

***Globalization and Economic Restructuring in Ontario:  
From Industrial Heartland to Learning Region?***

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## 1.0 Introduction

The process of globalization takes different forms and proceeds unevenly along many fronts. As it does, it produces qualitatively different challenges for, and impacts on, countries, regions and localities. At the same point that urban regions in the emerging market economies of central and Eastern Europe are facing the challenges of rationalization, adjustment and rejuvenation which follow from their transition to a market economy, the older industrial regions of Canada must come to grips with the sweeping changes triggered by the liberalization of trade and investment flows within North America which result from their closer integration into the North American Free Trade Area. While the history and geography of these two cases may differ markedly, both face challenges arising from the globalization process.

Several recent contributions link the global and the regional dimension, suggesting that the current period is characterized by a *paradoxical consequence of globalization* in which the ever greater integration of a national and regional economies into the global one accentuates, rather than minimizes, the significance of the local context for innovative activities. This perspective on the nature of innovation systems, at the national and regional level, underlines the continuing influence of the spatial dimension on the conduct of research and the innovative activities of even the largest firms. The systems of innovation approach emphasizes the institutionally-embedded nature of innovative activities and the influence of the political, social and spatial context within which economic activities are carried out.

In this context, analysts recognize that while the process of globalization poses new challenges for regions and localities, it simultaneously creates new opportunities for them which arise from their unique capacity to serve as centers of learning and innovation — qualities that have the potential to confer crucial advantages on those localities which achieve the right conditions for

competition in the emerging global economy. Large firms which have the potential to engage in production in a wide range of different locales are increasingly drawn to invest in those places providing the best prospects for learning an innovation — that is, learning cities and regions.

This paper sketches out the implications of this argument by drawing upon our experience with the case study of Ontario, Canada's largest province and industrial heartland. Ontario enjoyed a privileged economic position during the postwar golden age, but underwent a sustained period of economic restructuring beginning in the early 1980s. The restructuring triggered by the broader processes of globalization was accentuated after 1990 by Ontario's deeper integration into the North American economy following the signing of the Free Trade Agreement with the US and its successor, the North American Free Trade Agreement. These changes forced a number of critical responses on both firms and the government of the province, as they have striven to meet the challenge of becoming more innovative and adopting the characteristics of learning regions. This experience is highly relevant to those regions in Europe that are attempting to shift their traditional industrial base to a more knowledge-intensive economy that can compete effectively in the integrated European context.

## **2.0 The Global Economy and the Learning Region**

The emerging economy of the next century is simultaneously globalized and knowledge-based. Economic growth and rising standards of living are ever more dependent on continuing investments in basic research, the capacity of firms to innovate rapidly and the collective ability to transfer new ideas and knowledge from the research laboratory to the marketplace. At the same time, the marketplace is an ever more inclusive one, in which firms search out and develop new technologies on a global basis, design and source their products and services around the

globe and then brand and sell those products and services into a global marketplace. The reduction of national trade barriers and the negotiation of new multilateral trade and financial regimes has reduced many of the obstacles that impeded the flow of goods and services in previous decades. At the same time, the development and application of new digitally-based semiconductor technologies in a wide range of communication and transport applications facilitates the information exchange and trade in goods and services that underpins the global economy. These are described as the *technologies of globalization*, which provide the necessary infrastructure for the global economy (Archibugi and Michie 1997, 4).

The resulting economic paradigm is increasingly referred to as a ‘knowledge-based economy’. This follows from the central role that knowledge-based activities play in the production process, as well the rising proportion of the labour force that deals with the production, distribution and processing of information and knowledge in comparison to that proportion which handles tangible goods. The dynamic effect of the new paradigm results from the way it mobilizes knowledge, social intelligence, and innovative capacity. If knowledge is understood to include not just R&D, but also design, engineering, advertising, marketing and management, then knowledge-based inputs are becoming the defining feature of both manufacturing and service industries in the new economy. Together, the ability to deploy knowledge to create value and a sustained capacity for innovation are the keys to success for nations, regions, communities and firms in the emerging global economy.

The impact of the information technology paradigm is intensified by the parallel emergence of new economic relations at the global level, subsumed under the concept of globalization. This concept implies that individual economies are becoming more transnationalized or integrated

into the international economy and losing an important degree of national sovereignty and autonomy. The extent and nature of globalization, a subject of great dispute, can be gauged in several ways. One dimension refers to the growing integration of markets and production strategies, which facilitates the design and production of goods for global, rather than simply national markets. Similarly, the sourcing of components on a global basis, and the increasing reliance on the negotiation of strategic alliances with other firms for R&D, production or marketing of goods further contributes to the integration of national production strategies into a global one. The globalization of world markets is no longer limited to financing, production or sales, but extends as well to the ever greater internationalization of research and the acquisition of knowledge. The globalization of technology is linked to the increasing importance of R&D and knowledge in the new paradigm.

The trend towards globalization and the relative easy transmission of data and information among firms has fostered the view that national and regional differences account for little in the emerging information technology paradigm — summarized in the familiar phrase about the ‘death of distance’ (Cairncross, 1997). This perspective, which focuses on the technological hardware, rather than the organizational and learning dimensions of the new information technologies, emphasizes the leveling effect of the technologies and accentuates the trend towards convergence, thus reducing the significance of national and regional differences in locational decisions. It contrasts sharply with an alternative perspective in the disciplines of regional science and economic geography. The alternative view underscores the fact that despite the growing integration of individual economies into a global one, the geography of production in the new economy is marked by a ‘paradoxical consequence of globalization’ — the simultaneous growth in importance of the locality as a site for innovation (Acs et al., 1996). As

the information and communication networks created by digital technologies integrate the economies of the globe ever more tightly, they simultaneously increase the importance of space and proximity.

For the last decade or so, scholars of economic and social change have acknowledged that the global economy is also a knowledge-based economy. The competitive success of individual commodities is determined by the quality of the knowledge embedded within them. Moreover, since this is true for both the production of a good or a service, the traditional distinction between these two classes of commodities has blurred considerably. Since competitive success depends heavily on their ability to produce knowledge and utilize it effectively, there is a pressing need for firms, communities, regions and nations to invest a greater share of resources in education and training than they have in the past (Nonaka and Takeuchi 1995). The production paradigm of the new economy, with its emphasis on knowledge and creativity, is highly dependent on localized, or regionally-based, innovation. Innovative capabilities are often sustained through regional communities that share a common base of knowledge and the additions to that knowledge base.

From this perspective, it may be more appropriate to describe the emerging paradigm as that of a 'learning economy', rather than a 'knowledge-based' one. Learning here refers to the building of new competencies and the acquisition of new skills, not just gaining access to information. The easier and inexpensive access to information tends to reduce the economic value of more codified forms of knowledge and information. In tandem with this, forms of knowledge which cannot be codified and transmitted electronically (tacit knowledge) increase in value, along with the ability to acquire and assess both codified and tacit forms of knowledge, in other words, the

capacity for learning. It is the capability of individuals, firms, regions and nations to learn and adapt to rapidly changing economic circumstances that is more likely to determine their future economic success in the global economy (Lundvall and Borras, 1998).

The traditional notion of capacity building described above is predicated on a learning process assumed to be both *private* and *linear* in nature: private in the sense that learning is understood to be the essentially solitary pursuit of individual student/workers or firms; linear in the sense that innovations are believed to emanate from isolated R&D institutions, whence they are ‘pushed’ onto the market to be adopted by consumers. Recent work of both an empirical and theoretical nature from the literature on the economics of innovation and industrial organization suggests that innovation is often *not* a linear process in the sense described above. Instead, innovation has been more accurately shown to be non-linear, iterative, and interactive — that is, a *social process* that is triggered by consumers (or ‘users’) who engage in a mutually beneficial dialogue and interaction with producers. In this way, users and producers actively seek to *learn* from one another, by ‘learning-through-interacting’ (Lundvall 1988; Lundvall and Johnson 1994). Consistent with this view, innovation is not understood primarily as a process leading to fundamental breakthroughs or the ‘big bang’, but one that is continuous, day-to-day, and shaped in path-dependent fashion by past insights, decisions, responses to events, and technological choices (Hodgson 1993; Freeman 1994; Nelson 1995). Learning in this sense is virtually inseparable from the production process itself, the site of many important product and process improvements.

Given the highly social nature of learning and innovation, it should come as no surprise that these processes often work best when the partners involved are close enough to one another to

allow frequent interaction and the easy, effective exchange of information. Indeed, a credible and growing body of work emerging from a wide range of disciplines attests that innovation is fundamentally a *geographical* process: facilitated, though not necessarily contained, by spatial clustering of the involved parties within the same region (Porter 1998; Amin and Thrift 1992; Saxenian 1994; Storper 1997). The reasons for this are threefold. Spatial proximity facilitates frequent, close and (most commonly) face-to-face interaction. Such interaction, both planned/formal and unplanned/informal, fosters and enables learning-through-interaction. Second, firms clustered in the same region often share a *common regional culture* which can act to facilitate the process of social learning. Research indicates that such firms build up a common language or code of communication through repeated interaction over time. As Patel and Pavitt argue, because much of the most important knowledge transmitted between parties in the innovation process is *tacit* rather than codified, this characteristic confers a crucial advantage on firms which participate in such networks of exchange (Patel and Pavitt, 1997). Finally, this interaction-facilitating common language or code of communication is further supported by the creation of *regional institutions* which help to produce and reinforce a set of rules and conventions governing local firms' behaviour and inter-firm interaction.

In the past few years, the constellation of institutions at the regional level contributing to the innovation process has come to be identified as the *regional innovation system* (Braczyk, Cooke and Heidenreich 1998) in a manner analogous to the concept of national innovation systems (Lundvall 1992; Nelson 1993). This set of institutions, both public and private, produces pervasive and systemic effects that encourage firms within the region to adopt common norms, expectations, values, attitudes and practices — in short, a common culture of innovation that is reinforced by the social learning processes outlined above. The list of institutions most



frequently implicated in this type of analysis includes not only the usual R&D infrastructure (universities, technical colleges, public and private labs), but also industry-specific service centres for technology transfer and market analysis, local training councils, producers' associations, chambers of commerce, and suppliers' clubs, all of which provide opportunities for social learning-through-interaction.

Less obvious, but equally important are the 'background' institutions that define the fundamental incentive structures guiding firms' decision-making: capital market institutions that shape time horizons and expectations concerning paybacks from investment; labour market and industrial relations institutions that determine rates of labour force turnover (and hence, possibilities for workers to engage in learning-by-doing), the strength of incentives for private firms to provide training (and hence, the likelihood that firms will engage in opportunistic labour practices, such as poaching of skilled labour, that have the potential to undermine inter-firm trust and co-operation), the degree of participation of shopfloor workers in firms' decision-making, and other conditions that create or limit the possibilities for intra- and inter-firm learning (Gertler 1997).

Flowing directly from this analysis, the concept of the *learning region* has emerged to describe those places that offer the right institutional environment to encourage both private and social learning at four different scales: the individual worker, the individual firm, within groups of related firms, and within governmental bodies themselves (Florida 1995; Morgan 1997). The literature on learning regions argues that even global firms need to draw their innovative sustenance from the social production system surrounding them. Multinational firms, despite their global reach, are learning to exploit the richness and benefits of those geographically

concentrated, innovative, interaction-rich learning regions in a fashion that concentrates R&D activities in both their home base and those overseas centres that are rich knowledge-based resources. Hence, the model that may best describe this relationship is one of 'local nodes in global networks' (Amin and Thrift, 1992). As Morgan (1997: 495) recently put it, "we are now beginning to appreciate that globalization and localization, far from being mutually exclusive processes, are actually much more interwoven than is generally acknowledged".

### **3.0 Coping with Restructuring: Ontario in the 1990s**

These concerns have been particularly acute for Ontario over the past decade as it has attempted to cope with the economic impact of globalization, and its tighter integration into the North American continental economy. As Canada's most populous province, Ontario is home to eleven million of Canada's 30 million inhabitants. Its economy contributes 40 per cent of Canada's GDP and roughly the same proportion of the nation's employment (see Table 1). It has been the manufacturing heartland of Canada for decades, currently producing over 50 per cent of the country's manufacturing GDP, with roughly 46 per cent of total employment in the sector (Table 2). Despite this legacy of privilege and prosperity, Ontario recently suffered its worst downturn since the Great Depression. Between 1989 and 1991, the province's real GDP declined by more than five per cent (Table 1). Roughly 200,000 jobs were lost and of these, some 150,000 were in the manufacturing sector (Table 2).<sup>1</sup> Since 1991, the Ontario economy has slowly emerged from this downturn. Real GDP finally surpassed its pre-recession (1989) peak in 1994, and employment only attained its 1989 peak level in 1996. In manufacturing, real GDP and employment were especially slow to recover. Although GDP had regained its lost ground by 1996, the number of employed workers

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<sup>1</sup> In fact, manufacturing employment in Ontario continued to decline until 1993, when it reached 886,000. This represented a drop of almost 19 percent (or 203,000 jobs) from the peak employment level of 1,089,000 reached in 1989.

remained more than nine per cent lower than the pre-recession peak level (Table 2).

The timing of this episode in Ontario's recent economic history coincided with the introduction of the Canada–US Free Trade Agreement (FTA) in 1989 and its successor, the North American Free Trade Agreement (NAFTA) in 1993. The numbers cited above suggest that the net impact of the FTA on the provincial economy, and on manufacturing in particular, was negative overall (at least in the short to medium term). This view, however, oversimplifies the nature and extent of changes at work in the Ontario manufacturing sector, as well as the forces producing these changes. The timing of the FTA coincided with several other developments that severely impacted the Ontario economy. Foremost among these were: i) the onset of a regime of macroeconomic policy directed by the Bank of Canada, which saw both interest rates and the value of the Canadian dollar appreciate substantially during the late 1980s,<sup>2</sup> and ii) a major downturn in the US business cycle shortly after Canada's own recession had begun. These events militated against the expansion of exports to the USA and undoubtedly contributed to the severity of the recession in Ontario.

The task of evaluating the overall impact of the FTA and NAFTA is complicated by the central role played in Ontario's economy by automobile and automotive parts production, which constitutes more than one-fifth of Ontario's manufacturing GDP (Table 3) and produced almost 48 per cent of Ontario's merchandise exports to the US in 1994. This industry was reorganized on a continental basis beginning in the late 1960s, after the signing of the Canada–US Automotive Products Trade

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<sup>2</sup> The prime rate in Canada increased from 9.5 percent in 1987 to 14.1 percent in 1990, pushed up by similar changes in the Bank of Canada rate (from 8.4 percent to 13.0 percent). Between 1986 and 1989, the value of the Canadian dollar rose from 72 cents (US) to 84.5 cents (US) in 1989, and to 87.3 cents (US) in 1991 (Ontario, 1995).

Agreement (known as the Auto Pact).<sup>3</sup> These statistics confirm that the sector has been the fastest growing industry by a wide margin. Ontario ranks as the second largest auto producer in North America, after the state of Michigan. Although Canada absorbs approximately 12 per cent of North American vehicle sales, it accounts for almost 18 per cent of automobile assembly (virtually all of which is in Ontario). The sector suffered along with the rest of the economy in the early 1990s, but bounced back strongly from the recession, with increased automotive exports leading the recovery, due, in part, to the labour cost advantage of production in Ontario, as well as the reputation that the industry has acquired for both a highly skilled and a reliable labour force. Since the early 1990s every major assembler in the province has announced investments in new and upgraded plants.

While the transportation equipment industry stands out as the key sector in leading the manufacturing recovery in the 1990s, a number of others are notable as well, either for their absolute size or their rate of growth in the last decade. These include the electrical and electronic products industry (at 15 per cent of manufacturing GDP), the food industries (at 9 per cent of manufacturing GDP), and chemicals and chemical products (just under 8 per cent of manufacturing GDP). The electrical and electronics products industry (including telecommunications) clearly rivals automotive products as the dynamic engine powering the recovery of the manufacturing sector in this decade. It is the only industry whose growth rate rivalled that of the automotive sector and which accounted for a larger share of increase in total manufacturing GDP than the auto sector. This is not completely surprising, given the central role of electrical products as the core enabling technology in the information technology paradigm.

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<sup>3</sup> Holmes (1991: 156) reports that 80 per cent of all cars and trucks assembled in Canada are exported to the US, and 70 per cent of North American-built vehicles purchased in Canada are assembled in the United States.

Nevertheless, a set of technological and organizational changes have been triggered by the FTA. The steady increase in trade flows between Ontario and the US since the early 1980s depict a trend of increasing integration, suggesting some corresponding developments in the organization of industry on both sides of the border. An examination of the experiences in a number of industries is useful for analyzing the recent technological and organizational change in Ontario manufacturing. The analysis focuses on two groups of industries — one made up of more traditional and resource-based sectors (food, plastic products, clothing, furniture, primary metals), and the other consisting of more technology-intensive industries (motor vehicles, automotive parts, electrical and electronic products). Together, they constituted 65 per cent of Ontario's total manufacturing shipments in 1994 and they have fared quite differently since 1989. With the exception of food, the more traditional sectors saw their share of total manufacturing shipments decline or remain flat. On the other hand, transportation equipment (led by motor vehicles) saw its share grow substantially, as did the electronics component of the electrical/electronic sector. These figures suggest that Ontario manufacturing has shifted in the direction of higher value-added, more technologically sophisticated sectors.

Further indicators of change, which imply something about changing organization and technology in Ontario manufacturing, are evident in Table 4. These data depict the extent of rationalization that has swept over Ontario manufacturing since 1989. Subsequent to the boom years of the late 1980s, when the number of establishments in Ontario manufacturing increased by almost 3.5 per cent, the number of plants dropped precipitously after 1989. By 1996, *more than 10 per cent of the establishments that existed in 1989 were gone*. Similarly, the gain of more than 106,000 jobs between 1985 and 1989 was more than wiped out by a loss of 260,000 jobs between 1989 and 1995. Significantly, while real shipments also declined substantially between 1989 and 1991, they

grew by almost 70 per cent after 1991 (while the number of establishments and workers was still shrinking).

Looking at the experiences of individual industries, some interesting differences emerge again.

Within the traditional sectors, major dislocation is evident in industries such as clothing, furniture, and primary metals. Food and plastics seem to have escaped the worst of these ravages, although the same pattern of declining numbers of establishments and workers since 1989 is apparent.

Shifting to the more technology-intensive sectors, the general trend to fewer establishments is equally evident. In the auto parts industry, the number of plants fell by 14 per cent between 1989 and 1991, although it recovered slightly in the subsequent period. In electrical and electronic products, the reduction (evident also in the electronics group alone) was nearly 19 per cent. As for employment, the losses are generally somewhat smaller than those sustained in the more traditional sectors. Within electrical and electronic products, job loss was more than 50,000. However, this decline in employment coincided with a 63 per cent growth in shipments, of which two thirds was accounted for by the more advanced electronics segment.

Lurking behind these trends is a set of changes in technology and/or organization that have enabled the phenomenon of rising shipments post-1991 despite falling employment and a shrinking establishment base. In the more advanced sectors, rising productivity levels are widespread throughout. The processes of rationalization and adjustment that have washed over Ontario manufacturing since the late 1980s have been especially punishing for the more traditional and resource-based industries, which have experienced significant plant and job loss. On the other hand, all of the industries examined had attained higher levels of real value added per worker by 1996, compared to 1989.

Underlying the aggregate numbers outlined above is a set of changes in both the internal organization and processes of individual workplaces as well as a set of changes in the relationships between manufacturing units. Firms in many regions and industries have begun to adopt *network* relations in their dealings with customers, suppliers, and even competitors, largely as a way of engaging in the kind of social learning processes discussed earlier. In industries such as automotive, where such practices have become well established (Holmes, 1996), assemblers increasingly expect suppliers to take on a much higher proportion of the research and development function than they did ten years ago. Furthermore, firms at the top of the hierarchy of automotive parts suppliers are now routinely coordinating the production and assembly of major sub-systems of a finished automobile. Under such circumstances, closer relations with suppliers are absolutely vital to support this form of *collaborative manufacturing*.

With the increasing continental integration of industries such as automotive, aerospace, and telecommunications equipment, the network linkages described above extend across the Canada–US border, according to the location of prime customers. In some cases, the move to a network form of organization has provided a strong inducement for Ontario firms to invest in both production plant and R&D facilities south of the border, close to their large US customers. By the same logic, however, the pursuit of a global localization strategy has brought major Japanese car producers — notably Toyota and Honda — to Ontario. The Japanese transplants in Ontario have been constructed for the principal purpose of serving the US market, and the terms of access provided by the FTA (and now NAFTA) are crucial to their investment decisions.

Within the electronics sector, especially telecommunications, the same process of cross-border

rationalization has been evident, with major producers such as Nortel and Newbridge closing manufacturing facilities or shifting production to the US and Europe. While this has clearly contributed to the decline in manufacturing employment documented in Table 4, both companies have recently announced major expansions of their R&D facilities in the Ottawa–Carleton region over the next several years. This expansion has been joined by the location of major US firms, such as Cisco Systems, into the region to take advantage of its highly qualified and relatively lower priced (compared to the US) labour force. Indeed, within the information technology sector generally, the chief complaint in recent years has been the shortage of sufficient engineers, computer scientists and technicians to staff their current and future plans for expansion. This has prompted the Ontario government to respond with a major program to boost enrollments in a selected range of university and college programs over the next three years.

From the preceding analysis, it is clear that Ontario manufacturing has undergone profound changes in recent years. These have reshaped the organization and nature of production processes within the plant, as well as well as shifting the overall structure of the provincial economy towards those sectors that are more technologically intensive and higher value added. To what extent is the Ontario economy better off now than it was before? While growth in the provincial economy has not been strictly ‘jobless’, the more common use of advanced manufacturing technologies and modes of work organization are bringing about a change in the way that labour is used in the production process. Manufacturing in the province has undergone an important process of renewal, in which firms have upgraded the quality, responsiveness, and timeliness of their production systems, enabling them to achieve growing success in export markets.



#### **4.0 The Policy Response —Towards a Learning Region?**

In reaction to the profound restructuring of the 1980s and 1990s, the provincial government has enacted a series of economic policies that attempt to contribute to the process of economic renewal and the shift towards more technologically intensive activities. Despite a high degree of electoral volatility (Ontario has enjoyed four different governments involving all three major parties in the past fifteen years), policy makers have sought to address a number of key challenges. First, Ontario's manufacturing economy has for decades been characterized by an unusually high degree of foreign ownership. In the post-FTA era, this fact has rendered a large number of US-owned operations vulnerable to the process of rationalization and continental restructuring processes. For the provincial government, this has heightened the importance of its efforts to strengthen the research base in both the post-secondary educational sector, as well as private industry and to promote closer ties between the two. This is closely linked to the second concern, a chronic tendency on the part of Ontario firms to underinvest in R&D. This is especially evident in the automotive sector, where until very recently neither the 'Big Three', nor the Japanese automakers, have located their research facilities in Ontario.<sup>4</sup>

Third, and largely as a result of the second issue, public policy has sought to promote the transition towards more knowledge-intensive sectors within the Ontario economy. This has been stimulated in part by the standout performance of homegrown companies such as Nortel Networks, Newbridge Networks and others in the telecommunications equipment sector, firms such as Bombardier in the aerospace and transportation equipment industry, as well as a host of smaller companies in the computer software industry, all of whom are both leading performers of research and development and highly successful exporters. Finally, policy makers came to realize in the

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<sup>4</sup> This deficiency has been partially overcome in the last few years with decisions by Chrysler and General Motors to locate new research facilities in Windsor and Oshawa respectively.

mid-1980s that firms in more mature sectors such as automotive parts, plastic products, fabricated metal products, furniture, and food products required assistance to upgrade the quality and technological sophistication of their products in order for them to meet the ever-increasing quality standards of industrial and consumer markets.

It is beyond the scope of this paper to provide a comprehensive description of the full array of industrial policy approaches pursued in Ontario during the last two decades.<sup>5</sup> However, it is important to highlight a number of specific forms of intervention designed to establish a learning economy in Ontario. First, Ontario governments have consistently pursued a long-term strategy of investing in its post-secondary education systems, starting in the 1960s. The resulting system of 17 universities and 22 colleges of applied arts and technology can be thought of as the bedrock of Ontario's economic development policy. It has been responsible for a substantial increase in the general level of educational attainment in the province, placing Ontario above or on par with almost every other Canadian province or US state.<sup>6</sup> In the 1980s and 1990s, additional funding was targeted specifically at the research activities of the post-secondary sector, previously regarded as the exclusive responsibility of the federal government. One of the most important policy innovations was the creation of the Premier's Council Technology Fund by the Liberal government in 1986. The Fund financed a number of innovative programs under its umbrella, the most significant of which was the creation of seven university-based Centres of Excellence to strengthen research capacity in areas of key importance to the provincial economy. In addition to stimulating the production of basic research and the development of world class researchers, an

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<sup>5</sup> For a more thorough review of recent innovation policy in Ontario, see Wolfe and Gertler (1998) and Wolfe (1999).

<sup>6</sup> In terms of levels of educational attainment in the labour force, only Massachusetts, California and British Columbia rank ahead of Ontario, and only by small margins.

explicit requirement of the Centres is that they engage in this research collaboratively with industry partners who help to shape research priorities. In this way, a learning dynamic between the university sector and private firms has been initiated.

Finally, the most explicit attempt to create systems of social learning within leading sectors of the Ontario economy came through an initiative of the NDP government elected in 1990. The NDP had long advocated the adoption of an industrial strategy, but was vague on what it should consist of. In the early 1990s, the literature on the potential value of regional networking and cooperation in enhancing competitiveness provided a useful starting point. The centrepiece of its strategy was the Industrial Policy Framework, released in 1992. The overall goal of the framework was to promote the transition of the Ontario economy towards those sectors and firms with the capacity to generate higher wage, higher value-added and environmentally sustainable jobs. It focused on ways of developing higher value-added activities throughout the economy to increase competitiveness and create more, and better, jobs. It consisted of three main elements:

- i) changing the way Government invests, including measures to enhance the quality of physical and technological infrastructure through institutions such as the seven provincial Centres of Excellence (funding for the Centres was renewed in July, 1992 for an additional five years);
- ii) changing the way Government works with companies, specifically through the negotiation of strategies developed in cooperation with the firms and unions in specific sectors to improve their competitiveness.
- iii) changing how Government responds to economic change, through measures to support investment in green industries and enhanced support for organizational change in

Ontario firms (Ontario Ministry of Industry 1992).

The most significant change envisioned in the framework was the increased emphasis placed on working with sectors through the establishment of a Sector Partnership Fund in 1992. This program was created explicitly to encourage social dialogue and extended interaction between major industry partners (including employers, producer associations, unions, educational institutions, researchers, and governments). The objective was to animate a social process of negotiation and mutual learning in each sector with the goal of moving towards higher value-added and more successful production. The Sector Partnership Fund was a multiyear initiative, budgeted at \$150 million. It provided assistance to approved cooperative sector projects leading to higher value-added activities. For the purposes of the sector development process, a sector was defined as a group of Ontario-based firms that produced similar goods and services and identified themselves as a sector. The government's contribution was to offer funds on a matching basis to pay for both a strategic planning exercise and a set of policy initiatives and programs flowing from this analysis.

The Sector Partnership Fund was based on the four principles of flexibility, cooperation, leverage and accessibility. It recognized that each sector faces unique competitive challenges and was designed to be flexible in its response to those circumstances. Individual industrial sectors are characterized by distinctive sectoral properties, shaped by the specific nature of the technology they use and the constraining effects of their products and product markets. Patterns of relations with individual sectors and countries evolve over time and determine the social conditions under which firms must adopt to broader changes in technology and the economy (Hollingsworth and Streeck 1994, p. 278). Another principle incorporated into the SPF was that of leverage. In a time of scarce fiscal resources, governments could not assume full

responsibility for funding sector-based initiatives. This approach was based, in part, on the assumption that eligible projects constituted a form of quasi-public goods, whose utility to industry partners was strong enough to attract some private investment, but insufficient to be self-financing. The third principle followed the argument that within individual sectors, competition and cooperation should be viewed as complementary activities (Best 1990). Finally, the principle of accessibility established that all sectors were deemed eligible for funding and that within each sector a substantial proportion of its participants must stand to benefit from SPF-supported initiatives.

By any criteria of measurement, the initial stage of sector consultation and strategy formation was a success. Both the number of sectors involved and the extent of participation by key sector players in the consultative process exceeded the expectations of government officials by a wide margin. Between the summer of 1992 and the provincial election in June, 1995, the Ministry of Economic Development and Trade, along with the other lead ministries with sector responsibility, worked with a wide range of industry associations, trade unions and other stakeholders to develop sector strategies. Consultative efforts produced approved strategies in fifteen sectors: Food Processing, Green Industries, Telecommunications, Computing, Tourism, Cultural Industries, Aerospace, Auto Parts, Mines and Minerals, Construction, Health Industries, Forestry, Plastics, Residential Furniture and Chemicals. By the spring of 1995, work plans were approved and strategies under development in a range of additional sectors, including: Biotechnology, Consulting Engineering, Design, Machinery, Tool, Die and Mould, Retail, and the Electrical and Electronics industry. The last of these strategies was released formally in 1996.

The high number of sectors that participated in the strategy development process and their relative success in achieving consensus on their strategic plans suggest that demands on the Fund should have been high. Indeed there was no lack of recommendations for concrete initiatives in virtually all of the plans. However, the Sector Partnership Fund underspent its allocation in every year it existed and at the time of its termination in July, 1995 less than half the initial allocation had been committed. This was largely due to the government's expectation of industry funding for the initiatives; this 'quasi-market test' imposed a hurdle that many private sector participants found it difficult to surmount. Among the most successful initiatives financed from the fund were industry-specific centres for disseminating and diffusing best practices in product and process technologies and for providing specialized training. Examples included: the Guelph Food Technology Centre, designed to increase effective technology and information transfer, as well as to provide accessible pilot plant facilities for the food industry; an Ontario Centre for Environmental Technology Advancement to provide technical support services, financial advice and business counseling to help young firms commercialize environmental technologies; Connect-IT, a computing sector Resource Facility to assist the many small and medium-sized firms in Ontario's industry in developing sector-specific competency in management, standards, marketing expertise and export readiness. In the computing sector, funding was also provided to support the Electronic Commerce Institute to promote the adoption and use of electronic data interchange in Canadian industry.

In addition to its sectoral activities, the Ontario government also undertook measures to assist smaller, innovative high technology companies. One such measure was the creation of the Ontario Innovation and Productivity Service designed to help innovative growth firms overcome barriers to their further expansion. The program worked with a selective group of target firms to

identify challenges and opportunities for growth and develop a strategic business plan. It provided funding for strategic projects and facilitated enhanced access to provincial government programs, as well as the federal government and existing private sector resources. During its brief existence, the program assisted over 300 small and medium-sized firms with innovation in the areas of product development, design, marketing and production.

Under both Liberal and NDP governments, a growing number of sector-based institutions in the areas of industrial policy, labour market policy and financing mechanisms were created, raising an interesting issue in terms of coordinating the discrete elements of the regional innovation system. A report on the economic impact of the Centres of Excellence drew attention to the desirability of viewing these discrete initiatives in the area of industrial and technology policy as parts of a complex and integrated provincial or regional system of innovation. It emphasized the importance of measuring the effectiveness of the Centres as linkages between other elements of the regional innovation system: particularly, the science and technology infrastructure, the educational system, business enterprises and government (The Impact Group, et al. 1994). The report came shortly before a provincial election in 1995 and no action was taken to follow up on this important insight.

The new Conservative government was elected in 1995 campaigned on a platform, labeled the Common Sense Revolution, which called for an abrupt shift in the direction of government spending, in general, and its economic development policies, in particular. It evinced a preference for the use of broad framework policies, such as a reduction in the tax and regulatory burden to stimulate growth, in contrast to the more targeted spending policies of its predecessors, such as the Premier's Technology Fund and the Sector Partnership Fund. Within the first six

months of assuming office, nearly all of these initiatives were canceled or wound down.

Virtually all that remained were the Centres of Excellence which were renewed in 1996 with a reduced budget and a consolidation of the seven centres down to four. The government indicated that the Centres would be tied even more closely to the private sector for the purpose of promoting economic growth and job creation. Their primary purpose was to encourage university–industry collaboration that gave industry better access to university research expertise.

For the first two years of its mandate the issue of industrial and technology policies took a back seat, as the Conservative government struggled with a broader agenda of reducing expenditures (including major cuts in the budgets of post–secondary institutions) and personal income taxes, reforming the welfare system and engineering a massive redistribution of responsibility between the provincial and local governments. It was not until 1997 that the issue of innovation policy reemerged on its agenda. The budget that year introduced a major new spending program and several additional tax incentives. The \$500 million R&D Challenge Fund was designed to further promote business–university partnerships and research excellence. The main priority of the fund is to attract and keep world class researchers in Ontario. It has the flexibility to provide support for leading edge research that benefits today’s growing industries and helps create the industries of the future; state–of–the–art equipment and facilities; and incentives for gifted researchers to work in Ontario, including endowed chairs. Funding is awarded on a competitive basis, according to the proposal’s contribution to research excellence and economic growth. One criterion of economic benefit is the ability to attract private sector support. Of the various tax incentives introduced in the budget, the most significant is the Ontario Business–Research Institute Tax Credit — a 20 per cent refundable R&D tax credit for corporate–sponsored R&D



performed in Ontario by eligible universities or other approved post-secondary educational institutes or research associations (Eves 1997:177-83).

This shift in the government's policy focus continued in 1998. The budget announced several new policy initiatives with a strong emphasis on educating and training the labour force needed for the emerging knowledge-based economy. It identified strategic skills as the critical nexus between the emergence and rapid spread of new technologies and the resulting opportunities for growth in the local economy. The adoption and use of new technologies creates a demand for new kinds of skills needed to use the technologies in a diverse range of sectors, from automotive parts, to banking and software design. From the perspective of the local or regional economy, a ready supply of skills are essential to exploiting the opportunities for economic growth in any sector. In addition, they support additional spin-off jobs in related occupations. Conversely, a shortage of these strategic skills can block the expansion of jobs in the regional economy (Eves 1998:148-50). Two new measures were designed to deal with the critical skill shortages. The first was the creation of a new \$150 million Access to Opportunities Fund to create 17,000 additional places at Ontario universities in the high demand computer science and engineering programs in each of the next three years. In addition, the government provided \$10 million to support four innovative training programs at cooperative research institutes and community colleges in the areas of automotive parts design and manufacturing technology, new media skills, telecommunications and metal machining and engineering. It set aside a further \$20 million to support other effective partnerships to develop further strategic skills (Eves 1998:145-46)

While these measures do not offset the full weight of the programs and incentives eliminated in the first two years of the government's mandate, they indicate a substantial shift in the approach

that it is taking to the issue of innovation and economic development. In response to pressures from industry and the education sector, it has recognized that the public sector plays a critical role in the regional innovation system through the provision of basic research and education and the training of the highly skilled labour force demanded by the knowledge-based industries. This emphasis on the importance of the innovation system and its contribution to the development of a knowledge-based economy received further prominence in a vision document released shortly before the 1999 provincial election.

The report by the Ontario Jobs and Investment Board, *A Roadmap to Prosperity*, responded to a request from the Premier of the Province to develop an economic vision and action plan for the 21<sup>st</sup> Century, with a strategy to ensure jobs, investment and economic prosperity for the province in the first two decades of the next century (1999). In its response to this request, the report set out five strategic goals or ‘destinations’: knowledge and skills for prosperity, innovation culture, strong global orientation, building on our industry and regional strengths and favourable investment climate. Under each of these headings, the *Roadmap* developed a number of implementation strategies and a detailed set of recommendations.

The strategies placed primary emphasis on ensuring the creation of a highly skilled workforce with strong employment skills and a commitment to lifelong learning; building an innovation capacity throughout the economy, based on providing the appropriate incentive structure for innovation and a high investment in R&D; promoting Ontario’s exports in the global marketplace through the development of a world-class infrastructure and aggressive marketing; capitalize on the economic development potential of the province’s urban concentrations through more effective local governance, as well as strengthening industry sectors and economic clusters;

and finally, guaranteeing sound fiscal management in government to provide the right investment climate for growth and entrepreneurship. Each of these strategies, in turn, was followed by a number of key policy recommendations to the government. The document shares a number of key features in common with those issued by the two preceding governments, especially in terms of its emphasis on the need to maintain a highly qualified labour force in Ontario and the need to sustain an innovation culture, by promoting greater investment in R&D. It even shares the concern of the previous social democratic government for building innovative capacity by strengthening the role of sectors and clusters. It differs, however, in its continuing emphasis on the need for strong incentives for entrepreneurs and sound fiscal management, which clearly signals a continuation of its policy of tax cuts and expenditure restraint.

Ontario has undoubtedly been moving down the path towards ‘a learning region’ over the past decade and a half. However, a number of deep contradictions underlie the strategy currently being pursued. The fiscal policies of the first two years, and its more recent discovery of innovation policies are contradictory, not complementary. The deep cuts introduced to the education, social and municipal sector in the last mandate have undermined the capacity of these institutions to deliver quality services and weakened the conditions of trust and social capital that most analysts associate with learning regions. In this sense, they are weakening, rather than strengthening, the untraded interdependencies in the regional economy. While the policy shift and fiscal relaxation in the last two budgets has begun to reverse the trend, they have not undone it. The reelection of the government in June, 1999 with a strong mandate raises the question of how it will reconcile the divergent aspects of its economic agenda in a second mandate. The answer to this question will reveal a great deal about Ontario’s prospects for making further progress on its path to truly becoming a *learning region*.

## 5.0 Conclusion

Evaluating the impact of policy on economic development is never a simple, straightforward exercise. Nevertheless, there is some evidence to suggest that the policies pursued in Ontario over the past decade and a half have been instrumental in helping manufacturers — both in the mature, traditional sectors, as well as the more technology based ones — to improve their quality, sophistication, timeliness of delivery and overall innovativeness. For example, within the all-important automotive parts industry, productivity levels have increased sharply since 1990, to the point where the once sizeable gap between American and Canadian producers has been virtually eliminated (Wolfe and Gertler, 1998). In the automotive assembly sector, plants in Ontario have been disproportionately frequent winners of independently assessed quality awards, and this recognition has been accorded to both ‘Big Three’ and Japanese-owned plants, suggesting a regional effect above and beyond the influence of individual firms.

The policy measures adopted in Ontario between 1985 and 1999 describe a gradual evolution towards a more reflexive and comprehensive approach to managing the processes of economic restructuring and technological innovation. They were comparable to developments underway in numerous other subnational jurisdictions in North America that assumed a more active stance in responding to the challenge of a shift to a new economic paradigm. The reality confronting the provincial governments in these decades is that of regional economies linked into an ever more tightly integrated North American economy. The sustained emphasis by four provincial governments consisting of three different parties on investing in R&D and expanding the skill base of the provincial labour force suggest that it has absorbed some of the key lessons essential to becoming a learning region. The tentative process of adapting its public and private institutions to respond to the challenges of new technologies and continental integration has

followed a torturous path. It is too early yet to tell which tendency will prevail and whether Ontario will continue along the path towards a more reflexive, learning economy embarked upon in the past two decades.

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