constraints that now prevent governments from investing further in regional development. In such a context, the keys to regional development are

efficient utilization of resources and dismantling obstacles to development. If communities are to succeed in promoting development, they will need a way to assess their particular strengths and weaknesses. Development indices, because they include a large number of indicators, represent a useful tool for identifying such obstacles. Moreover, they can point out promising directions for promoting economic development and growth.

The results obtained using the regions of Quebec have demonstrated the difficulties involved in drawing regional comparisons. On the one hand, there may be significant intra-regional disparities that are not reflected in the indices,[42] even though, for our purposes, the choice of administrative regions provided sufficient detail. On the other hand, it is always a delicate task to compare Quebec regions because there are important structural differences between them that cannot be ignored. In this regard, the usefulness of drawing a comparison between, for example, the Montreal region and the the Côte-Nord/Nouveau-Québec region is limited.

In light of the preceding discussion, development indices appear to offer promise as self-assessment tools. A region that scored poorly under a particular index could act upon this information to improve the situation. The identification of such weaknesses could help decide the orientation of regional development initiatives. Similarly, a region in a favourable position could turn its comparative advantage into a development lever. The greatest benefits of such an approach could probably be achieved through a system of assessing development indices on a regular basis, say, yearly. In this way, a region could follow its progress (or lack of progress) in relation to the rest of the province and take corrective action to enhance its development. Regular updating of indices would also facilitate long-

term development planning by helping to group problems as requiring short, medium or long-term solutions.[43]

The precarious economic situation in several regions of our country and the closure of many single-industry towns point to the importance of being able to predict catastrophe instead of reacting to it (as is now the case).[44] Establishing a system of development indicators, which is intrinsically an introspective process, seems to have good potential as a preventive measure and an economic diversification strategy. In particular, the identification of regional weaknesses can help point out which regional resources are inadequate and which are under-utilized. Recent efforts to develop a vulnerability index indicate a growing interest in providing regions and communities with a way to conduct their own self-assessments.[45]

It must be acknowledged, however, that there are certain difficulties involved with using the indices developed here for self-assessment purposes. For example, assessing a region's progress is difficult with indices that reflect a relative classification of the regions involved. Region A might well see improvements in its relative position from one year to the next for the simple reason that other regions are faring poorly. To avoid this problem, national averages could be used in place of provincial averages. The use of time-series is another means by which self-assessment could be enhanced.

3.2.2 THE COMPREHENSIVE DEVELOPMENT CONCEPT

Choosing development indicators that include qualitative as well as quantitative indicators is in keeping with a vision of development that is comprehensive, global, and multi-dimensional. In adopting this point of view, we have had to transcend the sectoral perspective that has for too long characterized regional

development efforts in Canada. To use development indices is to recognize that regional development is an interactive process involving all regional actors -- private enterprise, the various levels of governments, unions, and community and social organizations.

The results of our analysis of the Quebec regions suggests that regions where essential resources such as qualified manpower are under-developed will experience particular difficulty in maintaining their momentum. These regions are already lagging behind their neighbours and run the risk of never catching up if they do not act to improve the quality (or quantity) of their resources. The broader implication of this finding is that development is intimately linked to optimizing the combination of resources in a particular area. While our research has not pinpointed the respective contributions of such resources to overall development, it has at least made it possible to identify the strengths and weaknesses that determine a region's development status.

3.2.3 AN APPROACH WELL SUITED TO REGIONAL NEEDS?

One advantage of using a relatively simple system based on standardized indicators to establish development indices is that such an approach is accessible to the regions and communities interested in using it. The construction and interpretation of indices does not require specialized knowledge of economic analysis, a fact which further increases its attractiveness for regional and local actors and decision-makers. This is a very important factor in light of the increasingly common desire of regions and communities to become active participants in the planning and implementation of their own development. Simple but detailed development indices provide regional actors with a working tool that can be mastered without outside help. Such indices can thus enhance regional independence and respect regional interests.

A close look at the development indices presented in this study reveals that the specifically urban nature of several of them makes them much more suited to studying urban regions and communities than rural. For example, the indicator for the presence of high-growth companies and that referring to the number of movie theatres per 1000 residents both have a distinctly urban flavour. (It must be remembered that we used a model developed for the American states; adjustments are inevitable if this model is to be applied to, for example, communities in Nova Scotia.) In light of this bias, we suggest that the choice of socio-economic indicators should be made according to local characteristics and priorities. The model presented in this study does not claim to offer a universal framework according to which all regions and all communities may construct their own series of development indices. Each user must select the best indicators for the job, assigning relative weights to them according to established priorities if need be.

Our research has also shown the importance of a high-quality, wide-ranging statistical base at the regional (and preferably the sub-regional) level. The decision to develop a series of indicators for the regions of Quebec was based partly on the fact that the statistical base at the micro-regional level was larger and more complete for this province than for other regions of the country. Nevertheless, it is important to point out that the research work required to develop a diversified series of indicators (we took into account 54 socio-economic variables) is considerable.[46] The collection, processing, and analysis of the statistical data used to construct our indices took months of work. Yet this work is still less technical than that required for the kind of econometric analyses and impact studies that have long dominated regional development research.

An overview of the literature and available statistical sources suggested that applying the technique used in the present study to other regions of Canada would run squarely into problems involving the scarcity and lack of homogeneity of micro-regional data. Indeed, data on financial flows, sectoral investment, commodities, exports, and SME presented certain problems. From the example of Quebec and in light of the potential utility of development indices, it is clear that it would be extremely useful and beneficial for governments to allocate resources to the development of a solid statistical base at the micro-regional level.

Such an effort would greatly benefit from cooperation between institutions at the local and provincial levels. Local and regional actors know better than anyone else the type of statistical data needed on their home turf. They can also supply data to others on occasion (such as data on municipal finances and community economic development corporations). In addition, the organizations traditionally looked to for statistics collection and dissemination (Statistics Canada, the Bureau de la Statistique du Québec, etc.) should start to take greater heed of the requirements of regions and sub-regions.

CONCLUSION

Macro-economic analyses relying heavily on unemployment and income indicators have tended to dominate discussions of regional disparity over the last several years. Development indices provide a new perspective on regional disparities. First, analysis at the micro-regional level is more precise. This approach reveals that there are pronounced intra-regional disparities within the major regions of Canada. It also reveals that the scope of regional development problems can only be appreciated by looking beyond traditional indicators. We believe, in fact, that it is essential to supplement current macroeconomic analyses through a disaggregated approach such as the one reported here. In this way, the respective contributions of regional resources to national growth may be identified. A methodological framework to allow this kind of microeconomic data to be incorporated into a larger analysis remains to be developed.

The establishment of development indices for the regions of Quebec shows that the benefits of urbanization are an extremely important factor in the regional development equation. While we did not try to establish causal links between the various indices and the final regional ranking, it is clear that the central regions of Quebec can boast better performance, more vitality and a superior capacity for self-development than the peripheral regions. These advantages are evident despite our efforts to eliminate the urban effect by weighting most of the indicators according to regional demographic weight.

It may be that economies of scale and agglomeration effects play a significant role. Yet we have also seen that the peripheral regions enjoy certain clear advantages because of their resource bases. This indicates that development possibilities exist in many areas of Quebec, as long as resources are utilized

efficiently and combined effectively (perhaps with resources lacking locally imported from outside), in conjunction with clear developmental objectives.

The approach we have advocated here is not without its limitations. In particular, there are certain weaknesses involved in a standardized-indicator system that assigns equivalent weight to each indicator; for instance, the predictive power of the constituent indices and indicators is ignored. Thus the usefulness of this approach for a regional development theory is slightly weakened. Research remains to be done on assessing the links between the various indicators and the developmental status of regions. There are also specific problems involved in constructing some of the indices. Our policies index, for example, remains too blunt an instrument, relatively speaking, because of the difficulty of adequately measuring political intervention at the micro-regional level. Work remains to be done on developingindicators that will be able to take this important aspect of the regional riddle more fully into account.

It will also be necessary to see how well the development indices approach works with other regions and sub-regions of Canada and with regions of different sizes. The work of the OPDQ (1988a, 1988b), with their focus on regional municipalities, is particularly promising. It is important to stress as well that the task of implementing and refining development indices should lie primarily with regional actors. While not denying the place of academic research, we hope that these indices will be put to practical use in small regions. Development indices may represent one of the most useful instruments for enhancing the renewal of regions bypassed by economic growth.

[1] For the purposes of this paper, small regions refer to "... single-orientation or over-specialized regions whose economic (and sometimes demographic) significance is very low, even negligeable, in relation to the reference country" (Vermot-Desroches, 1984).
[2] Savoie (1986e), p. 149.
[3] Standing Senate Committe on National Finance (982), pp. 1-2; Report of the Newfoundland Royal Commission on Employment and Unemployment (1986).
[4] Hagen (1982), p. 11. Also see Coffey and Polèse (1985), p. 86.
[5] Hermansen (1972), p. 7.
[6] Coffey and Polèse (1985), p. 86.
[7] For a summary of theoretical approaches to regional development, refer to Savoie's "Some Theoretical Considerations" in Savoie (1986b).
[8] The reader is directed to Hicks and Streeten (1979) for a critical look at the various approaches to development indices.
[9] Eberts and Young used factorial analysis to identify four "clusters" of variables labelled "structural complexity," "socio-economic status," "domestic base," and "industrial base" (Eberts and Young, 1971).
[10] Eberts and Young measured interchangeability by calculating the correlation coefficients between all the indices used in their work. Any two indices with a high degree of correlation between them were considered to be interchangeable. Factorial analysis or multiple regression was then used to decide which of the two indices possessed the greatest explicative power.
[11] Hicks and Streeten (1979, p. 577) indirectly reached the opposite conclusion by suggesting that any two highly intercorrelated indices were not interchangeable.
[12] This is a type of statistical analysis in which indicators' absolute values are converted into standardized coefficients on the basis of their standard deviation; the least significant indicators can thus be eliminated.
[13] The Regional and Industrial Development Program of Canada's Department of Regional Industrial Expansion is now using economic indices to classify small territorial units (census divisions) into four development levels according to unemployment, income and provincial tax shares. In this way, the financial assistance provided by the program is adjusted according to the development status of the regions involved. In our opinion, the use of more sophisticated development indices would enable government assistance to be adjusted more efficiently and to be better matched to regional needs.
[14] Office de planification et de développement du Québec, *Québec à l'heure de l'entreprise régionale - Plan d'action en matière de développement régional*, October 1988.
[15] The Corporation for Enterprise Development (1987).
[16] Ibid, p. 1.
[17] Ibid, p. 98.
[18] Federal-Provincial Task Force on Regional Assessment (1987).
[19] Ibid, p. 17.
[20] Harbinson et al. (1970), p. 71.
[21] The assumption of normal distribution implies that the values of the indicators are centred around a mean; this is not realistic when the indicators in question represent cities, regions or countries differing in geographic scale.
[22] Hicks and Streeten (1979), p. 578.
[23] Ibid, p. 576.
[24] Ibid, p. 575.
[25] For the purposes of this study, the terms "indices," "sub-indices" and "indicators" refer to successive levels of aggregation, "indicator" representing the lowest level.

[26] In a recent article, DeWolf et al. (1988) compared four development index-based studies of the U.S. states. They concluded that the main reason for the wide variation in results is the choice of variables and weights assigned to indicators.

[27] Appendix A discusses the choice of our basic statistical unit in greater detail.

[28] This average does not capture some significant variation between sub-regions. For example, the sub-region of Montreal accounts for more than half of the total population of the province and the Abitibi-Témiscamingue region for approximately 158,000.

[29] From an initial slate of 66 indicators, selected according to data availability and the choices made in the *Development Report Card*, 11 variables were rejected because of excessive inter-regional variation (standard deviation > mean).

[30] The "Côte-Nord" and "Nouveau-Québec" administrative regions were grouped together because, first, they are relatively similar in terms of geographical and socio-economic characteristics, and, second, they both have small populations. By so doing, we are left with nine regions for comparison purposes, rather than ten. It should be noted that Quebec is now divided into 16 regions; we were forced to use the former system because of lack of information according to the new division.

[31] Appendix B discusses the data sources and calculation methods (where applicable) used to construct the indices.

[32] Peripheral regions include, for our purposes, the Bas St-Laurent/Gaspésie, Saguenay/Lac St-Jean, Abitibi-Témiscamingue and Côte-Nord/Nouveau-Québec regions.

[33] For all practical purposes, there are no data available on capital flows within the Quebec regions. This is a serious impediment to an analysis of financial resources.

[34] Indeed, the Quebec City region accounted for between 10.9 and 16.77 per cent of total public capital expenditures in Quebec between 1978 and 1985, while, in 1985, the demographic weight of the region was 16.06 per cent of the provincial total.

[35] A recent study carried out by the Quebec Ministries of Labour and Income Security (1988) concluded that SME are more stable and suffer fewer job losses, in relative terms, than big business. A U.S. study by Birch (1979) generally corroborated these findings, while other authors (Storey and Johnson, 1987) have arrived at quite different conclusions.

[36] Measured here by added value and the extent of out-of-region exports.

[37] The concept of entrepreneurial energy, if it can be said to exist at all, has proven difficult to describe and measure, despite the best efforts of several researchers. See, for example, Côté (1986), Martin (1986) and Gadbois (1987).

[38] Commerce (1987), pp. 35-38.

[39] See, for example, Journal Les Affaires (1987).

[40] See, for example, the Association for Creating Enterprisers (1986), Coffey and Runte (1986), Julien (1984), Martin (1986), McLeod (1986), Newman and Warren (1986) and Ross and Usher (1986).

[41] We selected a threshold of $r = .70$ as representing strong correlation. The results of this analysis are available upon request. We also carried out correlation and multiple regression analyses (with per capita income and the unemployment rate as dependent variables) using the *Development Report Card* indicators. These results are also available for the asking.

[42] The work of the OPDQ (1988a) on regional municipalities clearly indicates the importance of disparities at the micro-regional level.

[43] For example, a deficiency at the level of education would require both medium- and long-term solutions.

[44] It should be noted that approximately 400 single-industry towns have disappeared since Confederation (see Decter, 1989: 10).

[45] See Canadian Association of Single Industry Towns (1988).

[46] Simply calculating the GINI coefficient, for example, required in the order of twenty person-days.

APPENDIX A

NOTES ON METHODOLOGY

1. THE CHOICE OF BASIC STATISTICAL REGION

Defining the concepts of region, territorial affiliation, and regionalism remains one of the major preoccupations of analysts interested in regional development policies (Savoie, 1986e). These concepts are even more important in the context of inter-regional comparisons. What is important is to make sure the definitions correspond to some degree to socio-economic reality. The problem is made more difficult by the fact that the concepts of "regionalism" and "affiliation" are difficult to measure, since they fall into a gray area of regional science lying at the crossroads of economics and sociology.

In Quebec, the debate has centred on the concepts of "municipalités régionales de comté" (regional municipalities) and "régions administratives" (administrative regions). Besides the conceptual and historical considerations involving in selecting a definition (which were discussed earlier), the decision to opt for administrative regions as the basic geographic units for our Quebec inter-regional comparisons was dictated by data availability and methodological considerations. The decision was not an easy one, however, since both regional municipalities and administrative regions are potentially suitable for regional development initiatives.

It might well be argued that regional municipalities, which spring from wide-ranging popular consensus, constitute in many ways the true unit of regional affilitation,[1] and that this division will likely become an important focus of regional development efforts in the near future. It is also possible that the

regional municipality is a better reflection of the various aspects of social and cultural consistency found in a region than the concept of administrative region. Nevertheless, the large number of regional municipalities (95), and the scarcity of statistical data concerning them forced us to use administrative regions as the unit of comparison in this study.

Since 1966, when the Quebec Ministry of Industry and Commerce established the definition of administrative regions, this territorial division has allowed services to be decentralized and a more realistic framework for economic and industrial planning to be put in place. In addition, this geographic grouping of economic and social players has led to the establishment of development structures that have complemented and supported government initiatives to enhance regional growth. We feel that these measures, as well as regional-oriented research efforts, have made administrative regions a good reflection of a socio-economic reality. Administrative regions were restructured in 1986, and their number increased from 10 to 16. For our purposes, however, the older classification system was used, since statistics reflecting the new territorial division would have been hard to come by.

2. AVAILABILITY OF STATISTICS

Several of the indicators used in this study refer to services or aspects of regional structure that cannot exist without a critical mass of residents. This is the case, for example, of indicators for universities, specialized hospitals and economic and industrial development corporations. In addition, much of the statistical research carried out by the Bureau de la Statistique du Québec (BSQ) uses administrative regions to make inter-regional comparisons within the province (although their most recent work is tending towards regional municipalities as basic units). The BSQ's efforts have resulted in the formation of a significant data base on the

physical, demographic, economic, and social environments. Using administrative regions, therefore, makes it possible to use these indicators, which in many cases go into greater depth than regional municipalities. We believe that, in light of these various factors, choosing the administrative region as the basic territorial unit is justified.

Notes

[1] Except for Montreal, Quebec City and the Outaouais, where urban and regional communities are used to determine regional affilitation.

APPENDIX B

DATA SOURCES AND CALCULATION METHODS

1. Performance index

P1: EMPLOYMENT GROWTH, 1984-1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.7: Labour market, main indicators, 1984-86, absolute value ('000).

Calculation method:

1) Number of jobs in 1984 - number of jobs in 1986 = α
2) (α X 100) ÷ number of jobs in 1984 = employment growth

P2: PARTICIPATION RATE, 1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.8: Labour market, main rates, 1984-86, per cent.

P3: UNEMPLOYMENT RATE, 1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.8: Labour market, main rates, 1984-86, per cent.

P4: AVERAGE UNEMPLOYMENT SPELL, 1986

Source: Statistics Canada, *Labour Force Survey*, special tabulations for the Service des études régionales et conjoncturelles of the Ministry of Manpower and Income Security (MMSR), 1987.

Statistics Canada, Household Surveys Division, Labour Force Survey Sub-Division, *Unemployment spells for selected economic regions in the province of Quebec*, 1986 annual averages (special tabulation for the Economic Council of Canada).

P5: EARNED INCOME PER CAPITA, 1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.15: Personal disposable income per capita, 1971-1986.

P6: INCOME GROWTH, 1981-1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.15: Personal disposable income per capita, 1971-1986.

P7: PERCENTAGE OF FAMILIES WITH INCOMES UNDER $20,000, 1981

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, 1987.

Data from Table 5.1: Family incomes of census families by income bracket, by regional municipality and administrative region, Quebec, 1971 and 1981.

Calculation method:

1) Number of families with incomes under $20,000 x 100 = α

2) α ÷ total number of families = percentage of families with incomes under $20,000.

P8: PERCENTAGE OF SOCIAL ASSISTANCE RECIPIENTS, 1987

Source: Social assistance file, Quebec Ministry of Manpower and Income Security, monthly information system on social assistance payments, July-October 1987.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006*. Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:

1) Number of social assistance recipients x 100 = α

2) α ÷ number of residents in 1987.

P9: PERCENTAGE OF PERSONS LIVING BELOW POVERTY LINE, 1985

Source: Revenue Canada Taxation, *Statistiques des codes de localité pour 1985*, Ottawa.

P10: AVERAGE WEEKLY WAGE, 1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from regional income tables.

P11: JOB-RELATED DEATHS PER 1000 WORKERS, 1986

Source: Commission de la santé et de la sécurité au travail, Annual reports 1986 and 1987, pp. 54-55.

The annual reports supplied data on the number of job-related deaths and the number of labour force participants. 1986 data was collected in a telephone survey by Statistics Canada's customer service section.

Calculation method:

1) Number of job-related deaths x 1000 = α

2) $\alpha \div$ number of labour force participants = number of job-related deaths per 1000 labour force participants.

P12: ON-THE-JOB INJURIES PER 1000 WORKERS, 1986

Source: See "Job-Related Deaths" above.

Calculation method:
See "Job-Related Deaths" above.

Comments: It should be noted that, in the case of Nouveau-Québec, files pertaining to on-the-job injuries or deaths are maintained in the region of residence of the person concerned.

On-the-job injuries include accidents resulting in leave (accepted and with pay), other accidents such as not resulting in leave, cases dismissed, cases pending, as well as job-related illness.

P13: GINI COEFFICIENTS, 1985

Source: Revenue Canada Taxation, *Statistiques des codes de localité pour 1985*, Ottawa. These statistics only cover income tax return filers.

Calculation method:

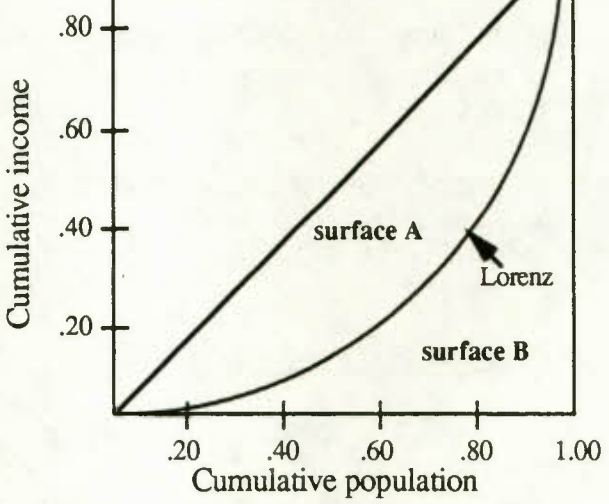
The GINI coefficients used in our analysis were calculated somewhat differently than true GINI coefficients because of data availability restrictions. The method used here is derived from Gunderson (1983), pp. 45-49.

1) The coefficient is calculated according to the following equation:

$$\text{Gini} = A/(A+B)$$

where A = the area calculated from the difference between a 45° line and the curve describing the cummulative distribution of the population (abcissa) against the cummulative distribution of income (ordered), also known as the Lorenz curve.
B = the area between the axes and the Lorenz curve (see Figure 1).

Figure 1



2) Since cummulative income statistics were not available (our data provided only the number of taxfilers by income bracket), we were forced to simulate these figures by multiplying the number of taxfilers (by income bracket) by the median income of each bracket.
These calculations involve a margin of error of 0.2-4.0 per cent, by administrative region.

3) Assuming the entire area of the square in Figure 1 equals 1, the area below the 45° line equals 1/2. This transforms the equation into:

$$\text{Gini} = 1-2B$$

4) Area B is calculated as though it represented a series of trapezoids, equal in length to the length of each quintile and equal in height to the cummulative proportion of income for each quintile. Thus B becomes:

$$B = \frac{h \sum_{1}^{5} (l_i + l_{i+1})}{2}$$

where h = height equivalent to the cummulative proportion of income for each quintile; and
l_i = length equivalent to lenght of quintile *i*.

P14: BENEFITS PAID TO SINGLE-PARENT FAMILIES, 1987

Source: Social assistance file, Quebec Ministry of Manpower and Income Security, monthly information system on social assistance payments, July 1987.

Calculation method:

1) Number of single-parent families receiving social assistance x 100 = α

2) α ÷ number of households receiving social assistance = percentage of single families receiving social assistance.

Comments:
It should be noted that the percentage of single-parent families receiving social assistance is expressed in a ratio to the overall number of housholds receiving social assistance for each administrative region.

P15 & 16: LIFE EXPECTANCY FOR MEN AND WOMEN, 1980-1982

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 296.

P17: INFANT MORTALITY, 1984

Source: Bureau de la Statistique du Québec, *Portrait statistique régional,* Administrative regions and regional municipalities, Volumes 1-10, 1987, Tables 1.4 and 1.5.

Calculation method:

1) Number of infants under one year of age who died in 1984 x 1000 = α

2) α ÷ number of live newborns in 1984 = infant mortality rate.

Comments: Infant mortality refers to the number of live newborns who die before reaching their first birthday. The infant mortality rate is the ratio of the number of infants under one year of age who died for every 1000 live newborns.

P18: SOCIAL WORKERS PER CAPITA, 1983

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 357.

Data from Table 23.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:

1) Number of employees in social service organizations x 100 = α
2) α ÷ number of residents = social workers per capita.

2) Capacity index

C1: SCHOLASTIC ACHIEVEMENT RATE, 1986

Source: Government of Quebec, Ministry of Education, Direction générale de la recherche et du développement, *Indicateurs sur la situation de l'enseignement primaire et secondaires*, 1988 edition.

Calculation method:
Data drawn directly from above-noted document, with the exception of the Montreal region, where an average value had to be calculated.

C2: UNIVERSITY GRADUATES PER CAPITA, 1986

Source: Bureau de la Statistique du Québec, special tabulations based on the 1986 Census, May 1986.

Calculation method:
Number of graduates ÷ number of residents.

C3 & C4: PUBLIC EXPENDITURE PER STUDENT, SCHOOL BOARDS AND COLLEGES, 1981-1982

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, Direction des statistiques régionales et environmentales, Volumes 1-10, 1987.

Data from Table 8.5: Operating expenses of educational institutions by budget entry, 1979-80 to 1983-84.

Data on number of students from Table 8.1: School enrollment in public and private systems, by level of education, 1981-82 to 1985-86.

Calculation method:
Operating expenses ÷ number of students enrolled in a given year.

Comments: Public expenditures involve the operating expenses of educational institutions, such as wages and salaries, fringe benefits, travel expenses, supplies and materials, services, fees and contracts, transfer expenses, expenses related to communication and information, and other miscellaneous expenses.

C5, C6 & C7: STUDENT-TEACHER RATIO, PRE-COLLEGE - COLLEGE - UNIVERSITY, 1984-1985

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, Direction des statistiques régionales et environnementales, Volumes 1-10, 1987.

Data on number of teachers by level from Table 8.3: Distribution of educational institution personnel, by level of education and position, 1981-1982 and 1985-1986.
Data on number of students by level from Table 8.1: School enrollment in public and private systems, by level of education, 1981-82 to 1985-86.

Calculation method:
Number of teachers ÷ number of students = teacher-student ratio.

C8: NUMBER OF PATENTS PER 1000 RESIDENTS

Source: Corporate and Consumer Affairs Canada.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006*. Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:
1) Number of patents issued in the region in 1987 x 1000 = α
2) α ÷ number of residents in administrative region in 1987 = number of patents per 1000 residents.

Comments: Data on patents includes 95 per cent of patents issued in Quebec in 1987.

C9: CASH DEPOSITS PER CAPITA, 1983-1985

Source: Bureau de la Statistique du Québec, *Statistiques financières des caisses d'épargne et de crédit du Québec*, 1985.

Calculation method:
1) Social capital + savings = deposits
2) Deposits ÷ number of residents = deposits per capita.

C10: RETIREMENT INCOME PER CAPITA, 1982.

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, Direction des statistiques régionales et environnementales, Volumes 1-10, 1987.

Data on retirement income from Table 5.7: Fiscal data on individuals, by regional municipality, 1981 and 1982.

Data on number of residents by region from Appendix 3.

Calculation method:
Retirement income ÷ number of residents in administrative region = retirement income per capita.

C11: INVESTMENT INCOME PER CAPITA, 1982.

Source: See "Retirement Income Per Capita" above.

Calculation method:
See "Retirement Income Per Capita" above.

C12: LOAN/ASSETS RATIO, CAISSES POPULAIRES, 1985

Source: Bureau de la Statistique du Québec, *Statistiques financières des caisses d'épargne et de crédit du Québec*, 1985.

Data from Table 2: Assets of local saving and credit unions, Quebec, end of 1985 fiscal year, pp. 22-23.

Calculation method:
1) Promissory notes + mortgages = loans
2) Loans ÷ total assets = loan/assets ratio.

C13: PHYSICIANS PER CAPITA, 1983

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 364.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006*. Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Data on number of physicians by administrative region from Table 32: Distribution of physicians by category, by socio-sanitary region, Quebec, 1980-1983.

Calculation method:
Number of physicians ÷ number of residents = physicians per capita.

C14: HOSPITAL EMPLOYEES PER CAPITA, 1982-1983

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 352.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Data on number of hospital employees per hospital from Table 20: Number of hospital employees, by socio-sanitary region, Quebec, 1977-1978 to 1982-1983.

Calculation method:
1) 1982 population + 1983 population/2 = 1982-1983 population
2) Full-time employees ÷ 1982-1983 population = hospital employees per capita.

C15: NUMBER OF HOSPITAL BEDS PER CAPITA, 1982-1983

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 345.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Data from Table 13: Number of hospital beds, by class of establishment, by socio-sanitary region, Quebec 1977-1978, 1982-1983.

Calculation method:
1) 1982 population + 1983 population / 2 = 1982-1983 population
2) Short-stay beds + long-stay beds = number of beds available.
3) Number of beds available ÷ 1982-1983 population = number of beds per capita.

C16: NUMBER OF DAYCARE PLACES PER CAPITA, 1984

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 372.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Data from Table 46: Distribution of daycare facilities and number of places, by category, by socio-sanitary region, Quebec, 1983 and 1984.

Calculation method:
Number of daycare places ÷ number of residents = number of daycare places per capita.

C17: NUMBER OF LIBRARIES PER 1000 RESIDENTS, 1984

Source: Ministry of Cultural Affairs, *Les bibliothèques publiques au Québec*, Government of Quebec, 1987.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:
1) Number of libraries x 1000 = α
2) α ÷ number of residents = number of libraries per 1000 residents.

C18: NUMBER OF MOVIE THEATRES PER 1000 RESIDENTS, 1984

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 482.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:
1) Number of movie theatres x 1000 = α
2) α ÷ number of residents = number of movie theatres per 1000 residents.

C19: TRADITIONAL CULTURAL FACILITIES PER 1000 RESIDENTS, 1984
C20: SOCIO-COMMUNITY FACILITIES PER 1000 RESIDENTS, 1984

Source: Bureau de la Statistique du Québec, *Le Québec statistique*, 1985-1986 edition, Les publications de Québec, 1985, p. 483 and 485.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:
1) Number of facilities x 1000 = α
2) α ÷ number of residents = facilities per 1000 residents.

Comments: Traditional cultural facilites include summer theatres, peformance halls, museums, art and cultural centres, exhibition halls and archives.

C21: DISTRIBUTION OF CULTURAL SUBSIDIES, 1987

Source: Ministry of Cultural Affairs, *L'aide financière du ministère, 1986-1987*, preliminary data, Direction de la recherche, May 1987.

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006*. Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:
Subsidies per administrative region ($) ÷ number of residents = subsidies in dollars per capita.

C22: CRIME RATE PER 1000 RESIDENTS, 1986

Source: Direction générale de la sécurité publique, *Criminalité et application des règlements de la circulation du Québec*, Government of Quebec, Sollicitor General's Office, 1986 statistics, p. 36.

3) Vitality index

V1: PERCENTAGE OF MANUFACTURED GOODS EXPORTED FROM QUEBEC, 1984

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from region tables on shipments of manufactured goods.

V2, V3 & V4: PUBLIC AND PRIVATE INVESTMENT BY INDUSTRY, 1986

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.12: Private and public real estate investment, 1986.

Calculation method:
Primary sector

1) (Agriculture, hunting and fishing) + (forestry and mining) = α

2) (α x 100) ÷ total investment in region = percentage of investment directed to this sector in region.

Secondary sector
1) (Food, beverage, tobacco) + (wood) + (paper, printing and allied industries) + (primary metal industries, metal fabricating, machinery and equipment) + (other industries and capital goods declared as operating expenses) = α
2) (α x 100) ÷ total investment in region = percentage of investment directed to this sector in region.

Tertiary sector
1) (Trade and finance) + (housing) + (public institutions) + (transportation, communications) + (other industries) = α
2) (α x 100) ÷ total investment in the region.

V5: ADDED VALUE IN MANUFACTURING SME, 1984

Source: Government of Quebec, Office de planification et de développement du Québec, *Profil statistique des régions du Québec*, Quebec City, 1988.

Data from Table 2.14: Manufacturing industries by size, 1984, per cent.

V6: HIGH-GROWTH MANUFACTURING INDUSTRIES, NUMBER OF EMPLOYEES PER 1000 RESIDENTS, 1986

Source: Ministry of Higher Education and Science, Direction de la maîtrise du développement scientifique et technnologique, *Inventaire des entreprises manufacturières qui font de la recherche et du développement au Québec*, Government of Quebec, 1986.

Calculation method:
1) Number of employees involved in research x 1000 = α
2) α ÷ number of residents = number of employees per 1000 residents.

Comments: Two criteria were used to select high-growth manufacturing industries. First, they had to be part of the high-technology sector (as defined by Statistics Canada in its "Standard Industrialial Classification") and, second, they had to be actively involved in research and development in this sector.

V7: SMALL AND MEDIUM BUSINESS GROWTH RATE, 1987

Source: Ministry of Industry and Commerce, *Les PME au Québec*, Report of Minister responsible for SME, 1987, p. 262.

Calculation method:
1) Number of SME in 1987 - number of SME in 1986 = α
2) (α x 100) ÷ number of SME in 1986 = percentage increase in number of SME.

V8: NUMBER OF SME IN THE ECONOMY, 1987

Source: Ministry of Industry and Commerce, *Les PME au Québec*, Report of Minister responsible for SME, 1987, p. 262.

Data from Table 8.15: Number of corporations and SMEs in operation, Quebec, 1986 and 1987.

V9: ENTREPRENEUR/TAXFILER RATIO, 1982

Source: Ministry of Industry and Commerce, *Les PME au Québec: État de la situation*, Report of Minister responsible for SME, 1986, P. 94.

Data from Table 4.2: Regional distribution of entrepreneurs and self-employed workers, by occupation and percentage total number of taxfilers.

V10: DAYS OF TRAINING PER 1000 RESIDENTS, 1987-1988

Source: Employment and Immigration Canada, Quebec region, special tabulation.

Calculation method:

1) Number of days of training x 1000 = α
2) $\alpha \div$ number of residents = days of training per 1000 residents.

4) Policies index

Po1: MUNICIPAL TAX BURDEN PER CAPITA, 1984

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, Volumes 1-10, 1987.

Data from Table 9.1: Revenue by source and budgetary expenditure, by regional municipality, 1979-1984.

Calculation method:
Revenue from local sources (regional property tax + other property taxes + other taxes + compensation in lieu of taxes + others) ÷ number of residents = municipal tax burden per capita.

Po2: TOWN PLANNING AND URBAN DEVELOPMENT EXPENDITURES PER CAPITA, 1984

Source: Bureau de la Statistique du Québec, *Portrait statistique régional*, Administrative regions and regional municipalities, Volumes 1-10, 1987.

Data from Table 9.1: Revenue by source and budgetary expenditure, by regional municipality, 1979-84.

Calculation method:
Town planning and urban development expenditures ÷ number of residents = town planning expenditures per capita.

Po3: DEVELOPMENT CORPORATIONS PER 1000 RESIDENTS, 1986-1987

Source: Employment and Immigration Canada, Employment Development Directorate, Management Information Services, Report No. 11, *Liste des projets de développement des collectivités et des programmes de croissance locale de l'emploi (clé) pour l'année 1986-1987.*

Bureau de la Statistique du Québec, *Perspectives démographiques régionales, 1981-2006.* Bibliothèque nationale du Québec, 1984 (moderate growth scenario).

Calculation method:

1) Number of projects by region x 1000 = α

2) α ÷ number of residents = number of development corporations per 1000 residents.

Po4: COMPUTER LITERACY RATE, STUDENT/COMPUTER RATIO, 1985-1986

Source: Direction de la technologie éducative, *Le parc des micro-ordinateurs dans les commissions scolaires de 1983-1984 à 1985-1986*, Government of Quebec, Ministry of Education, 1986, p. 31.

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