Preface

As industrial economies are transforming into knowledge economies and newly industrialized nations are attempting to leapfrog into the knowledge era, interest in building knowledge regions has increased considerably. The special role of knowledge regions in the development of the innovative capacity needed to sustain global competition is now well recognized, regions rather than national economies being seen as the source of technical innovations. The success of knowledge regions as innovation poles not only depends upon local factors but on a host of national and international factors, which are equally instrumental in shaping this changing innovation-driven competitive landscape. The lessons derived from comparing regions recognized for their economic dynamism with regions less successful in their transformation may be considered as insightful by the policy makers, economic development officers, and other interested parties motivated to help shape policy for their regions.

The objective of this book is to analyze selected knowledge regions in the USA, Canada and Mexico, to derive lessons on the approaches, institutions and policies that are appropriate in one national environment and less so in another. The analysis focuses especially on the mechanisms used for nurturing innovative firms and fostering their agglomeration in each region. It builds on the theoretical work of past researchers and experience gained in various parts of the world in developing viable knowledge regions.

This book is the outcome of the ‘Monarch’ research project (Monarca in Spanish), a project focusing on technology incubation in knowledge regions in NAFTA countries. The Monarch butterfly was chosen as an icon for this project because, in spite of its apparent fragility, it finds the energy to fly over the three NAFTA countries during its short life. The Monarch butterfly stands for the power of knowledge as a major force in the development of NAFTA as the glue that binds the three countries together. The project research and data collection activities were carried out during 1998–2003. The Monarch project focuses on the science, technology and innovation capabilities of knowledge regions in NAFTA countries, on the opportunities for innovation-based regional development, and on the barriers that limit that development.

The USA, Canada and Mexico provide an interesting framework for this type of analysis because, even if they have solid trade relations and share the same continent, there are significant differences between the three countries in
level of development, industrial infrastructure, education and systems of
innovation, differences which may help to explain the characteristics, and
finally successes and failures of our selected knowledge regions.

Linked by the NAFTA since its inception in 1994, the member nations
together have 426 million inhabitants and produce more than $12 trillion
worth of goods and services. Canada and Mexico are the US’s two top trade
partners, followed by China and Japan. In 2003, US was the single largest
trading partner for both Canada and Mexico, accounting for two thirds of
foreign trade of each country. In the same year, US had a quarter of its total
foreign trade with the two NAFTA partners – 15 per cent with Canada and 10
per cent with Mexico. The level of trade between Canada and Mexico is,
however, limited; 4 per cent of the Mexican foreign trade is with Canada and
only 2 per cent of Canadian foreign trade is with Mexico, though these figures
have been increasing in recent years.

In 2002, the stock of US investment in Canada was estimated at $190
billion, compared with $170 billion for Canadian investment in the US. In the
same year the stock of US investment in Mexico was roughly $90 billion
(which is a significant 63 per cent of Mexican stock of foreign investment) and
that of Canadian $5 billion (another 3 per cent of the Mexican stock of foreign
investment). The stocks of Mexican investments in both US and Canada are
not significant. NAFTA has also stimulated increased investment from outside
countries, accounting for almost 24 per cent of global inward and 25 per cent
of global outward Foreign Direct Investment.

By most accounts, NAFTA has created a very large free trade zone that has
been beneficial to the three partners. It has, however, not solved the region’s
deficit in advanced technology products. Even if, among industrialized
economies, the US innovation system is considered to be one of the most
comprehensive and advanced (accounting for a major share of global research,
development and innovation activities), the country’s trade deficit in advanced
technology products keeps on rising, reaching $27.4 billion in 2003. Canada
and Mexico and the region as a whole also have growing trade deficits in
advanced technology products. In terms of spending on R&D and innovation,
the US comes first (spending 2.74 per cent of its GDP), Canada comes second
(1.92 per cent), and Mexico is a distant third (0.39 per cent) according to 2001
figures. In a recent study, the World Bank has concluded that Mexico’s
deficiencies in education and research and development (R&D) limit the
NAFTA power to enable the country to reach a better level of technological
and economic progress. The three countries must continue to develop their
capacity for innovation, globally and at the regional level. In particular,
learnings from their successful knowledge regions should be adapted to the
less successful ones.

As outlined in the first chapter, the process that leads to the agglomeration
of innovative firms in a region is complex. It involves a number of heterogeneous actors (technology-based firms, research centers, universities, governments, business services and so on). It requires extensive interactions, cooperation and exchanges between those actors; inter-organizational relationships and networking being the key to producing the organic environment that encourages creativity and entrepreneurial behaviors. The framework for analysis which is presented focuses on the analysis of those actors and their interrelations.

Fourteen knowledge regions or Technology Innovation Poles (TIP) are analyzed: four in the USA, four in Canada, six in Mexico (aggregated into four cases). The three country chapters that follow, one each for the USA, Canada and Mexico, start with an overview of each country’s socio-economic characteristics and of its national system of innovation. They continue with the rationale for the selection of the regional cases selected for in-depth study, a short history of each case, an analysis of the elements that led to its development or hampered it, a description of the local innovation culture and incubating milieu and of some of its technology-based firms.

The final chapter provides a comparative analysis of the three countries and of the fourteen innovative regions that were analyzed, reflecting on regional success factors and constraints and ending with a summary of the lessons of the study focusing on potential technology development paths. It ends with an analysis of the potential for future cooperation in technological innovation between the three NAFTA countries, current cooperation being quite limited.

The three authors of this book, one from each of the three NAFTA countries, have directed research activities for the project: Sarfraz Mian for the US, Jérôme Doutriaux for Canada, and Leonel Corona for Mexico. The book is a result of a joint effort and the names are listed in alphabetical order.

During the research process, efforts were made to develop common questionnaires and interview guides for administration to the firms, research centers, science parks and incubators identified for the survey. In the implementation phase several challenges were faced including differences in definitions and interpretation, size and design of survey instruments, and ways to administer and collect data. However, wherever feasible a common methodology was employed for data collection and analysis. Occasionally, regional differences led to adjustments reflecting local realities. Incubating milieus meant science/technology/research parks and incubators/innovation centers in some cases and the whole regions acting as incubating spaces in others when there were no formal science parks and incubators present. The number of technology-based firms included in the US and Canadian case analyses were generally limited due to the low return rate attributed to survey fatigue experienced by many entrepreneurs in those countries. In Mexico, however, it was possible to administer a detailed survey to the firms as well as
research centers through onsite visits. In most cases, the science park and incubator surveys were conducted through multiple site visits resulting in detailed interview data.

NOTES

1. In this book, $ is used for the US dollar, C$ for the Canadian dollar, and PPP$ for OECD’s Purchasing Power Parity dollars, a currency estimate adjusted for local purchasing power.