

GOVERNING A KNOWLEDGE ECONOMY

**SCALAR, CIVIC AND STRATEGIC DIMENSIONS OF
CONTEMPORARY ECONOMIC GOVERNANCE IN NORTH AMERICA**

Tijs Creutzberg

A thesis submitted in conformity with the requirements for the degree of
Doctor of Philosophy, Graduate Department of Political Science, in the
University of Toronto.

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GOVERNING A KNOWLEDGE ECONOMY

Scalar, Civic and Strategic Dimensions Of Contemporary Economic Governance in North America

Doctor of Philosophy in Political Science

2006

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University of Toronto**

Abstract

This thesis examines the multilevel governance processes supporting regional microelectronics industries with the goal of better understanding how states are adapting to an increasingly global and knowledge-intensive economy. It finds that a new mode of governance is emerging that responds to the challenges associated with developing and sustaining competitive and knowledge-intensive industries. This mode is strategic, and structured as a governance network that involves a mix of mostly local actors who take a strategic interest and role in shaping the long-term economic prospects of a locality. Through mobilizing and developing knowledge assets in support of targeted industries, drawing down resources from upper levels of government, and helping resolve multi-jurisdictional regional governance problems related to sector development, these networks help regional firms adapt to ever-

changing global high-tech markets. From a theoretical standpoint, these governance networks are significant in part because of the presence of a strong civic component that has little in common with typical industry associations. In fact, these networks are entirely distinct from the widely studied policy networks, which are concerned primarily with policy relating to the regulatory conditions of the political economic system.

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CHAPTER 1

INTRODUCTION

THESIS OVERVIEW

The transformation in the structure of advanced industrial economies since the post War Keynesian era, has been, in the words of one observer, nothing less than ‘a fundamental redrawing of the global economic map’.¹ Increased trade, greater financial mobility, together with the emergence of globally organized production processes and supply chains are all widely discussed factors that have altered the geography of economic activity in recent decades, and deepened economic integration among these countries. In the international political economy literature such changes have been at the forefront of a significant debate over the importance of supranational cooperation in stabilizing an increasingly interdependent global economy.²

Another significant change to the structure of economies, however, has been the growing knowledge intensification of production processes in many industries. It is now a platitude in policy debates that advanced industrial economies have become ‘knowledge-based’. Yet for all its acceptance, the impact of this change on economic governance structures, particularly at the domestic level, is remarkably under-researched in political science as a whole. Compared to the vast debates on economic governance and globalization carried out in the international political economy literature, the issue of how the knowledge intensification of the economy has affected domestic economic governance has been, for the most part, a neglected subject. There are exceptions, including the notable work by state theorists such as Bob Jessop, whose ongoing interest in the relationship between capitalism and the state has led to

¹ P. Dickens. *Global Shift: Transforming the world economy*. (New York: The Guilford Press, 1998): 2.

² A review of this discussion can be had in M. Kahler and D. Lake, *Globalizing Authority: Economic Integration and Governance* (Princeton: Princeton University Press, 2003): Chapters 1 and 16.

many insightful contributions in the area.³ Yet in much of this work, the knowledge economy is a variable only in macro theoretical terms, with little attention given to specifics. It is this empirical gap - in understanding how the shift to more knowledge and innovation intensive production forms is affecting the state and governance more generally - that defines the broadest aim of this thesis.

Granted, the rise in prominence of knowledge industries in proportion to overall economic activity is not the only factor to have affected the domestic economic governance of advanced industrial countries. Indeed, there is a significant 'new regionalism' literature whose basic premise is that it is the changes brought by globalization and neoliberalism that are driving a restructuring in domestic economic governance, especially at the local level.⁴ Political forces must also be acknowledged for their role in defining opportunities, economic agendas, programs and interests that have supported the shift to an innovation and knowledge economy. In Canada, for example, the political realities of regionalism have long been an important dimension for understanding economic governance as it affects both the affluent and poorer regions of the country.⁵

One of the central themes in this thesis, however, is that knowledge intensification is at least as important to explanations of why economic governance is changing. This is due to the fact that knowledge industries have come to depend ever more on a state's non-economic institutional capacity in their bid for improved global competitiveness.⁶ This has, in effect, altered, in a fundamental way, the relationship between states and market actors.

Briefly explained, in the post war era, the autonomous firm, organized to produce relatively simple consumer goods for national markets at significant

³ Bob Jessop's most recent book, *The Future of the Capitalist State* (Cambridge: Polity Press, 2002) captures much of this emphasis; see for example, Chapter 3, *The Schumpeterian Competition State*.

⁴ For a summary see, among others, N. Brenner and N. Theodore "Preface: From the 'New Localism' to the spaces of neoliberalism' *Antipode* Vol. 3.

⁵ A more extensive discussion of this is provided in Chapter 6.

⁶ Such an observation is also made by Bob Jessop, among others, who states that 'the most advanced economies function more and more in terms of the extra-economic' and that this is a paradox that has resulted from 'the increasing interdependence between economic and extra-economic factors making for structural or systemic competitiveness' B. Jessop, 'The State and the Contradictions of the Knowledge-Driven Economy' *Knowledge, Space, Economy* P.W. Daniels et al. (eds.) (London: Routledge, 2000) 69.

volumes, was very much the dominant economic entity. In such an economic climate, economic governance consisted primarily of demand management policies articulated at the national level that sought to stabilize the macroeconomic conditions in favor of production and consumption. This is in contrast to the knowledge-intensive firm, typical of growth industries of today. With strategic links to other firms and public institutions to sustain their learning processes, and to maintain their competitive position in rapidly evolving global technology markets, most knowledge intensive firms are some distance from the self-contained economic entity idealized in classical economic theory. As many studies have now shown, the presence of federal R&D institutions, universities, high-tech incubators, research consortia and other support organizations, and increasingly, the quality of the local socio-economic environment, have all become integral elements to the success of firms and to emerging economic regions as a whole.⁷

Not surprisingly, this increased interdependence between market and non-market actors and infrastructure has brought a shift in the structure of non-market economic governance. The development of a region's knowledge infrastructure on which these industries depend has become a central concern in many advanced industrial economies, necessitating a form of governance that is fundamentally different from that which prevailed in the postwar era. Yet to fully appreciate and characterize these changes, one must look at domestic economic governance in the broadest of terms. This requires moving away from simplistic distinctions of private versus public and even national typologies such as 'liberal market economies' versus 'coordinated market economies', to terminology that can better accommodate the multidimensional character of contemporary governance.⁸ The reason for this is that the development of a knowledge infrastructure is a fairly complex process and does

⁷ These factors, discussed further in Chapter 2, are widely recognized as important elements to successful economic regions in the burgeoning industry cluster and economic geography literature. See for example M. Pugh O'Mara, *Cities of Knowledge* (Princeton: Princeton University Press, 2005) and B. A. Lundvall, *National Systems of Innovation: An Analytical Framework* (London: Pinter, 1992).

⁸ The 'liberal market economies' versus 'coordinated market economies' are categories developed by Hall and Soskice to reflect differences in political economic systems between Anglo-Saxon capitalist states and continental European and Asian states. This is discussed further in a later section of Chapter 1. Peter Hall, and David Soskice, D. (eds.) *Varieties of capitalism: the institutional foundations of comparative advantage*, (Oxford University Press. 2001): Chapter 1.

not emerge on its own through the coordination mechanisms of a 'free market' - regardless of how market-oriented a country's political economic system is. Rather, it requires that choices be made, most often by non-market actors, over the allocation of resources on several fronts. One is the type of investment, whether it be, for example, a new research laboratory, new research program administered through existing universities, or a quality of life investment that will help retain and attract a highly skilled workforce. Second, a decision must be made with regard to the recipient - will this be a nanotechnology investment, or workforce-training initiative targeted at a particular industry? Third is the location of this investment. Will these investments strengthen existing economic centres, or will they be used to develop economically weaker and under resourced regions?

Moreover, these decisions increasingly have a spatial dimension within the state. With the most resources at their disposal, national governments are invariably essential actors, able to respond to challenges of global industrial shifts by funding major strategic R&D investments for emerging industries. In both Canada and the United States, for example, federal governments have been, to various extents, leaders in developing the microelectronics industry, initially through defence departments who, after World War II, were quick to recognize the benefits of the emerging technology for national defence. Yet, it can often be actors at the local level that influence the location of these investments. Local actors are important in channeling, or localizing, resources made available through national and regional government programs into their respective regions thus helping thicken the institutional capacity for a particularly industry. A successful proposal for a federally funded national centre of excellence from a local university department, for example, can be a significant factor in building the regional concentration of a related industry. Local non-state actors can also be pivotal in developing institutions of technology transfer, simply out of a civic commitment to the region's economic viability. Thus, the once prominent national level has become increasingly less so in the knowledge intensive era due to the growing relevance of subnational dimensions to strategically shaping the competitive foundations of an economic region.

More succinctly then, the focus of this thesis is on the structure of economic governance that supports knowledge-intensive sectors. And the goal is to understand how best to accommodate the growing local dimension in the broader context of domestic economic governance. Are new governance structures emerging in fact and, if so, to what the extent, and how do they work? Answers to such questions are sought in a North American context, drawing on case studies of two regional economies with well-developed microelectronics industries, Austin, Texas, and Toronto, Ontario.

The remainder of this chapter is concerned with deepening the analytical foundations of the thesis by discussing in greater detail the political economic context of knowledge intensive industries and the theoretical approach to analyzing the related changes in domestic non-market economic governance. This is followed by a review of methodology and an overview of the findings and theoretical contributions.

THEORETICAL CONTEXT

Economic governance in a era of rapid technological change

“What people need to understand is that if you stand still in the semiconductor industry, you are moving backwards.”

Angelos Angelou, Austin, Texas

Capitalism, it has been aptly noted, is restless because knowledge itself is restless.⁹ New knowledge, when captured and transformed by firms into new products and services, can not only open up new economic spaces, giving rise to fresh impulses for economic growth, but can also disrupt, and even destroy, markets for existing activities and technologies. For those familiar with technology’s history, such restlessness has been intrinsic to the process of technological advance. From the transistor to just-in-time manufacturing techniques, the accumulation and creation of new knowledge has led to entirely new ways of achieving desired functional ends,

⁹ J. S. Metcalfe, ‘Industrial Growth and the Theory of Retardation: Precursors of an Adaptive Evolutionary Theory of Economic Change’ (CRIC Discussion Paper No. 57, 2002): 2.

ultimately to the demise of what were once dominant prior techniques. To Joseph Schumpeter, this was ‘creative destruction’.¹⁰

For states within whose borders such developments transpire, the restlessness of knowledge can be a significant, and at times, stark dimension of its economic prosperity. And indeed, this is all the more so in a liberal trade environment, which helps accelerate knowledge flows at a time when the knowledge intensiveness of many industries is on the increase. Through its transformative effect on economic activity, new knowledge can shift the relative economic importance of not just products but also of entire industries, regions and countries and in so doing recast the geography of global prosperity.¹¹ Products derived from major technological advances can, in as little as a decade, become low priced commodities with production relocated to low wage countries, or they may simply be made obsolete. And having spawned an industry from which a region or country may derive a significant portion of its wealth, such changes can no doubt have dramatic economic consequences when the infrastructure and institutions, upon which such economic activity depends, is made as obsolete as the technology itself.

This dynamic is, of course, as old as capitalism itself. Karl Marx was acutely aware of the transformative effect of new technologies on Great Britain in the 19th century, noting that the principal benefactors, the bourgeoisie, “cannot exist without constantly revolutionizing the instruments of production.”¹² And, soon after the Communist Manifesto was first published, the global geographic dimensions of this dynamic were already being felt. The United States, having heavily borrowed European technology up until the mid 19th century, was slowly emerging as a major technological innovator ultimately surpassing Britain’s long-standing industrial dominance with its ‘American system of manufactures’ of standardization and mass production.¹³

¹⁰ Schumpeter, J. *Capitalism, socialism, and democracy*, 3rd ed. New York, Harper & Row, 1962.

¹¹ J. S. Metcalfe, ‘Institutions and Progress’ (CRIC Discussion paper No. 45, 2001):22.

¹² K. Marx and F. Engels, *The Communist Manifesto*, (Oxford University Press: New York, 1992): 6.

¹³ See Chapter 6 – Why America?, in Nathan Rosenberg, *Exploring the Black Box: Technology, Economics and History*, (Cambridge University Press: New York, 1994)

Though neither the dynamic itself nor its global reach, has changed much over the centuries, the same cannot be said of its pace. As economies of advanced capitalist states have come to depend ever more on knowledge-intensive industry sectors¹⁴, the restlessness of knowledge becomes ever more evident for the various economic actors. High-technology firms, having become sustainable only to the extent that they can maintain a presence in emerging sectors, regardless of their past standing on the technological frontier, must continually invest in R&D. And states, believing “that the future of their countries depends on the composition of their economies”¹⁵, have turned to ‘innovation policy’ and ‘technology policy’ in the lexicon of industrial development to incentivize knowledge creation in their pursuit of high-growth, technology-based industries.

As for the locales where such knowledge intensive economic activity transpires, the pace of technological change presents them with the prospects of having to adapt through an ongoing process of economic reinvention out of a concern for losing their tax base and associated level of prosperity. Economic transformation thus becomes a near continuous process of adjustment and adaptation, one whose fuel - new knowledge - is itself perpetuated by a ‘change begets change’ cycle ‘where every advance in knowledge creates the conditions for further advances’.¹⁶

This, of course, is but a sketch of a far more complex picture of the economic changes facing advanced capitalist states. Global economic integration along with trends in social, political and economic systems, all have some explanatory merit in accounting for such macrodynamics of change. Yet it does nonetheless provide the appropriate backdrop for a central theme of this thesis, namely how states are managing the transformation to an increasingly knowledge intensive and globalized economy.

One aspect of this current transformation is that states are considerably more circumscribed in the manner in which they are able to coordinate their economies, so

¹⁴ See OECD, ‘A New Economy?’ (Paris, 2000).

¹⁵ Alan Wolff, Thomas Howell, Brent Bartlett and R. Michael Gadbow (eds), *Conflict among Nations: Trade Policies in the 1990s*, (Westview Press, San Francisco, 1992): 528.

¹⁶ J.S. Metcalfe, J. Foster and R. Ramlogan, ‘Adaptive Economic Growth’ (CRIC Discussion paper no. 59, 2002). See also J. S. Metcalfe, *Industrial Growth and the Theory of Retardation*.

as to promote its transformation, than in past eras. One of the earliest proponents of industrial policy, Alexander Hamilton, proscribed all manner of political means for promoting manufacturing activity in the US, including duties, prohibitions, and ‘pecuniary bounties for new enterprises’, in his 1791 Report on Manufactures.¹⁷ Such measures, once widely accepted as effective policies, have, however, lost their legitimacy among advanced industrial states amidst considerable empirical evidence from the post-World War II era showing the link between economic growth and opening of markets. Economic transformation, from this evidence, is thus best left to the coordination mechanism of supply and demand, with the state acting only to ensure that its macroeconomic policies are market-conforming and supportive of free trade. This commitment to free-markets is nicely captured in the 1984 report from Royal Commission on the Economic Union and Development Prospects for Canada which argues that there is in fact no role for the Canadian government in aiding the transformation from slow growth mature industries to faster growing industries: “We are convinced that the private sector will move, in time, into areas of growing opportunity, particularly if governments do not impede the adjustment process and provide a generally supportive environment. Canada should not pursue targeted industrial policy to encourage growth of exports in areas of potential high growth.”¹⁸

This dominant neoliberal logic suggests that little room has been left for states to actively engage themselves in the process of economic development in ways widely accepted in earlier times. A commitment to free trade agreements, to attracting inward investment through competitive tax systems, and ensuring that debt and inflation remain under control, became the prevailing economic orthodoxy in the 1990s. So was the claim that the state was ‘receding’, or in the process of ‘hollowing out’, due to concessions of authority made necessary to realize this new orthodoxy.¹⁹

And yet, paradoxically, as will become evident in the following chapters, the state’s role has become more pronounced, not less, as their economies have become

¹⁷ Alexander Hamilton, *Report on Manufactures*, 1791 republished in *Readings in American Government* (Kendhall/Hunt Publishing Co.: Iowa, 1983).

¹⁸ Canada. *Royal Commission on the Economic Union and Development Prospects for Canada* (Ottawa: Minister of Supply and Services, 1985): 198.

¹⁹ See Chapter 2 for a more detailed discussion.

more knowledge intensive. With a growing importance and awareness of the social and institutional dimensions of knowledge, together with the uncertainty intrinsic to innovation-driven economic activity, high-technology industries have become increasingly reliant on a wider array of largely public institutions in support of their knowledge acquisition and competitiveness – far beyond what the market, through its reliance on contractual governance, can provide. Moreover, there is considerable evidence that many of these institutions and actors are increasingly situated at subnational levels of the state. The associative system supporting and developing new firms, local cultural institutions, localized learning networks, and social capital, all affect the capacity of markets to act as the loci of knowledge generation.

The result: among advanced industrial states, economic governance - used here to refer to the modes of non-market coordination that affect the reallocation of sources within the economy - has become much more complex. The corresponding multilevel interdependence between market and non-market actors has meant that states have become more involved in the areas of their economy that are increasingly based on the production, distribution and use of knowledge and information²⁰, even though they may have conceded authority in their integration into a globalized and neoliberal economic realm. Indeed, the very use of the term ‘governance’ as opposed to ‘government’ reflects a reality that no one individual institution has sufficient control over the inputs – be it knowledge, resources or authority – needed to manage, affect the direction, or resolve problems of the economy. Instead, states, as well as firms are relying more on a network of actors and institutions to achieve desired goals – leading to what some have called a ‘new architecture of governance’.²¹

Proposition

The proposition for this thesis is two fold: first that this new architecture of governance explains the paradox between loss of state authority and its growing importance; and second that this architecture is one where the locus of authority has

²⁰ This is based on a definition of a knowledge-based economy which the OECD defines as “Economies which are directly based on the production, distribution and use of knowledge and information”. ‘The Knowledge-Based Economy’, STI Outlook, (Paris: OECD, 1996): 3.

²¹ R. Hudson, ‘European integration and new forms of uneven development: but not the end of territorially distinctive capitalisms in Europe’, *European Urban and Regional Studies* 10(1) 2003: 51.

shifted to subnational levels, to the actors and institutions most intertwined in the knowledge production system.

One of the more forceful proponents of this latter claim is Bob Jessop who has argued that states are witnessing a shift in economic power from the national to sub-national levels as their economies evolve towards a more knowledge intensive form and adopt neo-liberal economic policies at the national level.²² This trend he separates into two claims. The first is that there is a ‘hollowing out of the national state apparatus with old and new state capacities being reorganized territorially and functionally on subnational, national, supranational and trans-local levels’. And second, that there is a move towards ‘destatization of the political system’, as evidenced by the shift away from the state as a central actor in achieving state sponsored socio-economic objectives, to one where the ‘state apparatus’ is merely the ‘first among equals’ as a result of the use of partnerships to gain access to knowledge, expertise and finance.²³

Though informative in themselves, these propositions generate some relevant questions related not only to the structure of economic governance, but also to a country’s ability to transform their economies. Do they suggest, for example, that the national state is becoming a less influential actor in the development of an advance economy? And if so, is this improving or hindering the capacity to respond to an ever-evolving economy? Finally, assuming that the decentralization process has run its course, is there an emerging optimal domestic structure of economic governance that is best suited to helping economies adapt?

It should be noted that Jessop is by no means the only author to make the claim that there is a hollowing out of the national state apparatus states. He is nonetheless one of the few who consistently recognizes the change in the structure of the economy as an important factor in this shift. For example, another group who also make the claim that local regions are increasingly important milieus in a globalized

²² B. Jessop, ‘The rise of governance and the risks of failure: the case of economic development’ in *International Social Science Journal*, March 1998 Vol. 50, Issue 155.

²³ B. Jessop, ‘Capitalism and its future: remarks on regulation, government and governance’, *Review of International Political Economy* 4:3, 1997.

economy is the 'new regionalists'. Yet in much of this literature, it is typically only the impact of a liberalized trade and financial system in facilitating the internationalization of production that is considered. With this as the main economic variable, the logic of the new regionalism is that urban centers are best positioned to make the necessary decisions to ensure that their respective regions are globally competitive in attracting foreign investment.²⁴ In the Marxian language of Brenner, these urban centers have, in effect, become embedded in 'glocalizing strategies' whereby 'national political strategies help position diverse subnational spaces within supranational circuits of capital accumulation', all in an effort to transition to a 'competition state' that favors structural competitiveness over welfare.²⁵

These regionalist accounts, though convincing at a meta-level, are limiting to the extent that they circumvent some very important economic trends of interest here that have arisen in the post-Fordist era, including the increase in use of non-market modes of economic coordination, innovation intensive markets, and the shortening of product cycles. Moreover, among new regionalists, this broad meta-understanding is typically a backdrop to a mostly urban debate about the suitability of certain regional and local governance configurations and local economic development powers to respond to globalization writ large.²⁶ As much of this thesis points out, however, there is much more to local economic development than simply redistribution policies, taxes, transportation systems and effective local governance systems.

Finally, there is no indication from the ensuing case studies that the emergence of a new locally influenced governance structure comes at the expense of existing national forms. Rather they appear to have emerged more as a complementary form, providing a governance structure that is more strategically responsive to the ever-evolving technology markets, and which responds to the need for integrated decision-making at the local and regional levels that is necessary for embedding and

²⁴ See for example, J. Wolfson and F. Frisken, 'Local responses to a global challenge: comparing local economic development policies in a regional context'. *Journal of Urban Affairs*, Vol. 22 4, 2000.

²⁵ N. Brenner, 'Urban governance and the production of new state spaces in western Europe, 1960-2000', *Review of International Political Economy* 11:3, 2004, p. 476

²⁶ A particularly acute example of this Marxist 'top dressing' to what is essentially a historical study of urban reform is Pierre Filion, *The Urban Policy Making and Development Dimension of Fordism and Post-Fordism: A Toronto Case Study*. *Space and Polity* Vol. 5 No. 2, 2001.

developing an innovation and knowledge infrastructure. The national state, far from losing its prominence as a central actor as is argued by Jessop, acquires a new role in supporting the framework conditions and providing the resources to help realize local objectives.

THEORETICAL APPROACH - CATEGORIES AND PERSPECTIVES

The use of governance as an analytical language to analyze what at first can appear as an unwieldy, if not amorphous, set of relationships among various actors and institutions, is considered to be very much at the centre of the research approach. This language is, of course, not the only language available to centre an analysis on. In the multitudinous disciplines of the social sciences that concern themselves with state-market interactions, there is a rich diversity of analytical languages that could have been used to provide the theoretical structure for an analysis carried out here. The public policy, innovation and business literature, for example, offer some of the more concrete and transferable categories. These range from the popular, yet simplistic, public-private sector analysis²⁷, which allows for a focused look at two sets of actors, to a more sophisticated 'triple helix' analysis of interactions between university, industry and government.²⁸ And in political science, the concept of neocorporatism has yielded an entire literature examining formal relationships and interest representation between governments and industry for the purpose of coordinating economic activity.

Yet as derivatives of basic governance, most of these terms lack the breadth and flexibility to delineate the boundaries of inquiry that are required here. The use of governance is, in many ways, a first principles approach, free from conventional lines of inquiry of established concepts and flexible enough to craft more appropriate categories that can help provide insight into the subject matter of interest.

²⁷ See. W. Faulkner and J. Senker 'Making sense of diversity: public-private sector research linkage in three technologies', *Research Policy* Vol. 23, Issue 6, 1994.

²⁸ See L. Leydesdorff, and H. Etzkowitz, "Emergence of a Triple Helix of University-Industry-Government Relations," *Science and Public Policy* 23, 279-86, 1996.

Governance as an analytical language

Public discussions regarding the role of the state in economic affairs have traditionally been, and continue to be, structured in a discourse of market failure. By such a language, governments 'intervene' in markets only to provide for public goods, to mitigate externalities, or to ensure that they be competitive. Thus inefficient market structures and barriers to entry, imperfect markets for information, for example, all justify state coordination.²⁹

When it comes to state research and development expenditure the same logic is invoked, drawing on the seminal arguments of Richard Nelson and Kenneth Arrow, who were the first to claim that the private sector generally invests less than the socially optimal amount in R&D. Returns on investment in R&D, goes the argument, cannot be fully appropriated by an investor because of the tendency for knowledge, the main output of R&D, to be transferred outside to others, ultimately discouraging further investment. Given such a failure, the state intervenes through a number of policy measures, including the funding of R&D that would not, or could not, be financed or performed in the private sector.³⁰ This vocabulary, of course, is based on the liberal economic assumption that markets, when competitive, maximize in a self-correcting and regulating manner. By such principle, state interventionism beyond attending to market gaps, does not work for it upsets the self-adjusting mechanisms of the market. The prescribed relationship between state and market is thus one of arm's length, where each is an independent sphere unto itself, with their own logic and rules.

Much of the neoliberal reforms for maintaining or acquiring the prosperity enjoyed by the most successful advanced capitalist states of the past few decades can be readily understood from this dichotomous state-versus-market framework, whereby policies extending the operation of the market have led directly to the contraction of the state. Examples include the opening of financial and capital

²⁹ OECD, *Technology productivity and Job Creation* (Paris: OECD, 1998): 14.

³⁰ See: R. Nelson, *The simple economics of basic scientific research*. *Journal of Political Economy* 49:297–306, 1959; and K. Arrow, 'Economic welfare and the allocation of resources for invention'. In R. Nelson (ed.), *The Rate and Direction of Inventive Activity*, (Princeton: Princeton University Press, 1962).

markets, reduction of public expenditures, deregulation of businesses, privatization, lower corporate taxes and free trade – all part of what Williamson called the “Washington consensus”. This was a recipe written not simply out of ideological preference, but also from the accumulated wisdom and understanding of economic experts.³¹

While undoubtedly effective in establishing a rationale for state economic activities, providing a broad template, at least stylistically, for the private versus public roles, this language ultimately simplifies what has long been considered, from a political economy standpoint, to be a far more complex relationship between state and market. Karl Polanyi, for example, in a 1957 essay titled ‘The Economy as an Instituted Process’, was clear about the limitations of classical economics, rejecting the important assumption that there is a socially disembodied, circumscribed sphere of economic relations with a tendency toward general equilibrium. The economy for Polanyi must be understood substantively such that it can provide “a frame of reference to which the market is itself referable”.³² “The human economy ... is embedded and enmeshed in institutions, economic and noneconomic,” he added.

This tradition of recognizing the embeddedness of economic and non-economic institutions has thus long differentiated the analytical vocabularies of political economy from that of the economic literature concerned with public policy. In summarizing the political economic understanding of markets, Robert Gilpin writes that they are seen as being “embedded in larger sociopolitical structures that determine to a considerable extent the role and functioning of markets in social and political affairs, and that the social, political and cultural environment significantly influences the purpose of economic activities and determines the boundaries within which markets necessarily must function.”³³

Yet despite such a long-standing recognition, only recently has there been a revival in political economic studies of a vocabulary that truly embraces this

³¹ See Chapter 2 of J. Williamson ‘In Search of a Manual for Technopolis’. In Williamson (ed.) *The Political Economy of Reform* (Institute for International Economics, Washington, DC 1994): 18.

³² K. Polanyi, ‘The Economy as Instituted Process’, in K. Polanyi et al. (eds.) *Trade and Market in the Early Empires* (Free Press, 1957): 205.

³³ R. Gilpin R. *Global Political Economy* (Princeton: Princeton University Press, 2001): 75.

embeddedness. This is the language of governance, which had during the 1970s, been prominent in the corporatist literature, providing the conceptual basis for the formal negotiations that took place particularly in Western European states between the state, business and labour. Schmitter, a pioneer in describing this mode of governance defined it in 1981 as the “incorporation of formally designated interest associations ...within the process of authoritative decision making and implementation”. Indeed, at the time, such governance was held to be “the foundation for advanced industrial growth and adaptation and the mechanism that could assure survival and even growth in a fast paced open international economy”³⁴

Though corporatism has few contemporary adherents in the era of neoliberalism, the foundational language of governance is still very relevant for interpreting state-market relations. With an explicit focus on the mechanisms of coordination through which decisions are arrived at, an analysis of governance helps extend the analytical perimeter beyond the state, and indeed any one level of the state, so as to better accommodate and analyze the interactions among all relevant actors and institutions that have some bearing on the coordination of social, political and economic activities.

Defining it as simply the mechanisms of coordination through which decisions are made is but one of several definitions found in the literature. Bob Jessop offers a more restricted definition of governance as networks or any mode of organization that both coordinates interdependent activities and is self-organizing.³⁵ This is what he calls heterarchy and includes “self-organizing interpersonal networks, negotiated inter-organizational co-ordination, and de-centered, context mediated inter-systemic steering.” Another definition useful in rounding out the concept is one by Richard Nelson who makes room for a normative dimension to governance. Governance, or to use Nelson’s terminology, governance structures, “determine the values and interests that are to count in determining how much of what is to be provided and distributed” and “assign responsibility for provision and provide a system of incentives and

³⁴ Cited from R. Rogowski, ‘Comparative Politics’, in A. Finifter, (ed.) *Political Science: State of the Discipline II*. (Washington, D.C., American Political Science Association, 1993): 438.

³⁵ B. Jessop, ‘The rise of governance and the risks of failure’, in *International Social Science Journal*, Vol. 50, Issue 155, 1998.

controls for enforcing accountability”.³⁶ This aspect of governance reveals the political element whereby the preferred mode of governance can be as much about values as it is about effectiveness.

From these definitions we get a broader sense of the vocabulary of governance: decision-making, networks, interdependence, coordination, distribution or allocation of resources, and accountability. The usefulness of this broader vocabulary is readily apparent in the treatment of markets where they become but one mode of economic coordination by which demand and supply are organized. Thus rather than treated as a separate economic entity, markets are analyzed as a set of institutions that are interdependent with state, cultural, social institutions, much like Gilpin’s earlier definition of markets. This approach is also consistent with Geoffrey Hodgson’s work which defines a market as ‘a set of institutionalized and recurrent exchanges of a specific type’ whereby ‘consensus over prices and other information may be established’.³⁷ With such a definition, Hodgson notes that there is not just one type or set of markets but a wide range of markets ‘each depending on its cultural and institutional context’.³⁸

Equally significant is that the language offers a way out of the popular, though simplistic, dichotomies that frame state-market relations in various areas of the social sciences.³⁹ In the vocabulary of governance, debate over state-market relations is not about whether one type of governance institution - that is, markets - is more effective than another. Rather, it is about the *configuration* of institutions, the types, and their relative importance to sustaining the foundation for economic well being. Market versus hierarchies, public versus private, and strong versus weak states – these dichotomies all dissolve in more encompassing governance perspective that emphasizes configurations of actors rather than which actors do or do not play a role.

To summarize, the substantive component of the economy in state-market analysis is strengthened both from a theoretical and empirical standpoint when using

³⁶ R. Nelson. ‘On the Complexities and Limits of Market Organization’, Columbia University, 2000.: 3

³⁷ G. Hodgson G. *Economics and Utopia* (New York: Routledge, 1999): 174.

³⁸ Hodgson, *Economics*, 94.

³⁹ Jessop *The rise of governance*: 31

the language of governance. In the case of the theoretical, it reflects the observation that ‘the most advanced economies function more and more in terms of the extra economic’.⁴⁰ And empirically, it accommodates, rather than marginalizes, the unassailable reach of “economic intervention” that goes on mostly by states as well as other non-market actors. When US federal R&D spending reaches some \$112 billion dollars as it did in 2003, much more is involved than simply ‘market failure’. Likewise, when new types of coordination among market actors – such as research consortia, strategic alliances, joint ventures, become an organizational force in their own right, state structures are equally under resourced to explain such a trend.⁴¹

A multilevel analysis

The second theoretical lens adopted in this research is a multilevel one. In identifying and characterizing the relationships between all the relevant actors, this research gives equal consideration to agency and institutions at the local, regional or national level that influences the adaptive capacity of a particular region’s industry sector. This approach is remarkably uncommon in comparative political economy. The ‘modernization approach’ of the 1960s, which sought to understand how developed economies went about modernizing their economies, was predominantly national. So too were the corporatist accounts of the 1970s, which sought to explain how some states effectively managed inflation through their bargains with industry and unions over wages, and working conditions and the like.⁴²

More recently Hall and Soskice have advocated for a new characterization of political economies, again from a national perspective. They justify their national focus by a premise that many of the most important institutional structures shaping economic activity are within national jurisdiction.⁴³ Labour market regulation, education and training and corporate governance are the examples they give to

⁴⁰ Jessop, ‘The State and the Contradictions’, 69.

⁴¹ For an extensive typology of these types cooperative relationships observed in advanced capitalist economies, see Hage and Alter ‘A Typology of Interorganizational relationships and Networks’ in Hollingsworth and Boyer, *Contemporary Capitalism: The embeddedness of Institutions*, (Cambridge: Cambridge University Press, 1997).

⁴² For a periodization of theoretical approaches in political economy, see Chapter 1 of Hall and Soskice, *Varieties of capitalism*.

⁴³ P. Hall and D. Soskice, *Varieties of Capitalism* (New York: Oxford University Press 2001), 6.

support this premise, arguing that these regulatory areas are most influential on the way in which firms resolve their main coordination problems related to developing, producing and distributing goods and services. These regulatory areas influence, for example, styles of industrial relations, (bargaining over wages and working conditions), systems of vocational training and education, corporate governance, and inter-firm relations, a term which they use to capture links with other enterprises.

Thus, from these variables and their link to national regulation, they extract the essence of the political economic system. Firms that rely on hierarchies and markets (i.e. contractual governance) to resolve their main coordination problems are classified as 'liberal market economies', which include the Anglo-Saxon economies of the United States, Canada, the UK and Australia. And firms that rely predominantly on non-market modes of coordination, including cooperation, and network monitoring, are considered 'coordinated market economies'. In this latter group are the continental European economies such as Germany, Finland and Austria, and the East Asian developmental states such as Japan.

One of the central themes in this thesis is that such a focus can no longer adequately account for a meaningful segment of the economic governance in an innovation-driven economy, particularly in North American so-called 'liberal market economies.' Instead one must look more closely below the national level, though without discounting the multilevel institutional framework in which economic governance takes place, to find an important site of agency.

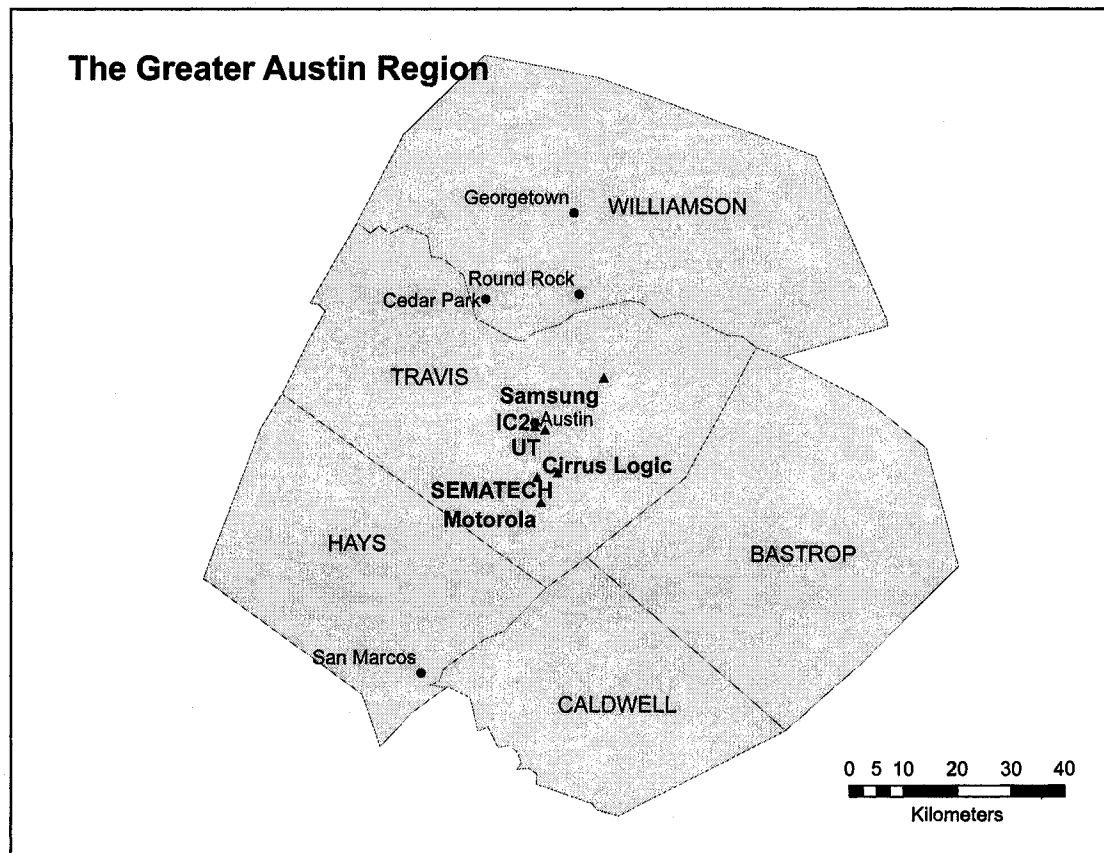
METHOD

In structure, this research is comparative, focusing on a set of relationships in two regions in North America, Austin, Texas and Toronto, Ontario, with the intent of generating some more general claims on the structure of non-market governance in knowledge intensive economies. To achieve this, interviews were carried out in each region, that were designed to map out respective patterns of relationships between all relevant actors and institutions that have influenced the development of each of the region's microelectronics industry. Each case study has been supplemented by

historical research into the regional development of these industries helping provide a temporal dimension to the analysis. This is necessary both in understanding the reasons for the existing patterns and to recognizing whether or not the patterns are part of a trend that is consistent with the propositions previously identified.

The Austin region for this study is the Austin-San Marcos region, a metropolitan statistical area (MSA) used nationally by the US Census Bureau, and locally by economic actors such as the Greater Austin Chamber of Commerce. The region embraces much of the Texas 'hill country' in the centre of Texas and is populated by some 1.3 million people (Figure 1-1). It comprises five counties, spanning just less than 7000 km², and 49 municipalities. The region is also home to the state capital, Austin.

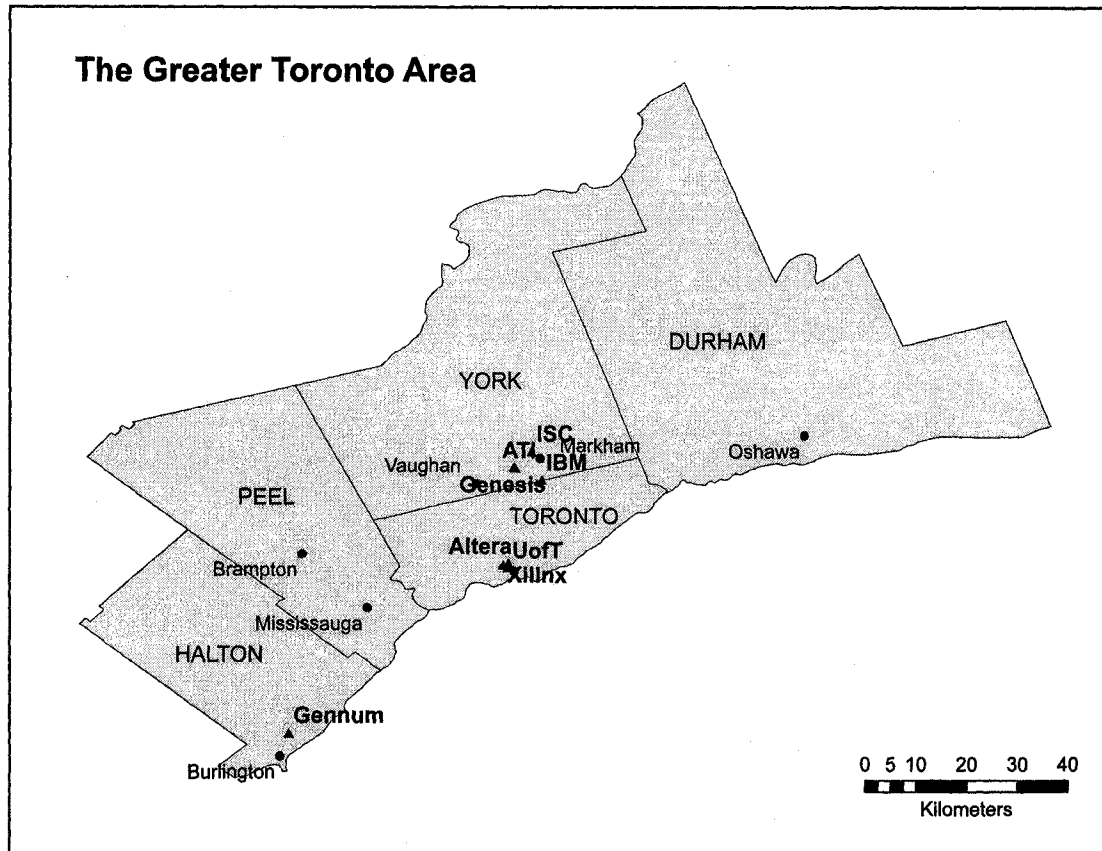
Figure 1-1: The Austin region and selected actors in the microelectronics industry



The Greater Toronto Area, though approximately similar to the nationally recognized census metropolitan area (CMA), is more an economic than political reality, having no official recognition by the province and few GTA wide governance

institutions. It comprises of the City of Toronto and four outer suburban regions and is located along the northern shore of Lake Ontario in Southern Ontario. With an expanse of approximately 7200 km², it is similar in size to the Austin MSA, though with a more substantial population of 5.3 million. The five regions contain 29 municipalities, four of which are upper tier regions containing 24 lower tier municipalities, and lastly, the City of Toronto (Figure 1-2).

Figure 1-2: The Toronto Region and selected actors in the microelectronics industry



Case studies and control variables

The choice of Austin and Toronto for regional case studies was made on the basis of two sets of considerations. The first set was in regard to the constants that were considered essential to a multilevel study of governance. Foremost was the industry itself. The choice of microelectronics is in many respects an obvious one for examining governance patterns in knowledge intensive industries. The industry displays all the hallmarks of the ideal type of a knowledge intensive industry:

innovative, highly dependent on advances in science and technology, complex design and manufacturing, all of which is reflected in a high R&D-to-sales ratio. From the very beginning, considerable R&D investments have been made by both public and private sector actors, a sum which by 2003, reached US\$14 billion a year in the US in semiconductor research alone. This amount is the culmination of an annual average increase of 14 percent since 1980 and represents 17% of industry revenue.⁴⁴ And this is in addition to capital investments by US firms into production equipment and plants of 10-20% of revenue a year.⁴⁵ Moreover, the industry has been a significant source of wealth for those regions and countries with such production and R&D capacities (see Chapter 3).

A second consideration in selecting this industry for the case studies is that there be an adequate degree of industry maturity and development. This is based on the assumption that the structure of governance would be affected if, in one region, the microelectronics industry was only in its very early stages of development. This is, however, not so readily achieved. Indeed, it is remarkable just how few regional concentrations of the industry exist outside the US. In a 2003 global ranking of top fabless IC design firms (i.e. non-manufacturing), for example, there are only three countries with firms in the top thirty: the US with twenty firms; Taiwan with six; and Canada with four, two of which are based in the Greater Toronto Region.⁴⁶ Ranked by the total number of fabless firms, Canada is second only to the US who dominates with some 475 firms compared to Canada's thirty.

Both Austin and Toronto are appropriate in this respect since both have long established microelectronics industries dating back to the development of microelectronics itself. There are, however, some limitations with this 'constant' that reflect the structure of the microelectronics industry itself. The last decade has witnessed a fundamental restructuring of the industry, which has led to the emergence

⁴⁴ SIA Data book, 2003.

⁴⁵ K. Flamm, *Mismanaged trade?: Strategic policy and the semiconductor industry*. (Washington, D.C.: The Brookings Institution, 1996): 53.

⁴⁶ IC Insights Inc, *Leading Fabless IC Suppliers*, 2004.

of two subsectors, one related to design and the other to manufacturing.⁴⁷ And importantly, not only is the knowledge base increasingly distinct between these two sectors, but so is the geography, as different regions develop specialized capabilities in either one of these subsectors. Much of the new foundries manufacturing specialized chips designed elsewhere are based in Asia, leading to a global rationalization of labour along model lines.⁴⁸ This division is evident in the two settings chosen for this study. In Austin, microprocessor manufacturing and related manufacturing equipment continue to be significant despite recent offshoring of manufacturing, whereas the Toronto microelectronics industry is noted for its strength in the design of IC chips. The extent to which these differences may affect governance is discussed in Chapter 6.

Another primary consideration was the polity in which the regions are embedded. And given that it is the region that is of interest, the polities must be considered in a multilevel context so as to be aware of the major institutional differences at the various levels of the state that may affect governance patterns. Thus for the two regions, the basic national polity of federalism ensures that both regions are subject to the same number of governments. Moreover, as part of North America, both regions are subject to the same international governance system – the World Trade Organization at the global level and the North American Free Trade Agreement at the continental level. In sharing such basic institutional governance structures, it is assumed that economic globalization (i.e. degree of economic integration) is for the most part the same, with both economies operating under the same constraints.

⁴⁷ In the former, specialized ‘fabless’ firms design and market semiconductors who then submit their designs to ‘foundries’ capable of rapid turnaround of smaller customized batches. This transformation has lowered barriers to entry and accelerated the pace of innovation and opened up the market considerably for new entrants. This production model has affected all but the microprocessor companies whose higher R&D intensiveness, and design complexity has allowed them to remain competitive as an integrated device manufacturer. See D. Hodges and R. Leachman, “Outsourcing and Offshoring in the Semiconductor Industry”, Sloan Industry Studies Annual Meeting, (Atlanta, 2004).

⁴⁸ Taiwan Semiconductor Corporation and United Semiconductor Corporation, for example, currently control 65% of the global foundry based production with other, most notably, China’s Semiconductor Manufacturing International Corporation (SMIC) growing rapidly – 630% in 2003. See Hodges D. and R. Leachman. The New Geography of Innovation in the Semiconductor Industry. Slide deck from the Competitive Semiconductor Manufacturing Program, (University of California at Berkeley, 2004)

Also relevant is the fact that both countries share a common institutional and ideological heritage in the form of economic liberalism in the Anglo-Saxon tradition. This is what Schumpeter calls the 'system of political economy' which he defines as 'the comprehensive set of economic policies unified on normative principles such as economic liberalism'.⁴⁹ As such, governments in both countries are fairly consistent in the style of economic governance and the manner in which they influence industrial activity. To the extent that there are differences as a result of federal regional development initiatives, these have been minimized by the fact that neither region has been a part of any federal national strategy for growth. In the case of Toronto, located in Southwestern Ontario, it is the only region in Canada without such a strategy, a status it has held since 1957 when the country established its first regional economic policy concerned with promoting regional growth.⁵⁰

The last set of constants, albeit of secondary importance, is at the local level with regard to their political geography. Both regions span five political sub-regions that cover approximately an equal expanse of territory, some 7000 km². And both regional economies benefit from the economic diversity brought by being respective capitals to their state and province as well as from any proximity benefits to such decision-making centers.

Uncontrolled variables

These constants leave open several institutional variables from the outset. Possibly the most significant, however, is the respective population size of each region. As a major metropolitan centre of North America, the GTA is five times the size of the Austin MSA region (see Table 1-1) with an economy that is much more diverse. This variation is undoubtedly significant for a study of regionally bounded governance. Metropolitan areas are both more complex and diverse than city regions such as Austin posing a different set of governance challenges and priorities. Yet the advantage of this variation in a comparative study of governance is that it positions size in the centre of any discussion, allowing insight into just how size may affect

⁴⁹ J. Schumpeter, *History of economic analysis* (London Allen & Unwin, 1967): 38.

⁵⁰ See OECD, *Territorial Reviews: Canada*, (OECD: Paris, 2002): Chapter 2.

patterns of governance. As the case studies demonstrate, one advantage of smaller regions is the visibility it affords emerging industry sectors, such as high-technology. Toronto, a more mature and diverse industry, makes acquiring the necessary attention from policy makers is a more difficult task, especially given that it is the most economically successful region in the country. This visibility, which has been a focal point in Austin's development of its high-tech success, would otherwise become 'invisible' in the analysis if size were held constant.

Table 1-1 lists the basic constants and variables of the study as established in the design phase of this research, and it includes the dependent variable. Over the course of the research, it became apparent that other variables are relevant to explaining the domestic governance patterns and these are considered in Chapter 6.

Table 1-1: Study constants and variables

	AUSTIN	TORONTO	
CONSTANTS	Industry	Microelectronics (manufacturing/design)	Microelectronics (design)
	Leading firms	Motorola, AMD, Samsung, Applied Materials, Tokyo Electron	ATI, Gennesis, Xilinx, Altera
	Multilevel polity	Federal	Federal
	Political economic system	Anglo-Saxon/liberal	Anglo-Saxon/liberal
	Regional knowledge infrastructure	University of Texas at Austin SEMATECH, MCC	University of Toronto, MDC, Micronet, CITO
	Political geography		
	Subregions - 5	Travis, Williamson, Hays, Caldwell and Bastrop	Halton, Peel, York, Durham, City of Toronto
	Geographic expanse	6924 km ²	~7000 km ²
	Regional capital	Texas	Ontario
	VARIABLES	Governance patterns	DEPENDENT
Size		Metropolitan centre	City-region
Population (2002)		1,349,291	5, 247, 232
Economic diversity		Moderate	High

Methodological limitations

The theoretical ideal for a comparative study of this sort requires that there be as many case studies of the dependent variable as there are independent variables, so as to determine their exact relationship, and ultimately, some predictive equation that can establish definitely what variables yield what pattern of governance. This methodology is, of course, borrowed from the realm of algebraic problem solving algorithms and is thus inherently problematic in its application to social sciences. On the theoretical end, there are difficulties related to ascribing a formal quantified linear logic to qualitative variables. Social science variables are often highly interdependent with one another, and as 'soft' variables, it is not possible to establish meaningful analytical relationships to one another. There are also difficulties related to identifying the appropriate variables from the outset of the research, variables which, for example, may not be common to a particular discipline but nonetheless significant to the phenomenon of interest.

Thus to suggest that phenomenon 'A' is a function of 'independent' factors 'B', 'C', and 'D' is to do so metaphorically, recognizing that such an approach is useful in adding discipline to analysis of institutional phenomena of interest. With only two case studies and many more independent variables, only some of which have been held constant, no definitive generalizations can be made with regard to the causal links between variables and governance patterns being investigated. To the extent that generalizations can be made, they will be limited by the main parameters of this study. Nonetheless, the method does yield relevant findings that can be supported by the literature.

DATA

The research drew upon four sources of data: interviews, a review of the academic literature, government documents, and non-academic studies relevant to each region. A total of 53 interviews were conducted with the purpose of identifying the key actors and institutions that influenced the decision-making structures involved in the strategic support of microelectronics industry. Interviewees included

associations, civic leaders, industry, and government officials at various levels (Table 1-2).

By identifying interviewees initially through research and later by asking the interviewees for suitable study candidates, the boundaries of the regional economic governance network were established. These boundaries were determined after approximately 20 interviews, where enough information was generated to produce a reasonably clear assessment of the central actors and institutions and their history. The interviews themselves ran an average of sixty minutes and were semi-structured with questions designed to identify central actors affecting the regional sector and their relationships with one another. Though questions were tailored to the role and position of the interviewee, all interviews asked basic questions related to industry leaders, the role of governments at different levels of the state, and where applicable, the reasons or importance of associative governance from their standpoint.

Table 1-2: Study interviews

Interview type	Austin	Toronto
Civic leaders	3	3
Firms	7	8
University	5	5
Associations	5	6
Government	5	6
Total	25	28
Time frame	August 2003	January 2004 - March 2005

Very few academic studies have been written on these regions with a focus on high-tech. The few that do exist were drawn upon considerably for the histories of each region. Much of the contemporary non-interview data however, comes from government and consulting documents such as policies, regional economic strategies, and some unpublished studies from study participants.

OVERVIEW OF RESULTS

One of the main contributions of this thesis is a typology of governance approaches which helps sort through the increasingly complex and multilevel set of non-market modes of economic governance. This typology (Chapter 3) distinguishes between two broad manners of governance, that of framework governance and strategic governance. What is argued is that only the latter of these reveals a strong sub-national dimension that makes space for local agency in non-market governance as suggested in the literature. Defined as the deliberate steering of resources to achieve a specific outcome, and in a specific location, that typically would not transpire through market processes alone, this local strategic governance is shown to be an important dimension to supporting and developing the knowledge infrastructure upon which the microelectronics industry depends.

This typology clears the way for identifying what is called a ‘strategic governance network’, a concept that captures the many local actors that are important in developing and localizing the research and learning infrastructure to the benefit of a chosen knowledge-based industry. The two case study chapters give empirical weight to the notion of strategic governance network by tracking their emergence and role in the development of the microelectronics industries within each region. What is found is that strategic governance networks are important to explaining the development and concentration of the industry in the two localities, challenging the common view of North American states (especially the US) as ‘vigilant enforcer[s] of antitrust rules devoted to protecting and permanently recreating the free market against associative collective action and communal networks’.⁵¹

In the Austin case study, the phenomenon is well developed and comprised of mostly local and associative actors who take responsibility for industrial adjustment of the microelectronics sector that exists in the region. Such responsibility involves: committing themselves to strategic initiatives to develop, adapt, and localize knowledge assets; and embedding these assets within the region by engaging them

⁵¹ J. Campbell, R. Hollingsworth and L. Lindberg, *Governance of the American Economy* (Cambridge: Cambridge University Press, 1991)

within the region's governance process and ensuring that the social environment is conducive to their retention.

In Toronto, a much less coordinated organizational structure of strategic governance has existed, one in which the federal government played a strong leadership role in the localizing dynamic of knowledge investments. A transition appears to be underway, however, towards the development of a more integrated and locally-rooted strategic governance network, similar in structure to that which exists in Austin.

In summary, strategic governance networks is a useful construct to capture the set of relationships that actively seek to adapt and develop the institutional milieu that supports ever-evolving needs of knowledge intensive industries. What is evident from the two historical case studies is that this set of relationships has grown in complexity over the decades, driven partly by the needs of knowledge intensive industries and partly out of need to localize, create and embed knowledge assets in a global economy.

With these findings, this thesis contributes to several literatures, not least the political economy literature whose focus on the national level and on related categories - such as strong and weak states, and liberal market economies versus coordinated market economies - is shown here to be very limited, if not misleading. As relevant is the contribution to the emerging governance network literature. Here, the case studies of strategic governance networks provide insight into their development, role, structure and functioning.

Finally, this research contributes a more nuanced perspective to the debate on whether the national state is in fact weakening in any meaningful way, a claim most frequently heard at the international level where non-state actors, trade agreements and organizations have indeed been gaining influence over states. In so far as it applies to the national level, this research provides only partial support for such a claim. While partnerships and networks have become increasingly common, it is far from clear whether this has led to a 'hollowing out'. At the national level, partnerships, which rose dramatically since the 1980s, have only made federal

governments more involved in the economy, not less. In the language developed in this thesis, the national level has played a crucial role in ‘framework’ governance, having taken steps to institutionalize coordination in knowledge intensive sectors. Moreover, while there is enough evidence in the area of industrial policy to support the assertion that the national level has been constrained by greater economic integration, it ignores the dynamic and strategic role of the subnational levels as captured by strategic governance networks.

STRUCTURE OF THESIS

The claim that governance processes are becoming more complex in an era of state decentralization is the starting point for the remainder of this thesis. But as Chapter 2 argues, such decentralization has not just been limited to the state’s links to industry but also characterizes much of what has transpired in the knowledge intensive industries themselves. In externalizing large portions of what was once internally organized research and development to outside actors, such as universities, government labs and smaller firms (through partnerships), non-market governance has not only become more complex but also more important. Moreover, it has increased firm dependence on the knowledge infrastructure. This has contributed to a ‘rescaling of the economy’ that has opened up space for new patterns of economic governance and new and increasingly sub-national governance actors.

If new patterns of governance are in fact emerging, what is an appropriate theoretical lens through which to identify and understand these patterns? This question is left to Chapter 3 where the distinction is made between ‘framework governance’ and ‘strategic governance’. From here, the concept of a strategic governance network is developed to reflect the type of locally rooted economic governance patterns that appears to be emerging.

The evidence supporting the concept of a strategic governance network is presented in Chapters 4 and 5 which track the development of the microelectronics industry in Austin and Toronto, respectively. What is apparent from these chapters is that the structure of strategic governance networks differs considerably, despite broad

similarities in the political and institutional context. Why these differences exist is ultimately left to Chapter 6, which investigates more closely the main variables in the comparative analysis for answers and how basic structural differences in patterns of governance may impact on governance effectiveness.

Finally this thesis concludes with a discussion in Chapter 7 of how strategic governance networks interface with the broader economic governance processes within the state. This provides the basis for an analysis of whether these networks can be considered as dependable governance institutions within the state or whether they are too informal and unstable to be relied upon. Here issues of accountability, legitimacy and reproducibility are elaborated upon. Last, strategic governance networks are situated back into broader debates in the literature, to explore their implications on some basic theoretical claims.

CHAPTER 2

THE NEW LANDSCAPE OF ECONOMIC GOVERNANCE

INTRODUCTION

This chapter examines the changes that have taken place since the post World War II period that have made non-market economic governance a decidedly more complex – i.e. more interdependent – process. It approaches these changes from two perspectives, that of the nation state and the firm. It shows how both have in effect externalized many important functions that were once governed through hierarchical control. All of this, it is argued, has opened up space for the emergence of new patterns of governance and gives credibility to the claims that the local level has indeed acquired new importance in knowledge economies. The importance of the local level suggests that there has been a shift in the locus of governance from the national to subnational levels, a claim supported by many authors pointing to the critical importance of such local institutions as social relationships, trust and networks in the knowledge creation process. The chapter closes with a review of the concepts in the literature that capture the diversity of actors and institutions in the governance landscape. These concepts - associative governance, governance networks and multilevel governance – are relevant to the extent that they provide the theoretical building blocks for a governance typology developed in the following chapter that assists in the analysis of the changing governance landscape.

GOVERNANCE AND THE ‘UNRAVELED’ STATE

The claim, in its various guises, has become a familiar one. Be it in studies of the European Union, international relations, public policy or political economy, the centralized state has been ‘in retreat’, ‘hollowing out’, ‘unraveling’ and even

dysfunctional.¹ Anxious metaphorical descriptors of state transformation to be sure, but all reflective of a multidisciplinary concern for the manner in which political authority of the national state - not so long ago an exemplary for hierarchical, accountable, top-down governance - is 'diffusing' as a result of an increasingly interdependent social, political and economic environment.

Where these claims resonate most loudly has been in areas of economic governance, where states, particularly those with advanced liberal capitalist economies, have not only seen their authority circumscribed in a post-Keynesian era of deepening economic integration and free trade but also delegated to authorities beyond their control. The strengthening of GATT under the WTO, and regional free trade agreements such as NAFTA, are but two examples of supranational governing institutions, which, in the interest of managing trade disputes and reducing trade 'distortions', have had such an impact in Canada and the US. Successive rounds of multilateral trade negotiations under GATT have all but eliminated tariffs as an effective policy tool on manufactured goods, having now been reduced to an average of 5% from 49% in 1947.² And under the WTO and NAFTA, further restrictions came with reductions in non-tariff barriers such as government procurement policies favoring domestic suppliers (e.g. Buy American Act) and subsidies. These were defined for the first time in the Uruguay round to include everything from grants, loans, and loan guarantees to assistance for research activities conducted by industry over a certain limit.³

Together with new dispute resolution mechanisms, which, in the case of the WTO, carries legally binding rulings, these trade agreements have become somewhat of a *cause célèbre* for those concerned about the loss of state power.⁴ Yet trade

¹ See for example L. Hooghe and G. Marks, 'Unraveling the Central State, but How?' *American Political Science Review*, 97, 2, 2003 and K. Ohmae, 'The rise of the region state', *Foreign Affairs*, 72, 2, 1993.

² M. Trebilcock and R. Howse, *The Regulation of International Trade* (Routledge, New York 1995): 21.

³ Under current WTO agreement, assistance to research activities is acceptable provided it does not cover more than 50% of the cost of basic industrial research or 25% of the costs of applied research. Source: M. Trebilcock et al. *Regulation*, 196.

⁴ Stephen Clarkson, for example, argues that trade agreements have in fact reconstituted the Canadian state. See S. Clarkson, *Uncle Sam and US* (Toronto: University of Toronto Press, 2002): Chapter 1.

agreements have not been the only cause of new limits on the traditional domains of economic policy. Under the gradual liberalization of the global financial system carried out through the elimination of capital controls, the steering of inward investment to preferred regions is no longer viable.⁵ Nor is it possible at the current degree of economic integration for states to regulate at their discretion. With corporations operating internationally, together with greater awareness of how a firm's performance relates to the broader institutional context of their place of operation, there is now greater pressure to harmonize regulatory policy so as to reduce their costs stemming from different standards and practices and ensure 'effective market access'.⁶

By the mid 1990s, the downloading of national responsibilities to subnational levels gave further support to the claim that the national state, with its once long-standing hold on coordinating and planning from centre stage, was in danger. In Canada, it was predominantly a concern over the mounting deficit that drove the government to download responsibilities, and their costs, to the provincial level. The federal government not only cut funding transfers for social policies, but also returned to the provinces' responsibilities for labour training, forestry, energy, mining resources and tourism.⁷ In the US, where growing deficits were also a concern, especially among the new Republican congressional majority, the downloading of responsibilities and the curtailment of federal power was also part of quite a different, and indeed, much longer debate over devolution within the federal system. Too many federal mandates regulating states and localities, excessive spending, and waste and inefficiency were some of the concerns that drove congressional debates in the mid 1990s and which ultimately influenced the passing of several pieces of legislation affecting the federal balance of power.⁸

⁵ M. Keating, *The New Regionalism in Western Europe*, (Edward Elgar Publishing, 1998): 21

⁶ See S. Ostry, 'Policy Approaches to System Friction', in Berger S. and R. Dore (eds), *National Diversity and Global Capitalism* (Ithica: Cornell University Press, 1996).

⁷ Though formally under provincial jurisdiction, these areas had received support from the federal government. See Clarkson, *Uncle Sam and Us*, 77 and 111.

⁸ New legislation passed between 1995 and 1997 included new block grants to states for welfare and a law preventing the government from imposing any new mandates without federal money. H. Hovey, *The devolution Revolution: Can the States Afford Devolution* (The Century Foundation Press: New

The horizontal shift

Compounding this vertical diffusion of authority has been an equally influential horizontal one whereby national states have increasingly engaged private sector actors to achieve desired economic and social objectives.⁹ What began as a several-decade-long trend towards greater use of contracting to realize government services, culminated by the early to mid 1990s into a widespread movement of 'new public management'. Governments, including those in Canada and the US, faced with large deficits, sought to 'reinvent' themselves by adopting a more business like focus. 'Customers', quality of service, and cost recovery became important as did a more results focused orientation. In the US, new public management came under the Clinton administration's 1993 National Performance Review whose objectives were to make government 'work better and cost less'. Budget inputs would be tied to performance outputs, market style incentives would be imposed on public managers and the use of partnerships would be encouraged across and between agencies and with state, local, nonprofit, and private sectors to improve service delivery and cut costs.¹⁰

'Getting government right' is how the Chrétien government labeled it a few years later in their sweeping 1995 *Program Review*. In a concerted effort to reduce the debt, the government sought to revamp all federal programs in order to bring about the most effective and cost-efficient way of delivering programs and services.¹¹ The review, one of whose criteria was asking whether direct delivery by government was the most effective delivery mechanism, ultimately changed the way many programs were delivered, spurring new partnerships with other levels of government, partnerships with corporations, and in some cases, complete privatization.¹²

York, 1999). See also P. Posner, *The Politics of Unfunded Mandates* (Georgetown University Press: Washington, 1998).

⁹ See B. Jessop, 'The rise of governance and the risks of failure', in *International Social Science Journal*, 50, 155, 1998.

¹⁰ John Kamensky, 'The U.S. Reform Experience: The National Performance Review' (U.S. Office of Management and Budget 1997).

¹¹ Canada. *Getting Government Right*, Department of Finance, 1995.

¹² Dick de Jong, 'Framework for Alternative Program Delivery' (Treasury Board Secretariat). See also, Chandran Mylvaganam, Extending the Canadian Treasury Board's "Framework for Alternative Program Delivery" (The World Bank Group, August 2000).

All of this goes some way to explain why governance has become such a relevant concern. With increased mutual dependence as a result of greater reliance on partnerships, governments have taken to 'steering' rather than 'rowing' in many of their traditional areas.¹³ Mere participants in 'multi-actored arenas' of stakeholders, many states have been left to establishing framework conditions rather than engaging in the management of specific goals.

Horizontal dimensions of innovation

In the area of managing the economy, another factor is also responsible for driving the state into these arenas of collaboration, namely a more comprehensive understanding of the technological process and its relation to economic growth.¹⁴ Long understood as a linear process whereby academics pursue unfettered research from which technological advances were subsequently made, the process technological change has recently acquired a much more multifaceted understanding. Cumulative in nature and increasingly complex, advances in technology have come to be understood, since the 1980s, as dependent on the coordination of a diverse array of assets and functions, many of which are within the public realm.¹⁵ Indeed, far from a linear unidirectional process, the process of innovation has been shown to be highly interactive with complex feedback relationships between firms, universities, government labs, as well as between users, producers and suppliers.¹⁶ Thus, not just universities, but an entire system of institutions, policies and firms are now understood as important factors driving technological advances. This set of relationships came to be known as a 'national system of innovation', a phrase popularized by C. Freeman and B.A. Lundvall in the early 1990s.¹⁷

¹³ This terminology was first coined by D. Osborne and T. Gaebler, *Reinventing government*, (Ringwood: Penguin Books, 1993).

¹⁴ B. Doern and R. Levesque, *The National Research Council in the Innovation Policy Era* (University of Toronto Press: Toronto, 2002): 19.

¹⁵ OECD "New Rationale and Approaches in Technology and Innovation Policy", STI Review (Paris, OECD): 10.

¹⁶ Von Hippel, in identifying feedback between users and producers, called innovation a distributed process with informal know-how trading. E. Von Hippel, *Sources of Innovation* (Cambridge, MIT Press, 1988): 6-9.

¹⁷ C. Freeman and B.-Å Lundvall (eds.) *Small Countries Facing the Technological Revolution*, Pinter, London, 1988. See also B.-Å Lundvall, *National Systems of Innovation* (London: Pinter, 1992).

Adding yet another dimension to this national systems of innovation understanding was earlier work of Lundvall, who in the mid 1980s, sought to account for the relationships and interactions between R&D laboratories and technological institutes and the production system.¹⁸ In studying such processes, it was found that pure market interactions were incapable of transmitting qualitative information between users and producers. Rather, it was non-market relationships such as trust and loyalty that formed the basis of co-ordination and co-operation that drives product innovations. 'The strength, the extension and the kind of trust embedded in markets will affect transaction costs and this will determine to what degree interactive learning can take place in connection with the market relationship'¹⁹

One of the major policy implications of this 'national systems of innovation' understanding has been a broad trend to develop policies that enhance innovation capabilities, not so much through broad framework incentives, which have existed for several decades, but through improving linkages between the science base and industry and in tailoring research and development initiatives to the needs of particular industries. With these linkages, firms gain improved access to knowledge that would have otherwise been external to their own learning processes and innovation efforts. As Metcalfe and Georghiou point out, such policies recognized 'that no individual firm is self-sufficient in its knowledge and skills and that there are corresponding gains from linking firms with the wider matrix of knowledge generating institutions'.²⁰

In North America, these horizontal dimensions of innovation were implicitly recognized with what was essentially a broad movement to institutionalize coordination between firms and the knowledge infrastructure. In the United States, the early 1980s demarcated a major shift in the legal relationship between state and industry, breaking with a set of policies that supported an industrial structure that had dominated since the 1940s where neither universities nor state agencies were

¹⁸ B- Å Lundvall and P. Maskell, 'Nation States and Economic Development', In Clark, Feldman and Gertler (Eds.) *The Oxford Handbook of Economic Geography*. (Oxford University Press, 2000): 359.

¹⁹ Lundvall et al., *Nation States and Economic Development*, 361.

²⁰ This is drawn from a two fold classification of innovation policy introduced by S. Metcalfe and L. Georghiou, 'Equilibrium and Evolutionary Foundations of Technology Policy', STI Review no. 22 (Paris, OECD 1998).

compelled to develop relationships with industry. Concerned with the strength of the its industry - particularly a perceived productivity slow down and the growing technological might of Japan - the federal government began to legalize and institutionalize a broad range of non-market modes of coordination between firms, universities and state agencies. The cumulative effect was the emergence of a broad regulatory framework that would accommodate and indeed encourage the increasingly complex types of relationships that would prevail in the high-tech industries, and not least the semiconductor industry.

The rationale of the early legislative changes had initially been to improve the technology transfer from university and national laboratories and in so doing restore growth.²¹ Such thinking though, would change over the course of the decade, first with the end of the Cold war as a primary justification for many federal agency budgets, and later with the Clinton Administration's push to eliminate the federal deficit and 'reinvent government'.²² These changes in rationales did not, however, alter the overall trend in the US of institutionalizing collaboration. Under the Clinton Administration in the early 1990s in its effort to reduce the deficit and reinvent government, new modes of non-market coordination were seen as a cost-effective solution to lowering costs while achieving objectives set out in new mission statements of federal agencies.²³

The first of a series of acts was the Stevenson-Wydler Technology Innovation Act of 1980, which made the technology transfer of federally owned or originated technology an explicit mission of federal laboratories. Along with recognizing the importance of improved information dissemination from the Federal government to private industry, the act also required Federal laboratories to take a more active role in cooperation with potential users of its technology. In the same year, the Bayh-Dole Act was passed which required any recipient of federal R&D funding - universities, non-profits, SMEs - to obtain and transfer patents and licenses of any scientific

²¹ J. Adams, E. Chiang, and J. Jensen, 'The influence of federal laboratory R&D on industrial research', *The Review of Economics and Statistics*, November 2003, 85(4).

²² L. Cohen and R. Noll, 'The Future of National Laboratories', *Proceedings of the National Academy of Sciences*, 93, 23, 1996.

²³ CRADAs, for example, were seen as a substitute for decline in traditional activities of national labs. See L. Cohen et al. 1996.

discovery that they patented. As with the Stevenson-Wydler Act, which applies to national laboratories, the intent of the Bayh-Dole Act was to encourage the commercialization of any intellectual property stemming from federally supported research, which prior to the act, were not being developed or patented, due to a lack of incentives. This opened up opportunities for non-US governments and firms to do so.²⁴

In 1982, the Small Business Innovation Development Act established the Small Business Innovation Research (SBIR) program requiring all federal agencies with research budgets in excess of \$100 million to set aside 2.5 percent of their budget for R&D projects with small businesses. By redirecting Federal agencies' R&D funds to small firms, SBIR does not provide additional funds but rather encourages partnerships between SMEs and federal agencies in areas relevant to the R&D mandate of the organization, ultimately supporting technology transfer.

One of the more significant legislative changes came two years later with the National Cooperative Research Act (NCRA) of 1984. In conferring legal status to firms engaged in cooperative research, the act amended the Sherman Antitrust Act of 1890, which for more than a hundred years threatened firms with triple damages for any sort of communication among companies in the same or related industries linked to R&D efforts. Though the NCRA did not grant immunity *per se* to antitrust action in cooperative research, it did nonetheless make it conditionally legal and indeed influential.²⁵ In 1993 the legislation was amended a second time with the explicit goals of 'promoting innovation, facilitating trade, and strengthening the

²⁴ E. Kvamme, 'Materials Research Society', *Science Policy*, July 2003.

²⁵ Section 3 of the NCRA states that: "In any action under the antitrust laws, or under any state law similar to the antitrust laws, the conduct of any person in making or performing under a contract to carry out a joint research and development venture shall not be deemed illegal *per se*: such conduct shall be judged on the basis of its reasonableness taking into account all relevant factors affecting competition, including, but not limited to effects on competition in properly defined relevant research and development markets. Cited from D. Gibson, and E. Rogers. *R & D collaboration on trial* (Boston: Harvard Business School Press, 1994): 80.

competitiveness' of US industry in world markets relaxing further restrictions on cooperative production activities.²⁶

The legislative shift towards increased cooperation continued a pace with the 1986 passing of the Federal Technology Transfer Act that made it legal for government laboratories to enter into CRADAs (Cooperative Research and Development Agreement) with private industry. This was later extended to include all contractor-operated labs (including Federally Funded Research and Development Centers) with the 1989 passing of the National Competitiveness Technology Transfer Act. Through CRADAs, federal agencies, encouraged by a budget allocation, can now conduct joint research on particular technical problems with industrial or institutional organizations while also protecting any intellectual property that may be developed.²⁷ One notable example of a CRADA bringing technological advances in the area of semiconductors has been a partnership between three National Laboratories and five companies in a \$350 million research on extreme-ultraviolet lithography (EUVL). Created in 1997, the partnership has been considered a dramatic success, having overcome "technical hurdles that once looked insurmountable."²⁸

As with the United States, Canada, in the early 1980s, was also preoccupied over the state of its economy, having seen economic growth fall in 1982 for only the second since time World War II and inflation and unemployment rise to double digits.²⁹ Moreover, as with its southern neighbour, newly industrialized countries, especially Japan, were a cause of concern particularly in the context of Canada's poor competitive advantage in the technology manufacturing sector.³⁰ Yet whereas the United States took steps to shore up its competitive advantage in high-technology

²⁶ See National Cooperative Research and Production Act of 1993; and T. Hemphill, 'Cooperative Strategy, Technology Innovation and Competition Policy in the United States and the European Union', *Technology Analysis & Strategic Management*, 15, 1, 2003, p. 94.

²⁷ Though the federal government may hold the patents on any technologies developed under a CRADA, industry partners are given the right to buy any such product transpiring from the agreement along with an exclusive marketing license. See Howell, 'Competing Programs', footnote 40.

²⁸ Howell, 'Competing Programs', 205.

²⁹ K. Norrie K., D Owrarn, *A History of the Canadian Economy* (Harcourt Brace Jovanovich, 199): 601.

³⁰ Between 1976 and 1981 Canadian had experienced declining market share in all but two of its high-tech sectors, chemicals and photographic equipment along with significant negative trade balances in all areas except for industrial chemicals and Aircraft and parts. See Tables 9-14 and 9.12 respectively in Canada. Royal Commission, 192-197.

industries largely through a series of legislative changes in support of industry cooperation, the Canadian government in the early 1980s turned to free trade as a solution to its economic struggles. Indeed, it would take Canada a few more years before any action was taken towards institutionalizing more cooperation among industry and state along the lines of the US policy shift.

In 1986, a matching funds policy for the research granting councils was introduced, which increased overall levels of support by matching private sector funding of university research with equivalent increases in granting council budgets of up to \$369 million over four years.³¹ Three years later, the federal government launched what some have described as 'the most dramatic change in the nation's science policy since the creation of the National Research Council in 1916', the Networks of Centres of Excellence Program.³² To be administered by the three granting councils responsible for university research, the program would establish networks of researchers and scientists across the country who would focus on long-term applied science in collaboration with Canadian firms and 'somewhat' guided by the needs of industry. Moreover, it would seek to 'reshape the culture of academic science around the dual goals of understanding and utility.'³³ In short the NCE programs, with its support for industry-led and results-driven R&D, was the response to a major concern at the time, that of Canada's long-term competitiveness.

Seven networks were funded in the first phase (1989/90 – 1993/94) to the sum of \$301.3 million over four years, a fifth of which came from collaborators. One such network is Micronet, which, with an annual budget of \$4.1 million, focuses primarily on pre-competitive research in systems on a chip (SOC) designs. This is the most direct of federal initiatives supporting the semiconductor industry, though it will not be renewed past its current funding phase. Overall, since its founding, the NCE

³¹ R. Gualtieri, 'Science Policy and Basic Research in Canada', in S. Phillips (ed) *How Ottawa Spends* (Ottawa : Carleton University Press, 1995): 309.

³² D. Fisher, J. Atkinson-Grosjean And D. House, 'Changes In Academy/Industry/State Relations In Canada', *Minerva* 39. 2001. According to the authors, the federal government decision to launch this program was strongly influenced by the Ontario Centres of Excellence (OCE) program established three years prior.

³³ Fisher et al. *Changes*, 312.

program, which as since expanded to 22 networks, has led to 66 patents filed, 31 patents awarded, 71 licenses granted and 78 spin-off private ventures formed.³⁴

Two other Canadian policy changes of the late 1980s are worth noting for their impact on increasing the collaborative role of the federal government. The first was the establishment of the National Advisory Board on Science and Technology (NABST) which, with heavier business representation, made a concerted effort to re-orient national laboratories to have a more commercial focus.³⁵ And in 1989, in keeping the pro-business ideology of the government, came a change of leadership of the country's primary research and development agency, the National Research Council of Canada (NRC). Having been criticized for inadequate industry relevance of its R&D activities, NRC was appointed a new president with a conviction that the agency must make a tangible contribution to the Canadian economy, lest it perish as a national institution.³⁶ With this vision, came performance-oriented management and a refashioning of disciplinary divisions into technology-focused institutions governed in part by business led advisory boards, laying the groundwork for a more innovation- and partnership- focused NRC.

Other than the NCE program, these changes, coming as they did in a period of fiscal restraint, did not add much new funding to high-technology, or for that matter microelectronics, but did reorganize industrial policy to focus on innovation, a part of which was related to IT. The Ministry of Industry, Science and Technology Canada (ISTC), for example, was given a budget of some \$200 million over four years for three strategic technology programs (IT, biotechnology and advanced materials),³⁷ and one of NRC's new interdisciplinary institutes was centered around IT. Canadian high-technology, however, would have to wait for a new government and a few more years - due to efforts by the Liberal government to rein in the federal deficit in the mid 1990s - before witnessing any evidence of a renewed commitment to a more active federal role. Yet as observers have noted, these efforts were best incremental,

³⁴ Canada. A Canadian Innovation Agenda For The Twenty-First Century.

³⁵ Doern et al. *The National Research Council*, 32.

³⁶ Doern et al. *The National Research Council*, 58.

³⁷ Doern et al. *The National Research Council*, 54.

despite strong policy platform commitments by the Liberal government suggesting otherwise.³⁸

In summary, over the course of two decades, legislative changes were enacted in the US and Canada that effectively institutionalized and encouraged collaboration among firms, universities and government labs and agencies. The result has been an environment supportive of the growing number of complex non-market relationships that very much underpin the knowledge generating capacity of the microelectronics industry.

There is much irony in the fact that this shift took place under the cloak of an establishing neoliberal paradigm. In the US, it occurred at a time when Reagan was pushing through major tax cuts and cutting back on the welfare state established through Roosevelt's new deal. And in Canada, this institutionalization of cooperation took place when the dominant policy debate of the time was free trade with the United States. Under the Mulroney Conservatives in the mid 1980s, free trade, and related structural adjustment programs were seen by some observers as Canada's new industrial policy due to the fact that they were to substitute traditional industrial support programs.³⁹

GOVERNANCE AND THE DECENTRALIZED FIRM

The state has not been the only social structure to have 'unraveled' over the past few decades. As a point of reference for how the firm has refashioned itself to the realities of an innovation driven economy, it is interesting to contrast Kenneth Galbraith's stylistic characterization in 1967 of the large corporation that flourished in the wake of the Keynesian revolution of his day to that which prospered in the wake of the IT revolution only a decade or so later. A 'technostructure' was what he called the large, mature, conglomerations that accounted for much of the production in the 1960s and exemplified by the likes of General Motors, Westinghouse and

³⁸ See D. Wolfe, 'Innovation Policy for the Knowledge Based Economy', How Ottawa Spends 2002-2003, Oxford University Press: Toronto.

³⁹ See B. Doern, in ed. M.J. Prince 'How Ottawa Spends 1986-87: Tracking The Tories', Toronto: Methuen, 1986. p. 65

General Electric.⁴⁰ This term, he argued, captured the essence of how decisions were made within organizations producing technologically complex, capital intensive products. Rather than by a single entrepreneur, decision making in a technostructure is necessarily group driven, spanning not only upper management but also any one who brings ‘specialized knowledge, talent or experience to group decision making’. This shift from the individual to the group, argued Galbraith, reflects a fundamentally new type of organization and correspondingly, a new industrial system, made necessary by the need to draw on a broad base of knowledge from the scientific and technical to marketing for detailed planning processes, considered by the author as essential in the production of complex technology.

It is telling that Galbraith considered the future of this new technostructure to be a seamless convergence with the state if only because it highlighted the interdependence between national level demand management policies and the growth of these mass production firms. Not only did the technostructure depend on a mechanism for stabilizing prices and wages, but it also required a trained and educated workforce, making convergence with the state only more feasible. “Increasingly, it will be recognized that the mature corporation, as it develops, becomes part of the larger administrative complex associated with the state...Men will look back in amusement at the pretense that once caused people to refer to General Dynamics and North American Aviation and A.T.&T as *private* business.”⁴¹ The added benefit to all of this was, of course, the conclusion that there was no fundamental difference between communist and capitalist systems, since their outcomes would inevitably be the same. The gulf was thus not so wide as made out to be.

Understandably, judging as he did from the increase in both scale and numbers of these types of organizations, Galbraith considered the entrepreneurial corporation to be in decline. For it was the modern corporation that was adapted to the needs of advanced technology and not the entrepreneur who, without the same access to

⁴⁰ Galbraith, K. *The New Industrial State* (Boston: Houghton Mifflin, 1967).

⁴¹ Galbraith, 393.

capital and specialized talent needed for comprehensive planning, would find their creations ‘pass inexorably beyond the scope of his authority’⁴²

Needless to say Galbraith could not have foreseen the fundamental, if not historical, restructuring of the industrial system that was to begin so soon after the publication of *The New Industrial State*. Triggered, as some have argued, by the oil crisis of the early 1970s that exasperated the contradictions intrinsic to the system of mass production, a restructuring was to unfold over the ensuing decades which would yield new organizational forms of production better suited to globalized markets and ultimately enabled by information technology.⁴³ In their pioneering analysis of the early 1980s, Piore and Sabel argued that this shift was nothing less than a second industrial divide, a historical marking as significant as when the mass manufacturing techniques first emerged to supplant the centuries old craft system.⁴⁴ In response to the era of stagflation and increasing global competition, firms found that with greater technical sophistication provided by craft industries, greater customized production could be made competitive with standardized goods of mass production. The result, they argued, has been a re-emergence of elements of the craft system as a result of a trend that the authors called flexible specialization.

Since Piore and Sabel, there has been much refinement, and redefinition, of the changes that were clearly underway in the production processes of the 1980s and 1990s as firms in industrial countries adapted to deepening economic integration and what Christopher Freeman has called the new techno-economic paradigm of information technology.⁴⁵ As Salais and Storper argued in the early 1990s, that while the dominant Fordist paradigm of mass production may have indeed been replaced, it has not been by a single mode of production but rather by several, each organized

⁴² Galbraith, 89.

⁴³ Regulated for the purpose of promoting national economic expansion through mass production of consumer goods, the Fordist system exhausted itself with the saturation of domestic consumer good markets by the late 1960s. This pushed firms to expand into foreign markets increasing economic integration and ultimately undermining the national regulatory system within which the system had developed. See M. Piore and C. Sabel. *The second industrial divide*, (New York: Basic Books, 1984): 184-85.

⁴⁴ Piore and Sabel, 5.

⁴⁵ See C. Freeman, C. and C. Perez, ‘Structural Crises of Adjustment?’, in G. Dosi et al. (eds.), *Technical Change and Economic Theory*, (London: Pinter Publisher, 1988).

under different logics of product design, techniques, competition and skills.⁴⁶ Labels such as 'Toyatism' and 'Wintelism' give some indication of these new 'worlds of production' though none have acquired the same popularity as that of Fordism.⁴⁷

One undisputed trend, however, has been the decline of the technostructure as a viable organizational model in the new economic landscape. For Galbraith, vertical integration together with large size, two defining attributes of the traditional corporation, were essential for minimizing market uncertainties.⁴⁸ Through greater vertical integration of supply and output, the firm could internalize 'highly strategic cost factors' within the planning system eliminating 'partially or wholly uncontrollable' market transactions. Thus in effect, vertical integration allowed for a substitution of market governance for non-market governance within the corporate hierarchy. This model was also well suited for their R&D efforts where vertical integration corresponded well with the linear manner in which new products were developed. Beginning with internal discovery, followed by patenting, development and production, and finally distribution through the firm's established sales channels, the model gave control over the direction of technological development.⁴⁹ And to great effect: nylon, semiconductors and magnetic disk drives are but a few of the influential technologies to have emerged from these large private sector research laboratories.

Such an organizational logic proved increasingly inadequate in minimizing uncertainty with the transition to the post-Fordist economy, not so much with market transactions but of technical change. In the new economic paradigm, shorter product cycles and the faster pace of innovation required an organizational flexibility more attuned with that of smaller organizations than of hierarchical structures with R&D

⁴⁶ R. Salais and m. Storper, The Four Worlds of Contemporary Industry, Cambridge Journal of Economics 1992, 16, 169-193.

⁴⁷ See for example M. Borrus and J. Zysman. 'Globalization with Borders: The Rise of Wintelism as the Future of Global Competition', *Industry and Innovation*, 4 2, 1997: 141.

⁴⁸ Galbraith, 28.

⁴⁹ As Chesbrough points out, "the strength of this model was reinforced by the federal government's wartime mobilization of scientists from universities and corporations, coordinated through Vannevar Bush's Office of Scientific Research and Development." H. Chesbrough, Is The Central R&D Lab Obsolete? : If the old model for innovation is dead, what comes next? *Technology Review*, MIT, April 24, 2001

departments, if they were to sustain their market position. Moreover, increasing cost and complexity of making technical advances brought with it declining technical self-sufficiency. “Until the mid-1970’s”, argues Herbert Fusfeld, ‘if a company wanted to get into a field, broaden its area, take any kind of strategic approach, it was reasonably likely to be able to do so with in-house technology. Or else the technology could be acquired at reasonable cost and in a reasonable time. Steadily into the 1980’s, that began to be less and less true. Companies could not do certain things because they did not have the people or they couldn’t be done in a realistic time. Those were the changing pressures on industrial research.’⁵⁰

According to Chesbrough, this organizational model began to show its shortcomings when products invented by these large R&D labs were obtained by competitors, who then would be the first to bring it to market without having had the expense of research. This ‘technology spillover’ eventually contributed to corporate R&D labs shifting their orientation to product-oriented work – while outsourcing more basic research to small startups, independent and contract labs, and partnerships with universities and national laboratories.⁵¹

Capturing this trend is the observation by Robert Haavind who recently wrote:

“Bell Labs under AT&T was once a fountain of scientific discoveries and new technologies... Deregulation and commercial pressures forced AT&T to break its monopoly into pieces, and the focus of Bell Labs shifted to product-targeted development rather than the fundamental research of the past. The same has happened at IBM, GE, and a couple of decades ago at RCA, which once ran one of the top research laboratories in the world. RCA Laboratories, a once-proud institution where Vladimir Zworykin built the first TV iconoscope pick-up tube and complementary metal-oxide-semiconductor (CMOS) technology was developed, was finally sold by GE.”⁵²

Echoing these remarks was an IBM executive who in 2000 is quoted as saying that with competition intensified and time to market a more important determinant of corporate success, companies have been ‘forced to channel their research more

⁵⁰ From ‘Science the Endless Frontier 1945-1995: Learning from the Past, Designing for the Future, Conference Highlights, 1995.

⁵¹ H. Chesbrough, ‘Is The Central R&D Lab Obsolete?’ *Technology Review*, MIT, April 24, 2001

⁵² R. Haavind, ‘Will the US lose its lead in research?’, *Solid State Technology*, January 2004.

closely to areas of strategic importance... They are not going to do [long-term R&D] anymore. IBM used to do it; AT&T used to do it; but we can't do that anymore. In this capital-intensive industry, companies are very hard pressed to find the resources to move from one generation to the next. It's particularly true in the smaller semiconductor supplier companies."⁵³

These anecdotal observations are supported by Freeman's work in summarizing the statistics on firm size and innovation. He points out that though many corporations with their large R&D departments did in fact contribute to about half of all the key innovations and much more so for key process innovations, they began to face increasing competition from the inventiveness of small firms from the 1970s and increasing into the 80s and 90s.⁵⁴ Such inventive prowess of smaller firms, he notes, was recognized early on in a study by Jewkes and colleagues which found that most of the 70 major 20th century inventions came from outside of R&D facilities of large corporations.⁵⁵ In a 1970 study of the scientific instrument industry, Shimshoni found that it was not only small, but *new* small firms who were responsible for many of the key innovations. Such firms, he discovered, had the advantage of motivation, low costs, lead-time in development, flexibility as well as access to technological expertise from elsewhere in the R&D system.⁵⁶

From a technostructure to a technonetwork

Yet for all the importance ascribed to small firms - particularly, as Freeman notes, in initial stages of inventive work and in the less expensive but often more radical innovations - large firms did not lose their dominance in the economy. As Castells argues, only by having changed their organizational model, have large corporations been able to maintain their position in the centre of the industrial system.⁵⁷ Corporate strategic alliances with both large and small firms have thus become

⁵³ Cited from Howell, 'Competing Programs', 203.

⁵⁴ C. Freeman and L. Soete. *The Economics of Industrial Innovation*, (London: Pinter, 1997): 234-235.

⁵⁵ Freeman et al., *Economics*, 233.

⁵⁶ Freeman et al., *Economics*, 235.

⁵⁷ M. Castells, *The rise of the network society*, (Cambridge: Blackwell Publishers, 1996): 166.

increasingly important in high-technology industries for leveraging R&D through partnerships, joint ventures or for accessing new knowledge, markets and capital.⁵⁸

Adding to this transformation was the integration of information technology, together with the reengineering push in the 1990s to refashion the organization from a vertical to horizontal structure of team management, processes and projects and customer-based performance measures transforming the organization yet further into a network structure. In the words of one observer:

“Companies are not trying as hard to be self sufficient anymore. They have core competencies, but they are trying to identify where the sources of science and technology are that they need, not just in ten years, but this year and next year. Reaching out to external sources is now bread and butter to industry.”⁵⁹

The new organizational model, having outsourced basic research to startup companies, universities, contract labs and national laboratories as well as to other high-tech corporations, is thus far from a self-contained and self-sufficient ideal. Rather, it is one where firms are enmeshed within an increasingly complex web of alliances, agreements and joint ventures all of which is a part of an even broader network of subcontracting arrangements. For Saxenian who, in her 1994 book *Regional Advantage* analyzed the success of Silicon Valley, it was the existence of this networked economy that accounted for part of Silicon Valley’s success. “By focusing on what they did best and purchasing the remainder from specialist suppliers, [the new generation of Silicon Valley firms] created a network system that spread the cost of developing new technologies, reduced product-development times and fostered reciprocal innovation.”⁶⁰

From the perspective of the firm operating in a ‘landscape of abundant knowledge’, Chesbrough has argued for a new model to represent a firm’s relationship to its innovation processes. In what he calls ‘open innovation’, firms are as much managers of intellectual property as creators due to the trend towards

⁵⁸ See OECD, ‘A New Economy?: (OECD: Paris, 2000): 39; and Castells, *Rise*, 162-63.

⁵⁹ H. Fusfeld, *Science the Endless Frontier 1945-1995*.

⁶⁰ A. Saxenian, *Regional advantage* (Cambridge: Harvard University Press, 1994): 141.

commercializing ideas that have originated outside the firm's lab. "The boundary", he writes, "between a firm and its surrounding environment is more porous, enabling innovation to move easily between the two."⁶¹ Industries transitioning to open innovation, such as semiconductors, pharmaceuticals, biotechnology (and some more traditional industries such as banking and insurance), have had several critically important innovations from seemingly unlikely sources all of which suggests that the 'locus of innovation ... has migrated beyond the confines of the central R&D laboratories of the largest companies and is now situated among various startups, universities, research consortia and other outside organizations.'⁶²

IMPLICATIONS FOR THE STATE

In the foregoing analysis it has been argued that a reorganization has taken place in the structures of governance in both the state and firm, the result of which is a far more complex institutional landscape structuring and influencing economic trajectories. The following section argues that this terrain has been cast along new spatial dimensions that have shifted the locus of governance to below the once dominant national level. This has culminated in discussions of 'economic communities' within national economies, empowered through their influence, if not control, over key institutions necessary for economic transformation in knowledge intensive sectors.

The spatial reconfiguration of economic governance

In advanced capitalist states, the institutions underpinning economic activity are typically rooted at different spatial scales. At the local level, informal norms and trust are essential to contractual coordination in the market place, while the national level is where much of the regulation of the capitalist system transpires. Indeed, for its role as regulator, the national level is typically the most prominent site of economic governance. Consider the agricultural industry where national level institutions

⁶¹ H. Chesbrough, 'The era of open innovation', *MIT Sloan Management Review*, Spring 2003, 44, 3, p. 35.

⁶² Chesbrough, *Open Innovation*, 37.

stabilize most, if not all, of the transactions that take place outside of the farm. Trade policy guarantees access to markets; monetary policy stabilizes prices and cost of borrowing for investment in farm equipment; and national transportation policy can affect distribution costs. Thus the locus of institutional support and coordination, or governance, is predominantly national as opposed to regional or local.

As several authors have argued, national governance was also central to the Fordist economy of the 1960s and 70s whose dominant mode of growth was achieved through the mass production of complex consumer durables through the mass use of semi-skilled labour.⁶³ Here, the macroeconomic regime responsible for sustaining growth in production and consumption, and the many organizational forms, social networks and institutions that governed the workings of the regime, were rooted at the national level. National demand management policies, for example, catered to the supply-driven character of production whereby, through large capital spending, these policies sought to ease the fluctuations in the economic cycle, helping stabilize growth which in turn promoted further investment for ever greater economies of scale.⁶⁴ Related to this were national policies encouraging mass consumption through labour policies and collective bargaining, which helped ensure that wages rose along with efficiency, which subsequently translated into greater domestic demand. And on the social end of the production regime, national governance was again crucial to trade unionism, which helped the state towards full employment targets and, in the expansion of welfare which catered to the social failings of the Fordist system.

Not all economic governance transpired at the national level but enough did so as to make the national state the pre-eminent scale of governance. With the growing internationalization of production that characterized this golden era of growth, networks of capital required supranational governance to stabilize the monetary system, achieved through the Bretton Woods agreement.⁶⁵ But even then, credit for the production system remained regulated at the national level.

⁶³ See for example E. Swyngedouw, 'Globalisation or 'Glocalisation'?', 2003; and B. Jessop, 'The rise of governance', 252.

⁶⁴ Jessop, 'The rise of governance', 255.

⁶⁵ Swyngedouw, 'Globalization', 2003.

With knowledge- and innovation-intensive sectors now taking on the role of the hegemonic production system in economic policy in many advanced capitalist states, this long-standing dominance of the national level governance is being challenged from below. For what differs in innovation intensive economies is a) the type of non-market institutions that are important in underpinning the essential, and indeed often more complex, set of transactions of knowledge intensive production processes and, b) the spatial scale at which these institutions are situated. Whereas the Fordist economy depended extensively on trade unionism and collective bargaining mediated amidst often hostile government-industry relations, for instance, innovation-driven economies are increasingly dependent on such institutions ranging from trust to the more formal variety such as universities, research institutes and research consortia, all of which can be pivotal in sustaining a cooperative climate conducive to knowledge creation and learning. This shift to 'supply side' governance has thus changed the relative importance - and mix - of non-market institutions that support economic transactions. The effect of this transition has been what Swyngedouw calls the 're-scaling of the economy', a label that captures the spatial reconfiguration of networks that coordinate economic activity.⁶⁶

Regional organization of innovation and learning

This institutional re-configuration is supported by a considerable literature focusing on regions as a unit of analysis for understanding innovation dynamics, a literature that is underpinned by two basic observations on the structure of innovation and more fundamentally, learning. The first is that learning has become the most important social process in knowledge economies where only through the capacity to learn can a firm maintain access and control over the rapidly moving knowledge frontier and avert what Lundvall argues is the constant threat of devaluation of their existing stock of knowledge.⁶⁷ Yet as Lundvall stresses, learning, far from being an individual affair, is fundamentally an interactive process that

⁶⁶ E. Swyngedouw, *Reconstructing citizenship, the re-scaling of the state and the new authoritarianism*, *Urban Studies* 33, 8 and Swyngedouw E, *Globalization or Globalization: 2003*.

⁶⁷ B.-Å. Lundvall, 'Why Study National Systems and National Styles of Innovation', *Technology Analysis & Strategic Management*, 10, 4, 1998: 408.

always requires the presence of networks.⁶⁸ Both Freeman and Lundvall emphasize the relative importance attached to the patterns of interaction between firms as part of a collective learning process in the acquisition and use of new technical knowledge.

The second observation relates to regional variation in institutions that are supporting this interactive learning process. On the formal side, regions differentiate themselves in their endowment of hard institutions such as education and training system, R&D facilities, policy supports and associative system, all of which can affect the institutional configuration that supports firm learning and interaction.⁶⁹ And on the informal side, are the conventions, informal rules, habits and trust, all of which play an important role in coordinating the many economic and non-economic actors involved in learning and innovation. According to Storper, these types of soft institutions supporting learning-based economic transactions are 'specific assets of production' in the sense that they can be regionally bounded and determined. He calls them, therefore, 'untraded interdependencies' adding that they are a 'central form of scarcity in contemporary capitalism', and help account for spatial differentiation 'in what is done, how it is done, and in the resulting wealth levels and growth rates of regions.'⁷⁰

This regionalist logic has ultimately given rise to various spatially bounded frameworks that give primacy to regional institutional configurations in explaining subnational differences in competitive advantage with respect to knowledge industries in particular. Regional innovation systems and industry clusters are the most prominent and influential, and both reflect the observation that more and more, competition in knowledge intensive industries is between groups of interrelated firms rather than between autonomous firms. The clusters concept, for example, as popularized by Michael Porter, stresses more a spontaneous interdependence of geographically proximate firms, whereas the concept of regional innovation systems

⁶⁸ Lundvall, *National Systems*.

⁶⁹ See for example, P. Maskell P, 'Learning in the village economy of Denmark: The role of institutions and policy in sustaining competitiveness' in H.J. Braczyk et al (eds.) *Regional Innovation Systems*, (London: UCL Press, 1998) and P. Cooke and K. Morgan. *The Associational Economy* (Oxford: Oxford University Press, 1998).

⁷⁰ M. Storper, '*The Regional World: Territorial Development in a Global Economy*'. (Guilford Press, 1997): 5.

suggests a more planned process with greater emphasis given to regionally-based cooperation among firms as well as institutions responsible for creating and diffusing knowledge.⁷¹

The development of these frameworks has coincided with much interest from subnational governments, as evidenced by the now central role that North American state and provincial governments have in supporting technology based economic development at the regional level.⁷² Currently, most if not all states and provinces have lead S&T offices, compared to 1980 when there was little to no focus on technology driven economic development.⁷³ Moreover, many state/provincial governments have developed strategic initiatives of varying levels of sophistication that have helped strengthen the R&D capacity of colleges and universities, encouraged firm creation by providing institutional supports for entrepreneurs and technology startups, and have facilitated the adoption of new technology into processes and products. And though such industry technology programs are comparatively small on a national scale, it has been argued that their decentralized structures, together with their support for closer cooperation between government and industry, has allowed for more rapid responses to economic challenges and a more efficient distribution of resources that has made them effective in enhancing national industrial competitiveness. One observer in the US has gone so far as to claim that state programs are "probably as close to an industrial policy as we will see in the U.S."⁷⁴

Evidence for economic re-scaling can also be seen in the rise of new patterns of governance that coordinate strategic decisions-making at the local level, especially in the US and to a lesser extent in Canadian city-regions. With national governments in North America increasingly committed to the principles of free trade as a basis for

⁷¹ See A. Isaksen and E. Hauge (2002). 'Regional Clusters in Europe', Observatory of European SMEs, No. 3, European Commission for a discussion of the different schools of scholarship on clusters.

⁷² Osborne, D. *Laboratories of democracy* (Boston: Harvard Business School Press), 1988.

⁷³ See Chapter 4 of National Science Board, Science and Engineering Indicators - 1991, for a discussion of this trend.

⁷⁴ Thomas H. Moss. 1991. Defining the state role in the science and technology enterprise. Background paper prepared for the Carnegie Commission on Science, Technology, and Government, Task Force on Science and Technology and the States. August

national industrial policy, they have backed away from traditional firm-oriented economic development policies that prevailed in the Fordist era of mass production and national champions. The effect, however, has been what one City of Toronto official calls a 'silent downloading' of economic adjustment to the local level. And, coinciding at a time when local institutions have become central to the success of high-tech communities, this downloading has had the effect of opening up space for economic planning at the local level. Communities, often driven by civic leadership, have been led to engage in a collaborative process of strategic planning with local industry and subnational governments in the interest of realigning their economic assets to take advantage of emerging economic opportunities, and to attract national and international investment.

According to Henton and colleagues, communities engaged in this type of collaborative approach are 'economic communities'.⁷⁵ They are 'places with strong, responsive relationships between the economy and community that provide companies and communities with sustained advantage and resiliency.' As to the style of governance that characterizes these communities, the authors argue that that these regions are 'marked by mediating people and organizations that help interests come together to deal constructively with forces of change.' Austin, Texas, is perhaps one of the most exemplary cases of this new approach as is demonstrated in Chapter 4. The commitment among local actors to shaping the long-term economic prospects of the locality is one of the most important factors in accounting for Austin's transition to a high-tech economy. Guided by locally commissioned strategic plans and strong civic leadership, local governance actors were essential to developing and embedding knowledge assets within the locality and in so doing, positioning the region at the forefront of the global microelectronics industry.

ACHIEVING ECONOMIC GOALS IN AN ERA OF DIFFUSED AUTHORITY

The apparent loss of authority associated with the decentralizing of the national state, the re-scaling of the economy, and the trend of greater dependence on non-

⁷⁵ D. Henton, J. Melville and K. Welsh, *Grassroots Leaders*, (San Francisco: Jossey-Bass Publications, 1997):22.

government stakeholders in carrying out state socio-economic objectives has unsurprisingly been subject to a surge of interest among academics offering new frameworks and vocabularies that seek to accommodate these changes in political order. Network governance, multi-level governance, governed interdependence, global governance, multiple jurisdictions, multi-centered governance, polycentric governance and multiple local jurisdictions; these are but a few of the terms from the various disciplines seeking to conceptualize the manner in which states are adapting to a decentralized authority while continuing to pursue their social and economic goals.⁷⁶ While on the face of it, such diverse terminology bespeaks of theoretical obfuscation in the quest to redefine the 'new architecture of authority', they are, in effect, all unified in their attempt to better understand new patterns of coordination that have emerged as a result of a reconfiguration of authority. And, most certainly, they are clear about one aspect, namely that it is governance and not government that is of theoretical pertinence.

What follows is a look at three concepts, developed in the literature, that are relevant to the case study examination of the emerging governance structure in North American regions. Each concept address a particular aspect of 'resource interdependencies', the effect of which has been to push states into various modes of networking in an effort to leverage interest group expertise, knowledge and financial resources though at a cost to their authoritative decision making power.⁷⁷ Most fundamental is the concept of associational governance, which recognizes non-state actors and the important role they play in interest intermediation among other issues. The discussion then turns to the constructs that accommodate the various actors, beginning with policy networks, followed by governance networks more generally, and third, multilevel governance. These three concepts provide the basic theoretical building blocs for the following chapter which develops a new governance typology for studying these emerging patterns.

⁷⁶ Hooghe and Marks, in *Unraveling the Central State*, provide a very good synthesis of the various terms that have beset the various disciplines dealing with multilevel governance.

⁷⁷ See Jessop B. *The Future of the Capitalist State*, 199.

Associative governance

The associative aspect of contemporary economic governance recognizes the involvement of associations and individuals in the coordination of economic activity that are neither state or market actors. In their seminal article in 1985, Streeck and Schmitter argued that such actors have become very much a fourth source of social order along side states, markets and communities. These ‘private interest governments’ have been empowered by a shift in a reliance on the state for economic regulation to autonomous associations.⁷⁸

In developing the concept of associative governance further, and away from strictly economic regulation, Cohen and Rogers argue that associations are very much a part of the solution to resolving tensions in industry adjustment and interest coordination consequent to industrial policy:

“Associations do this by helping construct an institutional infrastructure attentive both to the need to be maximally responsive to technological and product market changes and capable of limiting individual firm free riding. They provide the mechanisms for pooling resources for training in particular regions or trades and for developing and sharing research and development funds, particularly among smaller firms. The coordination and cooperation they provide help correct a variety of problems that firms face for familiar market-failure reasons: deficiencies in the supply of training, suboptimal pooling of research and development funds and product information among competitors, inadequate links in product design between primary producers and suppliers and the deadweight losses and excessive caution associated with more arm’s length forms of coordination that are especially damaging in the current economic environment.”⁷⁹

Another significant dimension of associative governance – though one that has not been developed explicitly in the theoretical language of associations – is the concept of ‘civic entrepreneurs’, developed by Henton and colleagues. As a term, it brings together the notion of entrepreneurship – an agent of change - with civic virtue, capturing the qualities of a type of local leadership that has become a

⁷⁸ See also A. Amin, ‘Beyond Associative Democracy’, *New Political Economy*, 1, 3, 1996.

⁷⁹ J. Cohen and J. Rogers. ‘Secondary Associations and Democratic Governance’, *Politics and Society*, 20, 4, 1992, p. 438.

significant catalyst in helping many US localities develop their economies. Civic entrepreneurs, according to Henton, ‘forge ties that bind economy and community for their mutual benefit. [They] help communities collaborate to develop and organize their economic assets and to build strong resilient networks between and among the public private and civil sector.’⁸⁰ As the authors found in their study of several municipalities across the US, these leaders practice a form of collaborative leadership that is effective at bringing people together at a time of ‘decentralizing community power structures’. Involved in hands-on implementation of change, these actors operate very much within, and for the benefit of, the public domain, addressing problems on a project by project basis which typically are not being addressed elsewhere. In effect, this new breed of associative governance adapts the institutional milieu through which firms, the local community and municipal government interface with one another. Civic entrepreneurs, as the authors note, ‘preach’ interdependence, recognizing as many do, the economic, environmental and social interdependencies between the three sets of actors. For knowledge intensive firms in high-tech regions, whose external organization to this milieu can be as important as their internal organization of production processes, this type of associative governance has become very relevant to many successful regions, including one of the case studies, Austin Texas (Chapter 4).

Associative governance is thus critical to non-market governance, but as a category of governance it does not, in itself, accommodate the non-market governance provided by the state qua regulator, financier of R&D, universities and economic development, for example. This task of bringing together both associative and state governance under one theoretical roof has largely been left to the now dated notion of ‘corporatism’, the 1970’s construct for examining the organized systems of national bargaining and sectoral governance. Yet in the current climate of ‘draining’ political authority, where governance, and particularly economic governance, increasingly spans different levels of the state, such a framework is clearly limited.

⁸⁰ Henton et al., *Grassroots Leaders*, 33.

Governance networks

The use of the term 'networks' to describe the structure of governance processes has been around for some time in the political science literature, its utility stemming from its metaphorical association to a net of multiple linkages to actors other than state based. One of its earlier usages came from corporatist theorists interested in describing the organized systems of bargaining and sectoral governance. The 'iron triangle' was one such model, reflecting the tripartite consultation and negotiation that transpired in policy decision making processes of industrialized countries.⁸¹

A more generalized usage came with the concept of policy networks, one which gained popularities from the late 1970s with Peter Katzenstein's book, *Between Power and Plenty*. In studying the links between domestic political structures and international relations, Katzenstein identifies the character of domestic public and private interests and institutions as an important conditioning factor of foreign policy. This constellation of interests and institutions he called policy networks.⁸²

As Skogstad notes, in a recent review of its conceptual development, the premise of the policy networks approach is that policy making takes place not just in the formal macro level decision making institutions such as parliament and cabinet, but in the decentralized and 'more or less regularized and coordinated' interactions between state and non-state actors.⁸³ The concepts thus take into account the complete set of actors who influence the policy process, providing answers to the questions of 'who participates?' and 'who wields power?' and ultimately providing insight into why policies have the content they do. In another definition, policy networks are defined more structurally as 'the dependency relationships that emerge between both

⁸¹ M. Marcussen and J. Torfing, 'Grasping Governance Networks, (Centre for Democratic Network Governance, 2003).

⁸² P. J. Katzenstein, "Conclusion: Domestic Structures and Strategies of Foreign Economic Policy," in *Between Power and Plenty: Foreign Economic Policies of Advanced Industrial States*, ed. Peter J. Katzenstein (Madison, Wisc.: University of Wisconsin Press, 1978), 308.

⁸³ G. Skogstad, 'Policy Networks and Policy Communities' Annual Meeting of the Canadian Political Science Association, 2005.

organizations and individuals who are in frequent contact with one another in particular policy areas'.⁸⁴

More recently, the conceptual use of networks as a lens for examining the structure of decision making processes among a varied set of actors has been generalized further as simply 'governance networks', of which policy networks are but one variety. In a working paper, the authors Marcussen and Torfing take some initial steps in defining the concept. Governance networks, they theorize, can be thought of as "1) a horizontal articulation of interdependent, but operationally autonomous actors; 2) who interact through negotiation; 3) transpiring within a regulative, normative, cognitive and imaginary framework; 4) that to a certain extent is self-regulating; and 5) which contribute to the production of public purpose within a particular area."⁸⁵ As with policy networks, the concept of governance networks focuses on horizontal coordination but has a more general concern for societal governance or for 'the production of public purpose'.

With this definition, the authors theorize a variety of governance networks, each existing within different institutional contexts and carrying out different functions. A 'regulating governance network', as manifested by councils and commissions formally created by public authorities, for example, is one that is concerned primarily with formal decisions regarding laws and directives. Another example is one that engages national and international authorities in creating appropriate norms of behaviour either technical or non-technical in a specified area. The authors define these as norm-formulating governance networks.

Regardless of the type, however, such networks tend to have certain characteristics. They are, for example, self-regulating, gaining legitimacy by 'contributing to the production of rules, norms, knowledge and identity in the public sphere'. And importantly, in the negotiating process among actors, these networks generate new knowledge, or learn through continuous discussion which helps build an understanding common among actors, 'of the social world and the role of the

⁸⁴ M. Atkinson and W. Coleman. 'Policy Networks, Policy Communities and the Problems of Governance', *Governance: An International Journal of Policy and Administration*, 5, 2 1992, 158.

⁸⁵ M. Marcussen and J. Torfing, *Grasping Governance Networks*.

network in that world.’ This is, in effect, the deliberative dimension of governance networks which, as the case study chapters show, has become important to aligning the intent of actors towards agreed upon goals.

Multilevel governance

The third conceptual foundation is that of multilevel governance, which introduces a scalar dimension into the structure of interdependencies among the various actors of a governance network. In the early 1990s, Gary Marks pioneered the term to better represent the realities of the new ‘political architecture of dispersed authority’.⁸⁶ Forged from the mold of the European Union, Marks provided a framework that could account for transnational (i.e. EU)-local interactions. These interactions were thought to be undermining the nation state, and more generally the collective decision-making with other levels of government and relevant actors, such that no one level could exercise monopoly over another.⁸⁷

While initially multilevel governance had a ‘relevant actor’ component, its popularity as a theoretical term has imbibed it with considerably more and, indeed, divergent meaning. In a recent review article Hooghe and Marks, find that multilevel governance has been used in two contexts.⁸⁸ The first usage, Type I, is in its essence, a term for intergovernmental relations of a federalist state and is concerned with the manner in which different levels of the government cooperate. It is thus characterized by non-intersecting, general-purpose jurisdictions comprising typically of four spatial layers (local through to the supranational) each with specified responsibilities. And equally characteristic is a non-intersecting membership - typically territorial - among jurisdictions such that the boundaries of each level are clearly demarcated within one another.

Type II governance, on the other hand, is held by the authors as an alternative to Type I. It is far more flexible and ambitious in form, characterized by a more

⁸⁶ See G. Marks, ‘Structural Policy in the European Community’, in A. Sbragia (ed.) *Euro-Politics* (Washington, DC: The Brookings Institution, 1992).

⁸⁷ See L. Hooghe, and G. Marks, *Multi-Level Governance and European Integration* (Lanham: Rowman and Littlefield Publishers, 2001): intro.

⁸⁸ Hooghe and Marks. ‘*Unraveling the Central State*’.

complex, less systematic institutional arrangement of overlapping jurisdictions and memberships. Jurisdictions are defined according to task, irrespective of the scale at which they are institutionalized, and memberships intersect, giving them the leeway to act 'autonomously' to solve the particular problem at hand.⁸⁹ As such there is little that is institutionalized in Type II governance, relying as it does on a backdrop of Type I governance, allowing it to adapt to the particular needs of governance.

Many of these features of Type II governance, - its flexibility, unspecified jurisdictions and task specificity - are similarly attributed to the concept of network governance in the work of Marcussen and Torfing, though with less of a focus on multilevel dynamics. It is thus with these two concepts, together with associative governance, that the patterns of non-market economic governance are later examined, the language of each helping give shape and tangibility to the analysis.

CONCLUSION

The literature reviewed in this chapter has supported one central claim: that with growing resource interdependencies, where no one actor, be it state or firm, has the necessary resources to achieve its desired social or economic goals, new patterns of non-market economic governance have become a necessity to sustain a competitive advantage. Non-market governance, once internalized through vertical integration as a way of minimizing risk, has now been externalized for the very same purpose. Economic actors, therefore, increasingly enter into what Galbraith might have today called a 'technonetwork' comprised of entrepreneurial firms, universities, markets, state programs and R&D laboratories, and in so doing externalize part of the risk associated with the uncertainty of globally competitive, and ever changing high-technology markets.

Moreover, these patterns are sufficiently different from those which stabilized economic activity in the postwar era to warrant significant investigation into how they function and how they are structured. From the national downloading and uploading of responsibilities on the state side to the 'technonetwork' reality of the

⁸⁹ Hooghe and Marks. 'Unraveling the Central State', 238.

industrial organization of knowledge intensive industries, the institutional foundations of economic activity has changed drastically, opening up spaces for new governance actors who are better positioned to respond to the ever evolving needs of the economy. And while these actors are increasingly local, they typically require cooperation from a variety of supra-local actors to access the resources for the appropriate strategic initiatives necessary for resolving broad issues related to developing a knowledge infrastructure. The subject of the next chapter is how best to analyze these structures.

CHAPTER 3

SCALAR DIMENSIONS OF NON-MARKET ECONOMIC GOVERNANCE

INTRODUCTION

This chapter advances a basic categorical distinction that helps unravel the growing complexity of non-market economic governance discussed in the previous chapter. More importantly though, the distinction helps give focus to a specific mode of governance examined in the following empirical chapters. Briefly, the chapter makes a distinction between what is called ‘framework governance’, which operates largely at the national level adjusting the rules of the political economic system, and ‘strategic governance’. This later mode is concerned not so much with the rules of the capitalist system but with building and sustaining an institutional milieu that supports a region’s flow of innovation, and ultimately its competitive advantage in chosen industries. This distinction is empirically derived from the case studies and based on the observation that the two modes are animated by distinct spheres of actors, each catering to a different dynamic within the economy. And importantly, only one of these modes, that of strategic governance, demonstrates a growing local dimension.

This purpose of this chapter then is to present and explain this framework, relevant as it is to the organizational context for the following two empirical chapters that examine the patterns of strategic governance of the two regions. The chapter begins with an overview of existing governance typologies so as to differentiate and delineate the new distinction within the literature. Though these existing typologies are indeed relevant to their particular analytical context, it is argued that none fully encapsulate the multi-scalar set of relationships that do exist, hence the appropriateness of introducing yet another set of governance terms to the literature. The framework presented here, although new in terminology, is not, however, ungrounded in the literature. Rather, the types of governance can be related to existing theory in the political science and innovation literature.

TYPLOGIES AND FRAMEWORKS IN THE ANALYSIS OF GOVERNANCE

A common starting point in the literature on economic governance is to distinguish among the different mechanisms of economic coordination and proceed to characterize the role of each in a particular case study of governance.¹ The state's role is thus contrasted against the role of markets and, more recently, associations, in the economic governance of a particular region or sector. Indeed, each of these categories - state/ market /associations - has become a repertoire in their own right, with respective critiques of each of the opposing governance modes.² As a typology, it has been particularly influential in shifting the analytical focus beyond the limited institutional repertoire that prevails in the economic literature of market vs. corporate hierarchy, and towards a far more comprehensive understanding of the institutional complexity of the economy. In a compilation of national case studies on economic governance by Hollingsworth, for example, the state is analyzed not only in its capacity as regulator, creating and maintaining the framework of market legislation, but also for its active role in fostering sectoral development, and as an enabler or facilitator of non-market coordination in particular industries.³ In more recent work, Cooke and Morgan identify a fourth role whereby states can act as 'de facto public entrepreneurs' especially where industries are nationalized.⁴

Treating associations as a distinct category of governance, as originally espoused in the pioneering work of Streeck and Schmitter in 1985, has also brought greater awareness to their role in mediating between state and market governance. For Cohen and Rogers, for example, such mediation involves helping to resolve tensions in industry adjustment and interest coordination. They note a broad range of functions where such mediating is required, including: the pooling of resources for training in particular regions or trades; for developing and sharing research and development

¹ See for example the introduction (p. 6-7) of Hollingsworth R., P. Schmitter and W. Streeck (eds.). *Governing Capitalist Economies: Performance and Control of Economic Sectors* (Oxford: Oxford University Press, 1994).

² This point is made by A. Amin who explores the various contributions of the repertoires. Amin, 'Beyond Associative Democracy'.

³ J. Hollingsworth and W. Streeck, 'Chapter 11: Countries and Sectors', *Governing Capitalist Economies*, 270.

⁴ Cooke and Morgan, *The Associational Economy*: 19.

funds'; and for overcoming inadequate links in product design between primary producers and suppliers.⁵ More recently, associations, chiefly in the form of civic entrepreneurs acting in a community or local context, have been identified as increasingly important in constructing an institutional milieu capable of adapting local infrastructure to the requirements of locally-based global high-technology firms.⁶ This can include everything from guaranteeing a water supply for chip manufacturing plants to strengthening school curriculums to establishing or developing the learning and research infrastructure, such as a new research facility, in support of local firms.

Yet, as useful as it is in casting light on the diversity of actors and their respective roles in economic governance, the typology is less effective in scalar and functional differentiation. Within the associative category, for example, there is considerable diversity and discontinuity in associative functions. This is alluded to by Cohen and Rogers who identify a range of functions from training to inadequate links in product design within the supply chain, and in the example of locally based civic entrepreneurs. Thus some aspects of associative governance are explicitly carried out within industry, as is some standard setting or collective research, while other associative activity is primarily intermediary, such as the influencing of public policy. Moreover, this functional diversity is often related to the scale of activity. For example, in the case of influencing public policy, this typically involves industry or trade associations whose membership, and hence their own level of operation, is commensurate with the level of government with whom they interact. A national industry association, for example, typically deals exclusively with national policy issues. While such organizations are indeed associative, they have few linkages with, for example, civic entrepreneurs engaging the local community in establishing the requisite infrastructure to seed local industry. Thus despite both being involved in resolving tensions stemming from industry adjustment, these two examples of associations - national industry associations and civic entrepreneurs - do so from an

⁵ Cohen and Rogers, 'Secondary Associations and Democratic Governance', 438.

⁶ See Henton et al. 'Grassroots Leaders', for a discussion of the role of civic entrepreneurs, Chapter 1.

entirely different focal points and scale. These distinctions are lost, however, when such actors are lumped together in a single category.

Likewise with the state. As was noted previously, the state's economic governance role is diverse, ranging from national level macroeconomic management to *animateur* of local business networks. Accommodating this range within a single category makes it difficult to draw out, in a systematic manner, the often distinct roles and patterns of associative and market engagement related to different levels of the state. At the international level, for example, economic governance such as that which is provided through trade agreements, is largely institutional, with established rules for resolving trade disputes and governing industry whose activities may extend into any one of the signatory states. Quite different to this 'framework governance' is the manner in which some local level governments in North America have been engaging in strategic economic development with associative actors and firms with the goal of tapping into global markets, not unlike the approach taken by East Asian developmental states, such as Japan, Korea and Taiwan. Moreover, when such functional diversity is grouped as a single conceptual category, the tendency, especially in international comparative studies, is to gravitate to an explicitly national focus at the expense of subnational levels. This framework therefore tends to lead to conclusions as per Hollingsworth et al that 'the degree and mode of state intervention in a sector seems to be determined almost exclusively by national factors, with only marginal impact of sectoral technologies and economics.'⁷ It is not so much the conclusion that is problematic but rather the industry case studies that do not consider subnational dynamics in their analysis.

An alternative typology that better addresses the scalar dimension of governance is offered by Cooke in his characterization of governance regimes responsible for technology transfer.⁸ Here the author identifies three models conceptualized from regional technology policy case studies of Japan, Germany and France. Each model captures variations among five variables related to technology

⁷ Hollingsworth, *Governing capitalist economies*, 273

⁸ See P. Cooke, 'Regional innovation systems: competitive regulation in the new Europe', *Geoforum*, 23: 365-382.

transfer: the initiation process of technology transfer (e.g. local versus non-local), the sources of funding, research competence (i.e. basic research versus applied research), technical specialization and the degree of supra-local coordination. The first of these models, the 'grassroots approach', characterizes an approach where the initiation process and funding are local. This is contrasted against a 'dirigiste approach' where both the initiation of actions and funding are national activities carried out outside the particular region. And third, in between these two models, is the 'network approach' where both the national and local levels are involved in these activities. Thus rather than group by type of actors, as in the tradition of Schmitter and Streeck, the typology differentiates governance by *attributes*, which in this case relate to technology transfer. In so doing it is able to isolate patterns that emerge among sets of actors, as defined by their involvement in the particular attributes, and identify the scale at which such governance transpires.

For a broader analysis of regional sectors, however, the typology is limiting in two respects. First, having been cast from an analysis of technology transfer and later extended to governance of regional innovation systems, the typology is specialized, focusing on a subset of variables, not all of which are related to governance. The level of technical specialization and research competence, for example, are attributes of a regional innovation system and not necessarily specific to the governance process *per se*. Second, by characterizing modes of governance by scale, the typology risks overemphasizing one level at the expense of the others, or rather, at the expense of a multilevel analysis. Indeed, the pitfalls of a purely regional focus that such a typology can generate are well noted by Lovering's sharp critique of the 'new regionalism' in which the region is held to be the primary focus of policy.⁹ Thus, with these limitations in mind, an alternative to the actor- and attribute- centered categories is presented in the following section that encompasses governance more broadly. This is done in an attempt to better capture the patterns of interaction among the different types of governance actors, irrespective of their level.

⁹ J. Lovering, 'Theory Led by Policy: the Inadequacies of the 'New Regionalism' (Illustrated in the case of Wales)', Debate, Joint Editors and Blackwell Publishers, 1999.

FRAMEWORK VERSUS STRATEGIC GOVERNANCE: A BASIC TYPOLOGY

In order to bring into focus the different levels at which governance occurs and the various types of actors all under one lens, it is useful to make a distinction in *the manner* of non-market economic governance. Governance, by this distinction, can be defined as that which is framework-oriented or strategic-oriented. Together, it is argued, these categories - framework governance and strategic governance - accommodate the dominant approaches by which states govern the economy. And importantly, they reveal distinct differences in the types of actors involved, their initiatives, and respective levels at which coordination is achieved.

As previously noted, these categories are empirically derived, and based on an analysis of the various actors involved in the microelectronics industry. Nonetheless they do have theoretical premises as discussed later in this chapter in the section on 'why two types of governance?'

Framework governance

'Framework governance' is essentially steering by indirect and neutral means, governing from the periphery through regulation and the tax system. Desired ends, such as innovation or research and development, are often incentivized, though in a broad manner without excluding access to such benefits to any one firm. Framework governance is thus in keeping with the neoclassical approach whereby a state's role is limited to influencing firm activity through policy that does not discriminate to the level of a firm or industry. It abides by the political principle of non-interference and the notion that markets, operating within a regulatory framework, are left 'free'.

In North America, framework governance is the most prevalent manner through which states exercise influence over the direction of industry, encompassing as it does, macroeconomic conditions such as financial management, the overall tax climate, and the funding of basic research, all of which are non-exclusive to firms and which affects more than just a specific industry such as microelectronics. The dominant actors are national governments, and to a lesser extent state/provincial governments, who determine and modify the regulatory environment. This decision

process, however, also involves cooperation with industry and trade associations, who collaborate through policy networks. Framework governance thus characterizes the essence of the systems of political economy in Canada and the US, and corresponds to the neoliberal Anglo-Saxon variety of capitalism.

From an innovation perspective, framework governance also corresponds to the concept of national innovation systems first proposed by Lundvall and later established further by Freeman, Nelson, Lundvall and others.¹⁰ With its emphasis on institutions and relationships that support the development of new technologies, innovation systems shifted the focus away from supply and demand considerations of industrial policy to the institutions and interactions that influence 'the rate and direction of technological learning'.¹¹ Framework governance, to the extent that it influences the institutions supporting knowledge creation and innovation, is therefore also an important component to managing a national innovation system.

There is also an international dimension to framework governance which responds to issues related to trade and to technical aspects of a knowledge-intensive industry (see Table 3-1). In the case of trade, the key actors are national governments who negotiate rules and the terms of trade and resolve disputes through international negotiation. This is in contrast to the governance of technical standards, where, in the case of the microelectronics industry, international industry associations and industry consortia play the dominant role. In microelectronics, the issues requiring industry international cooperation are related to developing technical standards for manufacturing and design, and to long-term, high-risk research and development.

Thus, as defined above, framework governance is a necessarily vast category, raising questions as to its usefulness. A category so broad can do little to illuminate within. Yet its primary purpose, and the reason why it was developed, is to distinguish these various and well studied aspects of economic governance from what

¹⁰ See: Lundvall, B. A. *Product Innovation and User-Producer Interactions*. Alborg: Alborg University Press 1985, p. 55; C. Freeman, *Technology and Economic Performance: Lessons from Japan*, Pinter, London, 1987. and G. Dosi C. Freeman and R. Nelson, G. Silverberg, L. Soete (eds.) *Technology and Economic Theory*. London: Pinter Publishers 1988.

¹¹ This refers to the definition of National Innovation Systems developed by P. Patel and K. Pavitt, "The Nature and Economic Importance of National Innovation Systems", *STI Review*, No. 14, OECD, Paris, 1994.

is called strategic governance, which is the primary focus of this thesis. In this respect, it is indeed useful to the extent that it highlights the multilevel context in which strategic governance operates.

What follows is an elaboration of how of framework policies have affected the microelectronics industry in the US and Canada. Given the breadth of the category, though, the following account is by no means complete. For example, the role of competition policy and the character of the financial system, though undoubtedly a factor in the regulation of transactions in the respective microelectronics sector, are not explored here. Rather the intent is simply to highlight that, while the focus of this thesis is on strategic governance, framework governance has nonetheless been vital to fostering the microelectronics industry in both Canada and the US.

National framework governance of the microelectronics industry

Despite the indirectness of framework governance, the microelectronics industry, and more broadly, high-technology, has been significantly impacted by this mode of governance since the early 1980s. In the following discussion, three examples are provided that are most relevant to the microelectronics industry, tax policy, R&D funding and the legislative shift to institutionalize and encourage collaboration among firms, universities and government labs and agencies.

Tax policy, especially that which seeks to incentivize innovation through R&D tax credits, is of central relevance to framework governance. Applicable to any firm, provided they meet certain conditions, these credits are widely used in both the US and Canada and are a central element of state industrial policy. The US federal government introduced its first such credit, the Research and Experimentation (R&E) tax credit, in 1981 as part of President Reagan's Economic Recovery Tax Act in an effort to indirectly stimulate corporate research spending at a time of concern of economic performance. A temporary provision, but one that has been renewed ten times since 1981, it offers a 20% credit on year-to-year increases of qualified research expenditures. Most recent estimates suggest that it is widely used, with 75% of claims coming from large manufacturing firms in five industries, two of which are

electronics and computers. All told, more than 12,000 firms claim the credit, amounting to an R&D subsidy of about \$1.85 billion a year.¹²

Canada has offered tax credits for R&D in one form or another since 1961, the most recent incarnation of which is the Scientific Research & Experimental Development (SR&ED) Tax Credit. In offering individuals, corporations and partnerships a 20–35% refundable tax deduction of up to 100% of qualified current scientific research and experimental development expenditures and eligible capital expenditures, the program is recognized as one of the most generous R&D tax credit programs anywhere, with some 11,000 Canadian firms, mostly SMEs, claiming \$1.4 billion in SR&ED tax credits a year. These credits are supplemented even further at the provincial level, with provincial tax credits available in most provinces. The Ontario Innovation Tax Credit for SMEs, for example, offers a further 20% tax reduction on eligible R&D expenditure. And to promote collaboration, the province offers another 20% refundable Ontario Business-Research Institute Tax Credit on expense related to contracts with public research institutes.

The primary actors involved in influencing tax policy, are governments, both national and subnational, as well as numerous policy-driven associative actors. These latter actors are primarily industry and trade organizations, who, on behalf of their members, lobby respective levels of government for changes to the framework conditions within which members operate. Concessions on capital gains taxes to improve the R&D tax credit process are typical focal points of these efforts, as are trade issues and, increasingly, immigration legislation. In the US, these types of organizations representing microelectronics firms include the American Electronics Association and the Semiconductor Industry Association.

In Canada, the two dominant associations of this type are CATA (Canadian Advanced Technology Association) and ITAC (Information Technology Association of Canada). Though CATA is the broader of the two in its representation of high-technology firms, their manner of operation and goals tend to be similar, primarily putting forth policy agendas for the purpose of influencing the policy process. Both

¹² This is from tax years 1991 to 1995. Source: National Science Board, Science and Engineering Indicators, 2000.

ITAC and AEA have regional chapters within their organization structure, though they typically carry out similar functions to their national counterparts but with a focus on regional government and related policy.

The funding of university R&D is another significant area of framework governance that reallocates resources in support of the high-technology industry, though not in any specific way which would prevent other sectors from benefiting from such policies. At the federal level in the US and Canada, such funding is mostly administered through government agencies who primarily fund 'pre-competitive' or basic research. The US government has long been supporting R&D through government agencies and Federally Funded Research and Development Centers (FFRDC). In the area of microelectronics R&D, DARPA (Defense Advanced Research Projects Agency), with a budget of \$US2.7 billion (FY2003) has been significant, having earmarked over US\$1 billion to basic and applied research in IT and electronics projects.¹³ The Federal Government is also the biggest provider of R&D funds used by universities and colleges (\$US2.8 billion FY2003), mostly channeled though through the National Institutes of Health (66 percent), followed by the National Science Foundation (12 percent), and the Department of Defense (8 percent). In Canada, the federal government plays a similar role albeit to a much smaller degree. Through the Natural Sciences and Engineering Research Council, the government supports university research to the amount of \$850 million (2004-05), \$9.3 million of which supports the Canadian Microelectronics Corporation.

Finally a third example of how the framework conditions have affected the microelectronics industry has been the significant shift during the 1980s and 1990s towards institutionalizing and promoting coordination between firms and the knowledge infrastructure. As noted in Chapter 2, for example, there were a series of policy changes beginning with the Stevenson Wydler Technology Innovation Act of 1980 in the US and a matching fund policy of 1986 in Canada which led to a major restructuring of state-industry relations. The result has been the creation of an

¹³ For 2003 DARPA allocations for basic research in 'Computing systems and communication technology' and Materials and electronics technology was \$424,940,000 and \$440,500,000 respectively. Applied research in advance electronics technology reached \$150,400,000. Source: United States, '2003 Budget estimates', Department of Defence, 2002.

environment supportive of the growing number of complex non-market relationships that very much underpin the knowledge generating capacity of the microelectronics industry.

International framework governance of the microelectronics industry

At the international level, there are several organizations that are influential in addressing global technical issues facing the industry. The oldest such organization is the International Standards Organizations and Semiconductor Equipment and Materials Institute (SEMI). SEMI, through its Standards program has been publishing standards since the 1970s with the stated goal of helping to ensure open markets and lower semiconductor manufacturing costs.¹⁴ Most recently, it has published six new technical standards for semiconductor, flat-panel display, and MEMS manufacturing industries, claiming to be global in its representation of respective industries. Standards span various areas of microelectronics production from materials to test methods, and increasingly, in the areas of environment, safety and health where countries have been relaxing standards on the use of chemicals in order to attract manufacturing facilities to a region.

Another forum for international industry collaboration is the International Technology Roadmap for Semiconductors (ITRS). ITRS has been collectively engaged in technological foresight process with the goal of providing industry guidance regarding central trends in the technical development of semiconductors. A global organization, ITRS brings together the leading semiconductor manufacturers, suppliers of equipment, materials, and software, as well as researchers from university, consortia, and government labs, in the preparation of a roadmap document that provides a reference point for research requirements, potential solutions to major technical challenges, all within an estimated time frame.¹⁵ By their own assessment, the ITRS documents “have become a truly common reference for the entire semiconductor industry”, adding that “the cooperative efforts of the ITRS participants

¹⁴ SEMI website, <http://wps2a.semi.org/>

¹⁵ ITRS, p. i, <http://public.itrs.net/>

have fostered cooperation among international consortia, universities, and research institutions around the world.”¹⁶

And on issues related to manufacturing, the industry, under leadership of a research consortium, SEMATECH, has recently established ISMI (International SEMATECH Manufacturing Initiative) to provide solutions to manufacturing infrastructure, standards, and productivity improvement challenges. Its twelve members represent the world’s largest microelectronics related firms such as Intel, AMD, TSMC, Samsung and Philips.

With regard to trade, the most significant international trade agreement dedicated to microelectronics was signed in 1986 between the US and Japan. An outcome of intense government to government negotiation, the Japan - U.S. Semiconductor Trade Agreement (STA) sought to address a growing weaknesses in US microelectronics competitiveness compared with Japan. The agreement was designed to curb the ‘dumping’ of Japanese DRAM chips on the US market, and open Japanese microelectronics markets to foreign made chips.¹⁷

Strategic governance

Whereas framework governance is generic, influencing technology industries as a whole in a largely, non-discriminating manner, strategic governance is very much the opposite. Strategic governance can thus be defined as the deliberate steering of resources to achieve a specific outcome in a specific location that typically would not transpire through market processes alone. It is self-directed and typically carried out with an idea of a desired state of development, such as achieving prominence in a particular industry or developing an economic region in a particular manner.

From this description, strategic governance is by no means a new concept, embodying at base, the goals of the East Asian developmental state. Japan’s economic development is an exemplar of how the national level can take leadership

¹⁶ Ibid, p.1

¹⁷ C. Parsons (2002). ‘Did The US–Japan Semiconductor Trade Agreement Have Any Impact?’ Asian Economic Journal 2002, 16, 1, 37-51.

Craig Parsons

in this type of strategic coordination.¹⁸ Robert Wade, in his pioneering work of Taiwanese industrialization, articulates a 'governed market theory' to highlight to strategic coordinating role played by the East Asian state.¹⁹ The performance of Taiwan, Japan and other newly industrialized East Asian states stems foremost from high levels of investment and competitive industries. But, these performance outcomes were in fact the result of strategic industrial policies, which were themselves underpinned by a strong 'autonomous' state that could guarantee effective coordination between state objectives and market actors.

This East Asian developmentalist approach does not, of course, transfer to a liberal political economic system of 'Anglo Saxon' states. Quite apart from the 'weak state' institutional tradition, which limits the extent to which state actors can effectively coordinate chosen firms, state-led industrial strategies of the type carried out in East Asia contradict the philosophical disposition of free-market economies.²⁰ The closest example in Canada of this kind of coordinated strategy for microelectronics was a program developed under the Department of Industry, Trade and Commerce in the late 1960s through which it provided funds to the Toronto based subsidiary of Control Data Corporation to develop its next generation of computers in Canada. In receiving the support, the company agreed to several broader economic development goals, even one that would have the manufacturing of the computer carried out in a plant in Quebec.²¹

These kinds of partnerships are uncommon, and have fallen out of favour among countries committed to neoliberal economic policies and international free trade agreements that, in principle, restrict these kinds of practices. Thus national industrial strategies among Anglo-Saxon capitalist states are typically carried through programs that provide additional R&D support to targeted industries through standard research funding channels. An example is the National Nanotechnology Initiative created by the Clinton Administration to develop a nanotechnology industry. This

¹⁸ See Johnson, 1982 and Dosi et al 1990 for a discussion of Japan's state led development of high-tech industries.

¹⁹ Wade R. 1990 *Governing the Market*. Princeton NJ: Princeton University Press.

²⁰ For a discussion of how a weak state tradition hinders the development of strategic industrial policy, see Atkinson and Coleman (1989), also discussed in Chapter 6.

²¹ This example is elaborated on in Chapter 5.

program provides additional R&D money for nanotechnology research projects which is then administered through its government agencies, such as the National Science Foundation and the National Institute for Health. These kinds of programs do not, however, involve the type of strategic coordination between firms and governments that has been characteristic of the East Asian Developmental state.

There is nonetheless a significant amount of strategic coordination that does go on and which is overlooked in national comparative studies. Strategic governance among western states, especially in North America, increasingly involves regional and local level actors rather than national government. Unwilling to subject their economic future to the vagaries of external market forces, the local and regional actors have turned to strategic efforts aimed at developing and localizing the research and learning infrastructure to the benefit of particular knowledge intensive industries. Civic entrepreneurs, often in collaboration with municipal and regional governments, formulate strategic plans to guide the building up of knowledge infrastructure and recruit firms of a chosen industry with the goal of strengthening existing capabilities within the region.

University professors working in engineering departments, along with municipal governments and technology associations may also be involved in strategic governance, engaging in initiatives quite different from the generic initiatives associated with framework governance.²² Strategic planning exercises, curriculum development at local institutions and the building of technology commercialization support institutions have all become important endeavors in developing and sustaining knowledge industries within a region and a country. Table 3-1 below gives a summary of the main differences in initiatives and actors that correspond to framework and strategic governance. The table is indicative, rather than comprehensive, in its listing of key actors and initiatives.

²² University professors, rather than universities, is a distinction used here because of the fact that universities, as institutions of higher education and research, do not normally view themselves officially as an agent of *local* economic development. Indeed most universities have very complex relationships with the state, interacting with each level in different capacities official and unofficial. University professors often engage in the local economic development process in an unofficial capacity.

Table 3-1: Two manners of non-market economic governance

	FRAMEWORK GOVERNANCE		STRATEGIC GOVERNANCE	
	International	National	National	Local
Primary actors	<ul style="list-style-type: none"> ▪ National governments ▪ International industry associations 	<ul style="list-style-type: none"> ▪ National/regional governments ▪ Industry Associations 	<ul style="list-style-type: none"> ▪ National / regional governments 	<ul style="list-style-type: none"> ▪ Civic entrepreneurs ▪ Municipal governments ▪ University professors ▪ Regional associations ▪ Technology / business associations
Initiatives	<ul style="list-style-type: none"> ▪ Trade agreements ▪ Technical standards ▪ Technology roadmaps 	<ul style="list-style-type: none"> ▪ Basic research funding ▪ R&D Tax credits ▪ R&D cooperation requirements 	<ul style="list-style-type: none"> ▪ Targeted innovation support programs 	<ul style="list-style-type: none"> ▪ Strategic planning ▪ Strategic recruitment /retention ▪ Localizing infrastructure investment ▪ Curriculum development ▪ Commercialization support
Governance patterns	<ul style="list-style-type: none"> ▪ International diplomacy ▪ Industry consortia 	<ul style="list-style-type: none"> ▪ Policy networks ▪ Policy communities 	<ul style="list-style-type: none"> ▪ Government ▪ Governed market theory 	<ul style="list-style-type: none"> ▪ Strategic governance networks

Governance patterns and the two manners of governance

Table 3-1 also highlights the observation that the two types of governance may also be associated with quite distinct governance patterns. In the case of national framework governance, two established governance models developed in the public policy literature, that of policy networks and policy communities, are well suited to characterizing the basic coordination pattern. These models loosely try to capture the actors and relationships involved in shaping policy. Policy networks, according to one definition, refers to 'the dependency relationships that emerge between both organizations and individuals who are in frequent contact with one another in particular policy areas', while policy community captures the 'shared framework' and established pattern of behavior' within which decision making takes places.¹ Both these concepts attempt to answer questions related to 'who participates and who wields' power in the policy-making process, recognizing that states are often only one actor in the process.

Along with acknowledging a similar set of actors, these models are relevant to framework governance also for their focus on policy. As Atkinson and Coleman find in their study of industrial policy networks in Canada in the late 1980s, the character of the policy network is closely linked to the nature of industrial policy. Where pressure pluralist networks exist, policy has typically been reactive, catering to the immediate needs of individual firms.² This observation bears out in their examination of the telecommunications sector, where they find a policy network comprised of competing industry associations and state agencies with very little coordination apart from individual links between dominant firms and relevant agencies. The result was a national policy that was poorly coordinated, reactive and which led state departments and agencies to 'carve up the industry and claim narrow responsibility'. An updated study of the microelectronics industry would likely find a similar configuration though with a slightly different set of actors - namely the two competing national associations, Information Technology Association of Canada (ITAC) and Canadian Advanced Technology Association (CATA) and Industry Canada.

¹ Atkinson and Coleman, 'Policy Networks', 158.

² Atkinson and Coleman, *The State, Business and Industrial Change in Canada*, 87.

In the area of local strategic governance, these models are much less relevant for two reasons. First, the set of actors involved in strategic governance, such as civic leaders, municipal governments and university professors, are typically not associated with those involved in framework governance. Second, the initiatives that are the focus of strategic governance do not necessarily involve public policy even though they may have a public good component. Two examples are the building of institutions by private actors that support local technology transfer or commercialization, and the process of adapting curriculums of local higher learning institutions to the needs of local industry. Both initiatives require a degree of coordinated decision-making within the locality but not any modification to the framework conditions at the local, regional or national level. The coordination pattern that emerges in strategic governance might better be described as a 'strategic governance network', the full character of which will be elaborated on in subsequent chapters.

Why two types of governance?

Why two types of governance patterns should in fact exist at the domestic level may be explained by the idea of differing growth efficiencies within economies, as advanced in work by Dosi, Zysman and Tyson and later by Kuttner.³ These authors argue that there is an allocative efficiency dynamic at work in an economy and what they call a Schumpeterian efficiency, both of which support a country's economic growth.

The first type, allocative efficiency, captures the effectiveness by which resources are allocated within the economy and, by extension, the degree to which *current* economic welfare is maximized. It recognizes that countries, through trade, can specialize in industries with different growth potentials and increase their wealth in step with global demand for these products.⁴ This is also the logic of comparative advantage, which stipulates that countries ought to specialize in the production of

³ G. Dosi, J. Zysman and L. Tyson, 'Technology, trade policy and Schumpeterian efficiencies', de la Moth and L. Ducharme (eds.) *Science, Technology and Free Trade* (London: Pinter Publishers, 1990) and R. Kuttner, *Everything for Sale* (Chicago: The University of Chicago Press, 1997): Chapter 2..

⁴ This logic is premised on the assumption that demand for these products increases with disposable income, an assumption economists call income elasticity.

goods for which they have a comparative advantage, trading with those more efficient at producing other goods. In such cases, both parties benefit from economies of scale, as well as any potential increasing returns to scale. Under Ricardian efficiency, a country can improve its wealth through increased global demand for its products, by price-cutting or devaluation. This is also, of course, the logic of free markets whereby market organization, under perfect competition, maximizes the allocation of resources, ensuring that a maximum value of output is obtained from the available resources and technologies and holding distribution of wealth constant.

This type of efficiency is broadly related to framework governance to the extent that economic efficiency is typically promoted by way of broad macroeconomic policies, which structure the basic incentives and rules of the markets. This set of policies typically fall under the neoliberal framework and include, privatization, lower corporate taxes and free trade, all policies that maximize current economic welfare.

Schumpeterian efficiency, on the other hand, reflects the transformative efficiency of the economy, or rather the effectiveness at which countries can innovate, diffuse technologies throughout the economy and adapt to an ever-evolving economy. This is based on the understanding that technological change is the foremost driver of economic growth, and that such change is supported by a process of learning, knowledge creation and knowledge dissemination.

One significant implication of these two types of efficiencies, however, is that being efficient in resource allocation in the Ricardian sense does not make one efficient with respect to technological change. Schumpeterian efficiency, promoted through innovation, is very much supported by non-market institutions and coordinated through non-market modes of governance.⁵ Associations and networks in this sense, act as facilitators of economic evolution, helping overcome, through coordination and cooperation, institutional impediments, or contradicting incentives that impede technological progress.

⁵ Refer to Chapter 2 for a discussion of this.

Moreover, from the standpoint of governance, these efficiencies are not necessarily complementary. As is demonstrated in the work of Dosi, Nelson, Kuttner and others, the different modes of governance underpinning the different forms of economic efficiencies can contradict one another. Ricardian efficiency, with its emphasis on market governance and price competition, can undermine the very non-market institutions and processes upon which Schumpeterian efficiency depends (e.g. long term associations, R&D laboratories and strong public education systems). Too great an emphasis on Schumpeterian efficiency, however, can undermine the competitive virtues of market governance, dampening pluralist and rivalry aspect of innovation that Schumpeter himself deemed important.

While the national level, qua regulator of industrial sectors and signatory to free trade agreements, continues to be the locus of power for Ricardian (or free market) efficiency, Schumpeterian efficiency is making subnational levels more relevant due to its increasing dependence on regionally embedded forms of economic governance such as associations and networks. This form of efficiency is promoted in part through strategic governance networks. This tension generates an interesting paradox whereby the push for allocative efficiency at the national level under neoliberalism is making the subnational level more important in its capacity to foster and protect the non-market institutions that underpin Schumpeterian efficiency.

Political and economic legitimacy of strategic governance

In the context of the North American liberal system of political economy, the notion of strategy when carried out by state actors in an economic context is certainly not without controversy. Given the use of the term here, it is therefore worthwhile to explore this debate in the context of the microelectronics industry if only to highlight how critical strategic initiatives have been to the industry globally.

Whether in academic or political circles, strategic economic action is very much a contentious term, often popularly dismissed as picking winners. This is all the more so in the US, where it is reminiscent of full scale national planning of former

communist regimes.⁶ This controversy is well expressed in the 1984 Report of the Royal Commission on the Economic Union and Development Prospects for Canada, the authors for which, write “the burden of proof must be on those who propose intervention. The economy will be more dynamic and its development prospects better if greater emphasis is placed on the market and less on government intervention, as the engine of development.”⁷

From the standpoint of economic theory, the often cited factors for supporting strategic action or industries - high wage growth, high value added and rapid expansion - do not justify ‘strategic’ intervention on behalf of the state. It is not an obvious task, for example, to identify those sectors which generate a substantial ‘rent’. An industry paying high wages could just as well be one that employs higher skilled individuals, whereas industries that appear to earn high rates of return may do so because no one is accounting for the failures, which if brought into the equation would suggest only an average rate of return.⁸ Economists also challenge the argument that the microelectronics industry is strategic because it is an enabling industry that provides inputs to a wide range of downstream products. Such interlinking between upstream and downstream industries, argues Kenneth Flamm, is the norm and not intrinsic to the semiconductor industry, as is evident from any input output table of industrial economies.⁹

Yet despite the controversy, few, if any, governments from advanced industrial states have shied away from programs that support the development of particular industries. “Governments, notes one observer of the microelectronics industry, ‘believe that the future of their countries depends on the composition of their

⁶ Robert Gilpin provides an illuminating account of the controversy surrounding Japan’s economic development, culminating into the 1991 East Asian Miracle Project carried out by the World Bank which denied any strategic role in East Asian newly industrial countries. The countries, the report concluded, had simply got their fundamentals right, despite the report’s own acknowledgement of effective state intervention. R. Gilpin *Global Political Economy*, 2001 Princeton University Press: Princeton, p. 323-326.

⁷ Dosi et al., ‘Schumpeterian efficiencies’, 260.

⁸ See P. Krugman (ed.), *Strategic trade policy and the new international economics* (Cambridge: MIT Press, 1986).

⁹ Flamm, *Mismanaged trade*, 379.

economies, and for the most part they see their success as nations defined by their relative success in these [semiconductor initiatives].”¹⁰

Moreover, the industry, in addition to technology spillovers, accrues a disproportionate share of the economic gains, due to the possibility of monopoly profits. As Dosi and colleagues note of high-technology more generally, “[strategic] investments permit a country or region to have a distinct advantage in commercializing these technologies, in gaining advantage in the design of products implementing their possibilities, and in reaping a large fraction of world profits from these and related activities.”¹¹ High wage employment in the US microelectronics industry, for example, increased in the US by some 50% compared to a 6% decline for manufacturing overall over a thirty-year period.

Tellingly, in microelectronics alone, there are 15 major programs currently being supported by governments that directly target microelectronics technology, five of which are in the US.¹² These R&D initiatives are in addition to efforts by governments to affect the geographic development of the industry which have been particularly influential when seeking to establish a manufacturing base in microelectronics within their own borders. With labour now an insignificant component of the overall cost in the manufacturing of semiconductor chips, firms have been quick to respond to financial incentives offered by governments so as to offset the very high capital costs of new foundries (\$US2-4 billion). The most aggressive states in this area of support have been those in Asia, particularly the newly industrialized countries such as Singapore and Malaysia, though currently it is now China that is offering the largest of these types of incentives.¹³

The effect of these programs on the global governance and evolution of the industry are difficult to ignore. It was, for example, the decision by the Taiwanese government in the late 1980s to establish a manufacturing capacity by creating two

¹⁰ Alan Wolff, Thomas Howell, Brent Bartlett and R. Michael Gadbow (eds), *Conflict among Nations: Trade Policies in the 1990s*, Westview Press, San Francisco, 1992, p. 528

¹¹ Dosi et al 1990.

¹² Wessner 2002

¹³ Most of China’s assistance has been channeled through Project 909, a 1.2 billion program whose objective is to establish 5 semiconductor manufacturing companies with another 20 design and development centers in an area of Shanghai. See Thomas Howell p. 243.

foundries - UMC and TSMC – that ultimately led to a fundamental reshaping of the global production chain, under what has since become known as ‘the foundry model’.¹⁴ UMC and TSMC now account for 53% of the global market share and are leading a trend which could see the US lose its leadership should US producers continue to outsource their production.¹⁵ And while China remains far behind in chip design capability, few doubt its potential within the decade to be a formidable presence in the semiconductor industry in a large part to its government’s concerted coordinating efforts in establishing a manufacturing capacity.¹⁶

The more visible hand of government, however, has been that of national security, which has provided the dominant rationale - especially in the US, but also in Canada – for national strategic governance initiatives. Although the fundamental innovations preceding commercial production of the semiconductor were all efforts of private sector research laboratories, the industry was quick to develop a strong relationship with the state, largely for military reasons. The first relationship from which all future involvement followed, developed soon after the invention of the transistor at Bell Laboratories in 1947, when the U.S. government stepped in to offer support through procurement, convinced of their strategic value in military technology. It is estimated that in the twenty-year period from 1950 to 1970, 40 to 45 percent of all industrial R&D that took place in the semiconductor industry was funded by the US government.¹⁷ Much of this supply side intervention was defense- and aerospace-related and justified on the grounds of national security. The Apollo and Minuteman programs, for example, featured government procurement that guaranteed the purchase of a large volume of integrated circuits at high volumes, enabling firms to develop an efficient production capacity. As Arthur Little noted in a 1963 study:

Due to its considerable interest in semiconductors and particularly in transistors, the government has throughout the 1950s tried to stimulate the development of improved types. Around the middle of the 1950’s they were convinced transistors were needed for future military equipment so

¹⁴ Howell p. 212

¹⁵ Ibid p. 214).

¹⁶ White paper: National Security Aspects of the Global Migration of the US Semiconductor Industry

¹⁷ K. Flamm p. 36.

they accelerated the production investment to provide developmental and production facilities for making certain types which were considered to be desirable for future military electronic equipment.

The contracts for a total of thirty different types of germanium and silicon transistors were placed with about one dozen of the major semiconductor companies, and this helped some of these to gain a foothold in the industry. In many cases, this investment was matched by similar amounts of capital equipment or plant space supplied by the contracting companies. Thus the total potential capacity of over a million transistors a year was created.¹⁸

In Canada, the military, as Chapter 5 discusses, was of equal importance to the country's microelectronics industry. In particular, it was instrumental in establishing an industrial capacity out of a desire create a comparative technological advantage while having Canadian industry meet the technological and scientific standards of the latest weaponry. These efforts first began with initiatives of the Defence Research Board and later with the Royal Canadian Navy both of whom commissioned Toronto-based subsidiaries of multinationals to carryout microelectronics related R&D projects that would support military objectives.

STRATEGIC GOVERNANCE: A BASIC PREMISE

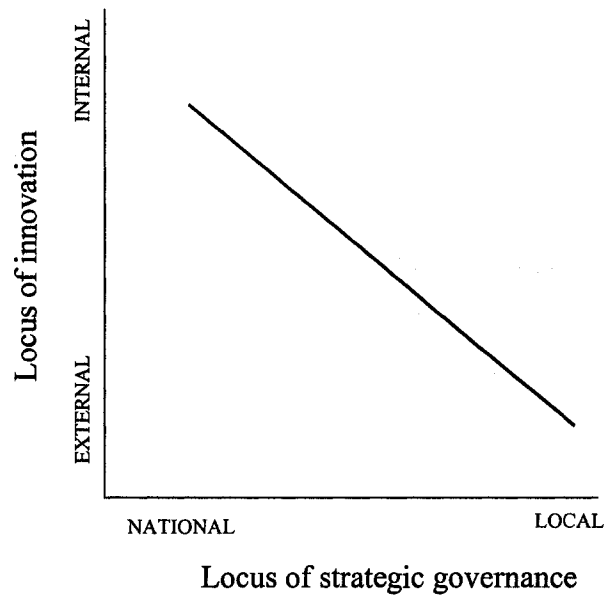
Having established the theoretical contours for this study, it is now possible to discuss a basic premise that arises from the literature review. As noted in Chapter 2, space has opened up for local agency in economic governance for two partly related reasons. The first is the rescaling of the economy, whereby the relative importance of local level institutions has increased. The second is the trend among knowledge intensive firms towards 'open innovation' whereby part of the innovation process is externalized from the firm.¹⁹ These two trends would suggest an inverse relationship between the two: as the locus of innovation has shifted horizontally outwards, the

¹⁸ Cited from C. Freeman (1997) p. 180.

¹⁹ A third reason for the rise of local agency is offered from the standpoint of risk reduction in a paper by Ian Bromley, 'Modern Economic Development Planning: Regional Foresight Exercises as Risk Reduction Strategies and Negotiated Co-Investment Processes', ISRN National Conference, 2004. In it, he argues that public and private sector actors engage in an economic development process to leverage their regional assets. The effective co-investment process can minimize risks and maximize outcomes for firms, supporting institutions and the regional economy as a whole.

locus of strategic governance has shifted vertically downwards as depicted in Figure 3-1.

Figure 3-1: Innovation and governance



The reality, of course, is less simplistic than this stylized graph indicates. As the foregoing discussion has argued, there is a national component to strategic governance that continues to play an important role in structuring the overall innovation process. A more nuanced portrayal may therefore be some form of bifurcation in the locus of governance, rather than an inverse relation. As the locus of innovation is externalized from the firm, the local level becomes relatively more important in the strategic governance of the knowledge economy. And, as the following chapters will show, this importance has come not at the expense of, but rather as a complement to, the national scale.

CONCLUSION

One of the benefits of a typology is its ability to bring together often disconnected ideas or ideologies, and present them within a single, conceptual

coherent framework.²⁰ This typology attempts to do just this, bringing some necessary clarity to the increasingly complex reality of non-market economic governance. By categorizing the various mechanisms of governance along two dimensions related to the manner in which the mechanisms operate, the typology brings together two distinct governing paradigms, which are often dealt with separately in the literature. These are the neoliberal approach (i.e. framework governance), which is most dominant among Anglo-Saxon economies, and the 'developmental approach', most closely associated with East Asian economies (i.e. national strategic governance). What the typology demonstrates is that these two paradigms can, in fact, work together within a multilevel context.

In North America, as the following chapters make evident, the balance is achieved at different levels of the state whereby the national level articulates mostly a framework response, and the subnational level, a strategic response. The balance of these dimensions is likely to differ by country, but be present nonetheless. Indeed, from the assumption that all advanced industrial countries govern through both strategic and framework governance, the relative weight of each mode, together with their respective balance across levels of government, offers a promising new approach to characterizing political economic systems. It is reasonable to assume, for example, that Japan, which is noted for its strong, national level strategic governance, might be expected to have a political economic system that is more strategic than framework oriented, and with a predominantly national locus of governance for both strategic and framework governance. Among more decentralized European countries, such as Germany, the configuration would likely differ again with corresponding implications for policy and economic performance.

²⁰ This point is made by J. Hage and C. Alter in justifying their own typology in 'A typology of interorganizational relationships and networks', R. Hollingsworth and R. Boyer, *Contemporary Capitalism: The Embeddedness of Institutions* (Cambridge University Press: Cambridge, 1997).

CHAPTER 4

THE RISE OF A STRATEGIC GOVERNANCE NETWORK IN THE AUSTIN REGION

INTRODUCTION

To use the term 'community' as an attribute of the mode of economic governance that prevails in Austin, Texas, is likely to draw queries from anyone familiar with the state's popular lore. The strongly rural, militantly independent, and mobile Texan nurtured on the frontier, so prevalent in state imagery and mythology, is undoubtedly contradictory to the notions of mutual dependence, fraternity and sense of responsibility for others that is conveyed by the concept of community. Yet for Austin no other term can better capture the essence of how the region has coordinated itself in responding to the challenges of an ever-evolving economy. The sustained commitment of its citizens and associations in the shaping of the region's sectoral development has been exemplary and has laid the foundations for a distinct mode of economic governance well suited to the dynamics of a global knowledge intensive economy. The extent to which the economic governance process has taken place outside of public policy is also remarkable, underscoring the relevance of the notion of community in the region's economic governance.

Much of what has been written on Austin's economic success has done little to deepen the understanding of the region's governance. These accounts are informative in their chronological descriptions of Austin's economic and institutional development but limited in their analysis of the coordination involved in achieving

this transformation.¹ Discussion of the ‘how’, for example, typically end with the finality of cultural variables such as the Texan ‘can do spirit’.²

The purpose of the following discussion is thus to look at what is underneath this ‘can-do spirit’, to the actors and institutions that have strategically guided the economy over the past few decades. In so doing, this chapter gives empirical shape to the notion of a community-led strategic governance network, the name given to the pattern of strategic governance that has matured gradually over several decades in response to successive economic challenges.

The discussion begins with an examination of its organizational development as evident from a historical look of the key events from which local strategic governance has been shaped. With the conceptual contours established and actors identified, a more formal definition of local strategic governance is advanced, which is then explored further by an analysis of its main attributes and dimensions.

TRANSFORMING OF THE AUSTIN ECONOMY

In the ever-growing industry of regional performance indicators, the Austin-San Marcos region has stood out in more than a few rankings in the last few years. In 2002, it was ranked as having the strongest economy of any US city for the 4th year in a row³; it placed second only to San Jose in the number of patents in 2000 and in the following year, first in growth of patents⁴; it ranked third among US regions for the education of its work force; and in 2001, Austin was considered the best places to live in the US by MSN. This is but a sample of the 37 odd national rankings published

¹ For examples see P. Robbins, ‘The Town that Won the Pennant: A Short History of Austin’s Economic Development’ (The Austin Environmental Directory, 2003), and J. Miller, ‘Regional Case Study: Austin Texas Or “How To Create a Knowledge Economy”’, (European Commission Delegation Washington D.C. 2002).

² Typical of this journalistic genre is S. Robinson, ‘The Austin Lesson: Can-do spirit for high-tech’, (Albuquerque Tribune, July 09 2001) which argues that in the final analysis, the Texas tradition of getting things done, however so, is at base of its success.

³ POLICOM Corporation, www.policom.com

⁴ Ranking from the Centre on Urban and Metropolitan Policy, Brookings Institute.

between 2001 and 2002 where Austin placed favorably in everything from the safest city in the US to the best place to grow a high-technology firm.⁵

Its standing on several fronts, especially on quality of life factors, can no doubt be partly attributed to the very pleasing surroundings. Situated in Texas Hill Country, the Austin-San Marcos region benefits from a very pleasant climate and varied geography that has given it recognition as one of the top US destinations (2001) by National Geographic Traveler Magazine and has made it a popular home for athletes and environmentalists alike. Yet for the majority of indicators, much of what is being captured is the region's industrial prowess in high-technology, particularly in semiconductor research and manufacturing, software, computers and peripherals. By the mid 1990s there were some 275 technology manufacturers in the region, 60 percent of which were in the computer and electronics industry. Motorola, Advanced Micro Design, Samsung, Applied Materials, Tokyo Electron, and Dell Computers are among the most prominent to have significant operations in Austin, contributing by the late 1990s, to upwards of 68% of the total manufacturing in the region. In fact, it has been one of the few regions in North America that has seen its manufacturing base expand consistently over the past two decades most of which is high-technology related, with some of the larger firms such as Dell employing upwards of 20,000.⁶ On the service side, the numbers are similar, with employment in software development, computer systems integration, software consulting, accounting for approximately half of the 150,000 service employment by the mid-1990s.

It was of course not always thus. As the state capital and home to the University of Texas at Austin, the region's economy in the decades following World War II had been heavily represented by the government and education sectors with agriculture still a major source of revenue in the area. Manufacturing is estimated to have been responsible for no more than 2% of employment in the mid 1950s.⁷ Though transition itself spanned decades, the pivotal moment came in the early 1980s with the successful recruitment of the first major private sector research consortia in the US,

⁵ For a complete listing, see Austin Overview: 2003 Opportunity Austin, Greater Austin Chamber of Commerce.

⁶ Angelou Economic Advisors Inc. An Economic Review and Forecast 1996-1998, Austin, Texas.

⁷ An estimate by the Austin Chamber of Commerce cited from Robbins, *The Town*.

the Microelectronics and Computer Technology Corporation (MCC), which was followed a few years on by the establishment of another pioneering public-private research consortium, SEMATECH (SEMiconductor MAnufacturing TECHnology). Together, these two organizations crystallized the identity of Austin as a Mecca for high-technology, building on a manufacturing base established by such companies as IBM, Motorola, National Instruments and AMD. And importantly, it gave the region international recognition for its growing concentration of expertise in microelectronics manufacturing and research.⁸

The presence of large research consortia and multinational firms are certainly the most visible manifestation of Austin's economic success. They do, however, overshadow what is arguably the more significant institutional development of Austin's economic transformation, namely the deeply embedded set of institutions, associations and individuals that contribute to the region's economic governance. These include the Austin Chamber of Commerce, several technology related associations catering to the growth and development of local high-technology firms, numerous civic organizations dedicated to maintaining the economic dynamism of the region, and civic leaders able to mobilize local resources, including the University, to address significant regional challenges and shape long-term strategic plans for the regions growth prospects.

In fact, as the following discussion reveals, this constellation of actors and institutions has been central to the transformation of the region, having not only been involved in the early regional economic planning processes, but also in helping strengthen the region's research capacity and in embedding economic assets through strengthening the ties of firms to the region. This community has also been active in influencing the policy process over issues related to the quality of the regional infrastructure, such as education and transportation infrastructure, issues that increasingly have an impact on the region's overall economic vitality. In the section that follows these examples will be discussed in greater detail, and within a historical

⁸ This impact is widely acknowledged among civic leaders interviewed for this study.

context so as to expose some of the factors that have led to the development of the economic governance community.

THE ORGANIZATIONAL DEVELOPMENT OF LOCAL STRATEGIC GOVERNANCE

Early roots: Chamber of Commerce and the University of Texas at Austin

Early signs of community involvement in building Austin's knowledge intensive economy are evident from the very start of the region's foray into electronics, which can be traced back to war related research that took place in the 1940s at the University of Texas at Austin. One of two significant graduate research institutions involved in the emerging field of electronics was the Balcones Research Centre, a sprawling 402 acre complex established in 1946 within the administration of the University. Originally a magnesium mill run by the federal government during the war, it was handed over to the University at no cost provided that it be used to "extend and develop the research function of the University for the benefit of the public." Such terms were in fact the vision of an engineering professor, Neils Thompson, who spearheaded the effort to acquire and convert the sprawling collection of deserted buildings into what came to be a preeminent graduate research facility. At a time when more and more veterans were returning from the war and engineering programs were expanding, Thompson had become concerned over the limited prospects for growth in research at the University.⁹ Together with a colleague, C. Granberry, Thompson negotiated a twenty-year lease with the U.S. government through the office of then Congressman Lyndon Baines Johnson, after which time the university would be permitted to take full ownership of the lands.

Staff at the new facility carried out research into the emerging field of electronics, and also took on military contracts for defense equipment related to acoustics, radar and sonar. This would help educate and train a cohort of scientists and engineers, several of whom would later establish their own companies. The most significant of these spin-off firms was TRACOR, established in 1955 by three

⁹ University of Texas at Austin. 'In Memoriam J. Neils Thompson', Memorials 1999-2000

physicists associated with the Balcones Research center and the College of Engineering. The firm, originally involved research and development in the physical sciences for US government agencies and industry, later moved into the manufacture of instruments, components, and military products, a move which helped it grow into a Fortune 500 defense contractor, with some 2,200 employees by the mid 1980s. It was however, TRACOR's role as a centre for start-up companies that made it significant in establishing an electronics industry in the region.¹⁰ By 1983, some 15 direct spin-offs had been established, including Texas Telesystems, Continuum and Radian, whose total employment impact was estimated at 6,377 by 1984.¹¹ Since then, the firm has spun off an additional five, bringing the forty-year total to twenty.

Neals Thompson, through his role in establishing the Balcones facility on behalf of the University of Texas, was in many ways prototypical of the type of regional leadership that would later come from the University not so much as an institution per se, but from individual faculty members. It was a style of leadership that extended beyond the university and into the region. Tellingly, Thompson would later assume presidency of the Board of Directors of the Austin Chamber of Commerce in the early 1970s where he would also serve for five years as vice president of Economic Development.

The second principle actor involved early on in fostering the research and industrial capacity of the region was the Austin Chamber of Commerce, a private, non-profit organization representing area businesses. In 1956, a year after the founding of TRACOR, the chamber made one of the first efforts to establish industry in the region. Concerned with the fact that Austin's 'biggest export' was their young graduates from university, the Chamber refocused its efforts away from recruiting national trade associations, which at the time deemed desirable for economic development, to the recruiting electronics firms. Such a move was also seen as a way of compensating for the many acres of tax-exempt government lands due to the presence of both state government and the university. Notably, these early efforts

¹⁰ D Kleiner, 'Tracor', *The Handbook of Texas Online*

¹¹ D. Gibson, D. and E. Rogers. *R & D collaboration on trial: the Microelectronics and Computer Technology Corporation* (Boston: Harvard Business School Press, 1994): 428.

were guided by the region's first industrial planning effort, a 1957 report commissioned by the Chamber and drafted by the UT Bureau of Business Research to make recommendations on the types of businesses that ought to be recruited and established. The report became recognized as the foundational planning document of Austin's high-tech economy, recommending three possible directions for development: poultry farming, air conditioning equipment and research and development of electronics. Recommendations were also made on planning for an industrial district. According to the Chamber's president at the time, Vic Mathias, electronics was deemed a desirable industry for its likely appeal to Austinites who were familiar with the type of buildings in which such industries were typically located. Moreover, they were considered 'clean', free of smokestacks.¹²

Remarkably, in the subsequent years of marketing, the Chamber, in the 1960s, had anticipated several important factors that were later to be recognized as essential for high-tech regions. Quality of life was being promoted as early as 1964, through the chamber's effort to market Austin as a 'city of upper middle-class citizens'. To this end, *The Austin Magazine*, a Chamber publication, boasted of Austin's scenic countryside, recreational activities and cultural amenities and the region's suitability for raising a family. The strength of Austin's labour pool was also highlighted: "Over the next five years there will be available some 18,000 locally trained graduates..."¹³

From these efforts, Austin began seeing some very real results, most notably with the recruitment of a large scale IBM facility in 1966, its first major national firm. Originally a plant for the manufacture of Selectric typewriters, the IBM facility would later become a central anchor firm to the region's software industry, with employment upwards of 7,000.¹⁴ This recruitment success was followed a year later with the arrival of Infotronics and Communications Research, Texas Instruments in 1968, and Westinghouse in 1971.

By 1983, 28 major high-tech firms had established themselves in Austin, contributing to a total high-tech employment of 22,800 and 6.1% of total labor

¹² Robbins, *The Town*, 3.

¹³ Robbins, *The Town*, 3.

¹⁴ Robbins *The Town*, 4.

force.¹⁵ Motorola, employed some 5,000 in its microprocessor division while Texas Instrument, employed another 3,000 in its data systems group.¹⁶ According to Gibson and Rogers, four factors attracted these companies to the region: relatively low wages, low taxes (neither the state nor local government levy corporate or personal income taxes), a large reputable university, and finally a high quality of life. Texas has also been a 'right to work' state, where union affiliation cannot be required for employment, a point advertised early on in the Chamber's recruitment briefings.

In these early decades, the Austin Chamber of Commerce was undoubtedly the central actor in the casting of Austin's industrialization, which at this point had been predominantly recruitment driven. Its relationship with the university was important on several fronts from working on strategic planning to help create an employment base for future graduates. Remarkably, university faculty were also involved in the Chamber's early recruitment efforts, where, on their visits to other cities, they were asked to make personal visits to officials of targeted companies to inform them of the University's resources.¹⁷

The municipal government had yet to play any significant role despite, its responsibility for the municipal infrastructure for the new recruits. In fact, the city was typically not informed of prospective clients and in one instance, city council had received only a day's notice of AMD's planned expansion into Austin in 1979. Such weak linkages between the Chamber and the city made any long-term planning considerably more difficult.¹⁸ Moreover, it underscores the extent to which much of the economic governance from early on had been conducted largely outside of the policy process.

MCC and the shaping of a governance culture

It wasn't until the early 1980s when Austin began to benefit from the development of a more complex set of linkages in the governance of the region's economy beyond what existed between the Chamber and UT. The seminal event

¹⁵ Gibson and Rogers, *R&D*, 428.

¹⁶ Gibson and Rogers, *R&D*, 428.

¹⁷ Robbins, *The Town*, 3.

¹⁸ Robbins, *The Town*, 7.

came in 1983 with the recruitment of the MCC, an event that galvanized a much broader set of relationships that would mature into a multilevel and multi-actored governance process responsive to economic adaptation of the region.

MCC was unusual in two respects. First, the organization itself was a major experiment in for-profit private sector R&D cooperation in the US, one that not only required a change of attitudes among firms that were accustomed to competing with one another, but also one that required an amendment to the federal antitrust legislation in the US which had long legislated against R&D cooperation.¹⁹ Second, the executives of MCC led by Admiral Bobby Ray Inman, chose to make their site selection process public, a move that went against prevailing practices of corporate site selection whereby firms negotiated in secrecy with prospective locals. The effect of this decision was significant. In addition to realizing its intended purpose – that of ensuring a sustained commitment from both member firms and interested regions²⁰ – there were unintended effects of competing in what became a highly publicized national competition. For Austin, the experience prompted the start of a transformation in the governance of its economy. By bringing together a diverse set of individuals in preparation for the bid, the competition forged a new set of relationships that mobilized the necessary expertise, influence and financing to successfully respond to the challenge. This approach would later be used to respond to other challenges, including the successful recruitment of SEMATECH, and the creation of a new advanced materials research capability for nanotechnology.

In the case of MCC, the task force that was organized in preparation of the bid was multilevel and ad hoc, bringing together Texas Governor, Mark White, EDS chairman, Ross Perot, Mayor of San Antonio, Henry Cisneros, along with several high level administrators from the University of Texas, and Ben Streetman, a microelectronics expert hired by the University the previous year. These individuals were important not only for their expertise and influence but also for their

¹⁹ As Gibson and Rogers (p.190) point out, MCC challenged a long-standing belief among its members in the value of rigorous competition and free enterprise, forcing managers to 'transcend their competitive instincts and provincial concerns to learn how to collaborate in goal-directed long-term R&D.

²⁰ Gibson and Rogers, *R&D*, 105.

cooperation in bridging of the public / private institutional divides that were required in organizing a broad package of financial incentives. The University alone offered \$49.5 million, having agreed to triple its microelectronics research program and establish 30 new endowed professorships in electrical engineering and computer science. A further \$20 million came from the Austin business community for subsidizing mortgages for MCC employees, and another \$23 million from business from the 12 surrounding regions.²¹

In the year that followed, the Austin Chamber of Commerce commissioned a second long-term strategic plan, this time by the Stanford Research Institute (SRI International). As with the first plan, this one became as influential, giving the region a horizon of ten to twenty years in which it would prepare itself for the transformation to an 'information society'. 'If Austin follows the strategies suggested', concluded the report, 'the wealth created by both present centers of excellence and by new technologies will spread throughout the economy creating jobs and entrepreneurial opportunities in all sectors, for all Austinites – an opportunity economy in a uniquely livable city.'²² Among the recommendations made were: to strengthen and establish new partnerships between business, government and educational institutions, especially UT; to create a climate for innovation and entrepreneurial activity by nurturing new start-ups, creating business incubators, encouraging spin-offs and increasing venture capital availability; and to realign educational intuitions to provide industry based training and adult retraining.²³ Remarkably, these goals were for the most part realized, as will be apparent later, largely through the initiative of community actors.

The second pillar

The manner of ad hoc coordination that proved so successful for MCC was invoked for a second time in the bidding for SEMATECH. Another pioneering research consortium, SEMATECH was again viewed as the US response to Japanese competition, which had eroded US market share in some areas of microelectronics, in

²¹ Gibson and Rogers, *R&D*, 148.

²² Cited from Miller, 'Regional Case Study'.

²³ Miller, 'Regional Case Study'.

particular DRAM (dynamic random access memory) chips, by some 80 percent by 1987.²⁴ Its purpose was to strengthen US Semiconductor manufacturing by leveraging resources and sharing risk in efforts to overcome common manufacturing problems in semiconductor production. Though the idea of SEMATECH came from industry, half of its \$200 million budget would be funded in part by the Federal government. SEMATECH was thus seen as a major federal project one which was highly sought after by many states. Indeed, from a regional economic impact standpoint, SEMATECH, much more so than MCC, was expected to have a considerable impact on the local economy due to its focus on implementation of technologies rather than long-term research. In addition to the 800 high-wage jobs planned for, SEMATECH was expected to draw major semiconductor manufacturers within close proximity of the facility and generate several spin-off companies.²⁵

SEMATECH's site selection was also carried out through a national competition, though one that drew many more proposals from many more states than did MCC. Whereas MCC had interest from 27 states and 57 cities, some 135 proposals from 34 states were prepared in the bid for SEMATECH.²⁶ However, despite the increased competition the Austin community proceeded in much the same manner as they did with MCC, though with the considerable benefit of having gone through the process four years earlier. Drawing on its experience in collaborating across the public private divide and across the community, the bid team was able to mobilize the necessary resources to guarantee a flawless bid, which paid attention to everything from mortgage and children incentives to cooperative state-funded research, all of which was worth some \$68 million.

By most accounts, the establishment of these two research consortia was a defining period in the transformation of the regional economy.²⁷ Along with the symbolic effect for the region's perception as a high-technology hub, these research consortia, and in particular SEMATECH, had a substantial economic effect from

²⁴ Gibson and Rogers, *R&D*, 475.

²⁵ Among those to have relocated to Austin as a result of SEMATECH include Tokyo Electronics and Applied Materials, the later of which brought numerous additional semiconductor equipment and parts manufacturers. Source: interviews.

²⁶ Gibson and Rogers, *R&D*, 483.

²⁷ Supported by discussions in interviews

having drawn in many firms to the region. These included Motorola, AMD and Applied Materials, the latter of which was responsible for attracting an additional thirty semiconductor equipment and parts manufacturers to the region. Yet in the history of Austin's governance, the research consortia were arguably more relevant for the legacy of collaborative alliances that they bestowed to the region and indeed across the US among the many states that participated in the bidding. The experience of having had the entire community 'sing from the same hymnbook in the same pew at the same time', as one of the bid architects, Pike Powers, recalled, endowed the region with an understanding of the interdependence within the community and the know how of achieving collective goals.²⁸

In their review of the successful multilevel public/private collaboration that transpired over the duration of the bidding, Gibson and Rogers identify several important factors, three of which have relevance to the manner of governance that was emerging. One was the focus and commitment of those involved, all of whom understood the importance of such a research consortium to a state economy struggling to establish itself in the global economy. Texas agriculture had been in decline due to drought, oil and gas reserves were diminishing, and many of its graduates were migrating in pursuit of high-technology employment. MCC was thus viewed as an important step to diversifying the economy in a growing sector of high wage jobs. Also important was the cultural and geographic proximity of participants, most of whom were long time Texans and graduates of either Texas A&M or UT and emotionally committed to having Texas win MCC. This helped consolidate a collaborative spirit that would keep regional rivalries at bay. Finally, the authors note the extensive cooperation between 'first level influencer' such as Ross Perot and Governor White and 'second level influencers' such as Ben Streetman and others from UT, in coordinating the various actors and making the necessary decisions, all of which took place in a time frame of weeks.

²⁸ Interviews and Gibson and Rogers, *R&D*, 496.

Beyond recruitment

The civic mobilization that transpired in the bids for national economic institutions and firm recruitment do not, on their own, provide an adequate foundation for a new model of economic governance. Certainly, the involvement of local civic organizations in economic development has been a long-standing practice, dating back to when such organizations in Texas raised money to entice railroads to build tracks through their communities.²⁹ Likewise, the Austin Chamber of Commerce's first claim to success stems from its involvement in having the University of Texas established within Austin in the early 1880s.

Rather it is the extent of cooperation among a greater diversity of entities, together with a high degree of cohesion among such actors who are mobilized around a common economic vision of where the region ought to go and what is required for it to get there, that provides the organizational imprint for a distinct pattern of community-based economic governance. The process is thus deliberate and ad hoc, steered by local strategies and realized largely by the independent actions of associations and civic entrepreneurs who share a sense of civic obligation to ensuring the well-being of the region.

These attributes become apparent in an examination of the several other coordinating initiatives that have had a strong complementary effect in strengthening the region's institutional matrix that supports its knowledge-based industries. One such initiative has been the creation of a series of organizations all focused on providing the institutional support for transferring technology out of the university and into industry. The organizations were developed through the leadership of George Kozmetsky, Dean of the Business School at the University of Texas, who regarded them as experiments in what was a long standing interest of his, that of creating wealth from technology. The laboratory for these experiments was the IC² Institute (Innovation Creativity and Capital), which he had founded in 1977 as an organization that would take on unstructured problems at the boundary of academics and business world. After a decade of research, the Institute had come up with a

²⁹ R. Calvert, A De Leon, and G. Cantrell, *The History of Texas* (Illinois: Harlan and Davidson, 2002): 206.

framework for strategizing technology-based regional economic development, called the 'technopolis wheel'. This structured a way of creating wealth from technology commercialization, giving emphasis to the need for multisectoral cooperation among the education system, companies and various levels of government and associations and provided a template for Austin's growth into the 1990s. It was also a basis for Kozmetsky's three institutional experiments, all non-profit entities that were to 'change the town'.³⁰

The first of these organizations was the Texas Capital Network, established in the late 1980s, and designed to be a group of angel investors who would scrutinize and invest, on a matching basis, in the very early stages of companies though under less onerous terms than was typically demanded by venture capitalists. A completely separate entity from UT, the Texas Capital Network would later grow into the largest non-profit venture capital network in the United States. In 1989, Kozmetsky founded his second experiment, the Austin Technology Incubator (ATI), with financial assistance from the city of Austin, Travis County and the Chamber, as well as from private funds and run under the auspices of the IC² Institute. Recognizing the need by start-up companies to amortize costs for common expenditures and the high price of legal, accounting and other professional business services, Kozmetsky provided selected start-up firms with a low-cost environment and convinced a group of experts to defer their fees in assisting companies. By 1997, ATI had graduated 45 firms, with another 20 in residence, contributing over 1500 jobs with annual revenues of \$197 million to the regional economy. By 2003, there were upwards of 140 graduates, four of which had gone public.³¹ As part of the university, the ATI has also been holding courses to educate students on the logic of technology commercialization and entrepreneurship, some of whom have gone on to be employed by the start-up companies at the incubator.

The third institution catering to the value creation chain, was the Austin Software Council, later renamed the Austin Technology Council, to reflect a changing membership. With so many of the software entrepreneurs lacking basic

³⁰ Source: interview.

³¹ Source: interview.

business skills, Kozmetsky created a knowledge network that would allow companies to talk to one another and learn from their failures. The organization had been conceived of as an important second stage of institutional support to graduates of the incubator, bridging the gap to greater independence.

Together, these four organizations, in effect, fulfilled part of the recommendations made in the SRI report, in creating a climate for innovation as well as improving links between the sectors of the 'technopolis'. The IC² Institute, for example, has become one of the central governance forums in the region, holding workshops and meetings and maintaining close contacts with government, the community, the mayor's offices, as well as the chamber.³²

One of the other important governance forums in the Austin region is the Austin Area Research Organization (AARO), an association comprised of business and community leaders dedicated to the long-term social and economic well being of the region. Indeed, AARO is, in several respects, an exemplar of the dynamics exhibited in community economic governance. As much an implementer as a coordinator of public goods, AARO has been instrumental in resolving governance problems that affect the economy that other actors – especially government – have been unwilling or incapable of dealing with. One of several initiatives was developing a long-term water supply plan, an issue of critical importance to the microelectronics industry which requires a very substantial quantity for its manufacturing processes. Prior to AARO's initiative, no such planning had been done either at the state or regional level, and by 1997, Austin had a mere 18 years worth of supply. With a good deal of animosity existing between the regulator of the surface water agency, the Lower Colorado River Association (LCRA) and the City of Austin, AARO took it upon itself to bring the two sides together to negotiate a contract in good faith. Having done so, the two parties signed a contract in 1998 guaranteeing a 50 year contract with an opportunity to renew for another 50 years and in so doing ensured that Austin would continue to be a safe place for the microelectronics industry to reside.

³² Source: interview.

This has been one of several initiatives that AARO has had a good deal of success in resolving. In 2003, the association, together with other groups in the community, was involved in the drafting of a state level bill that would earmark new money to help retain SEMATECH. With the venerable research consortia considering a move to Albany, New York, to take advantage of generous state subsidies, and to be in closer proximity to its new research centre at the University of Albany, the Austin community responded by persuading the governor of Texas to establish a \$295 million Texas Enterprise Fund - the first of its kind in the state - whose first disbursement would be to SEMATECH.

Joined-up governance

The strategic governance process described thus far is unsystematic in nature lacking any formal institutionalization. In fact, its coherency is derived not from any one organizational form but from the concept of community. It is the commitment among actors, associated with the region, to a particular public vision that animates and gives coherency to the coordination process. In the case of Austin, the vision is an economic one, whereby the current and future state of the economy is a reference point against which a wide variety of urban issues are framed and resolved.

The effect is a more horizontal and decentralized governance process that achieves what F. Gaffikin and M. Morrissey (2000) have called 'joined up governance'. Key 'exogenous' community level issues like transportation, typically marginalized in economic development policies and strategies despite their integral importance to successful outcomes, are included in a joined-up form of governance. As a result, they become endogenous to the overall regional planning and development effort. The result is a decision making process that embraces the interdependence between firms, the education system, physical infrastructure, and the tax base. This integrated outlook is strongly reflected in AARO's own mission statement:

"We believe that a healthy expanding economy is fundamental to the quality of life of the area's citizens. We also believe access to opportunity for all citizens; sound educational, cultural, health safety and infrastructural systems; and the preservation of our unique natural

environment are integral to our quality of life and to a health economy. AARO will focus on collaborative initiatives to address issues of a long-term nature, but will also engage actively in immediate issues with long-term implications.”³³

An event that crystallized this more integrated approach to governance came in 1992 with a grass roots ballots initiative that forced a reluctant city council to legislate stricter development limits.³⁴ Up until this time, Austinites had been very much divided over the benefits of the rapid pace of growth, particular with regard to its environmental effects. This culminated into an environmental backlash in the 1980s much of which was targeted against the Chamber of Commerce for its growth-without-limits position. The success of the ballot, which sought to stop the development from spilling over onto the region’s aquifer, was a maturing event for the city. Together with the Chamber, the city has since taken to recognizing environmental issues as an integral part of the region’s economic development. In fact, AARO’s own mission statement cited above, was introduced a year after the ballot, reflecting the extent to which this change of attitude permeated into the community as a whole.

ACTORS OF LOCAL STRATEGIC GOVERNANCE

Austin’s economic governance community has been predominantly associative in its constitution, with a large part of the governance dialogue existing outside the policy sphere. The municipal government was notably absent on a few occasions in the past, including the bid effort for MCC where its attention was focused on a highly charged election campaign where a pro-growth mayor was competing against a no-growth incumbent. Likewise with the recruitment of 3M, during which the city was bypassed entirely in the Chamber’s coordination effort.³⁵ However, since the early 1990s, the city has taken a much more active role in economic governance

³³ AARO Mission, AARO, Austin, Texas.

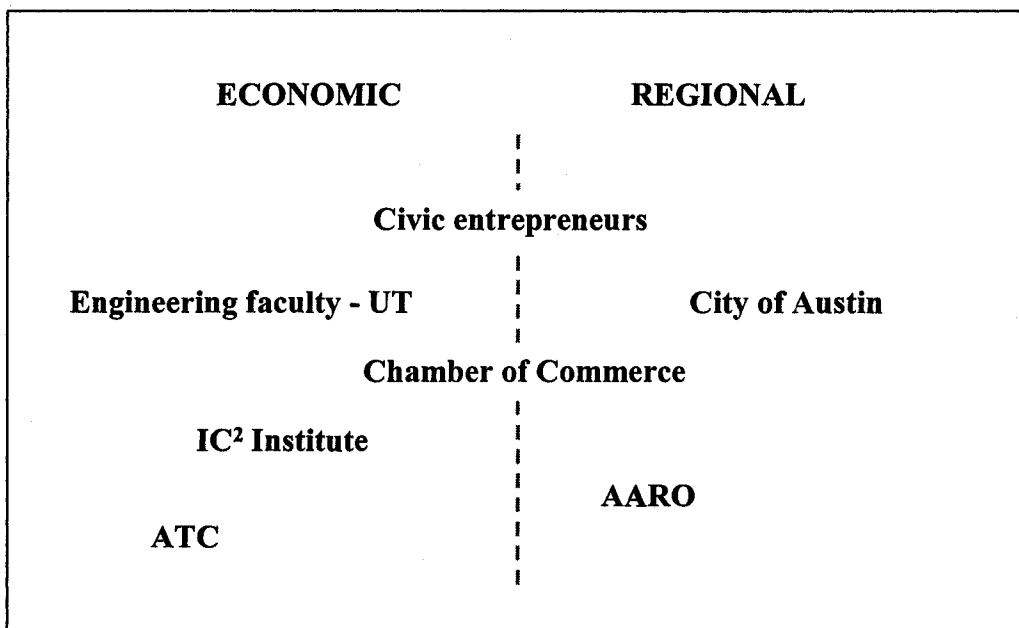
³⁴ P. Robbins, ‘Creating environmental business in Austin’ (The Austin Environmental Directory, 2003): 17.

³⁵ In their reaction to MCC and 3M, the city apparently wrote to the top US companies telling them: “don’t plan on coming to Austin unless you contact us first”. cited from Gibson and Rogers, *R&D*, 134.

community as tensions have softened between leaders of the environmental movement and business.

The core membership of Austin's economic governance community is summarized in Figure 4-1. This is a contemporary representation, reflecting those who have been engaged in regular dialogue regarding the region's economic trajectory since the mid 1990s. The figure distinguishes with a dashed line the economic oriented actors from the predominantly regionally focused actors, with bridging actors centered between the two categories.

Figure 4-1: Primary actors in Austin's strategic governance



Civic entrepreneurs

The concept of a civic entrepreneur, as developed by Henton and colleagues is central to defining Austin's economic governance community. As leaders of collaboration who attend to the public good with the motivation of civic virtue and the spirit of enterprise, civic entrepreneurs have been the principle agents in developing and leading the governance initiatives from early on. In Austin, three such individuals are recognized across the region as being of such caliber - George Kozmetsky, Niel Kocurek and Pike Powers - each of whom has animated different aspects of the governance process.

Kozmetsky is undoubtedly the most famous civic entrepreneur in Austin, and outside the region as well, having been awarded the National Medal of Technology by President Bill Clinton in 1993. As previously noted, he was responsible for building up the institutional capacity for developing new firms out of the knowledge base within the region, contributing a considerable amount of his own money. To Kozmetsky, creating firms was preferable to 'stealing' them, as he claimed the Chamber has done through its recruitment practice. Kozmetsky also took on the role of mentor to many new technology firms in the region, including in the early 1980s, that of Michael Dell's company. And within the University of Texas System as a whole, he was active in creating numerous institutes at the various campuses, including the Center for Energy and Economic diversification, the Advanced Robotics Institute, the Institute of Biotechnology and the large Scale Programs Institute.

An exemplar of the type of collaborative leadership and civic commitment displayed by civic entrepreneurs is Neal Kocurek who, unlike Kozmetsky, had deep family roots in Austin region. In a recent obituary in a local newspaper, Kocurek was described as the 'maestro of collaboration' and 'the father of regionalism in Central Texas' who could identify issues 'with no political boundary line and bring together people from the entire region to talk about these issues.' In this manner, Kocurek had considerable success in a wide range of civic projects that included everything from establishing Austin's only convention center, which had been previously defeated in five referenda over 25 years, to leading 'Envision Central Texas', a grass roots project that engaged the five county areas into a long-term, comprehensive planning project on the future of development.

His involvement in the economic well-being of the region started early on in his career in the Department of Electrical and Computer Engineering at the University of Texas at Austin, before chairing the Department. There, he spearheaded efforts to develop a strategic plan in the department, one that was for the department but that recognized the benefits for the university if it had a strong 'state of the art' industry.³⁶

³⁶ Source: interview.

By the time, the university had gotten involved in the MCC bid, the department had a microelectronics lab and renamed itself as the Department of Electrical and Computer Engineering.

Ultimately, however, what distinguished Kocurek was his ability to get things done, which for Kocurek meant resolving regional issues that were not being addressed by the political system. This made him a sought after leader and a central actor in the economic governance community. His appointments included vice chairman of the Greater Austin Chamber of Commerce, president of the Austin Area Research Organization, a director of the Austin Community College Foundation, a former member of the Austin Electric Utility Commission, and former chairman of Department of Electrical and Computer Engineering at the University of Texas and before his death in 2004, president and CEO of the Austin-based St. David's Health Care System.

A third notable civic entrepreneur within the region is Pike Powers, partner of an Austin-based law firm who helped forge the economic governance community early on in his role as executive assistant to the Governor during the MCC site selection process, and later, as a key player in the bid for SEMATECH. Powers is very much an animateur of the entire community, acting, as both a networker and, in the words of Henton et al., an 'agitator' who brings the community together to respond to the next economic challenge. His most recent mobilization effort was directed once again at SEMATECH, which in 2003, was considering the substantial relocation incentives being offered by the state of New York. Lead by Powers, the Austin community responded with the Texas Technology Initiative, a three-pronged state-funded strategy that was developed by Power's working group which included AARO and the Chamber. As part of the strategy, new funding would be available for SEMATECH, which was given \$40 million in financial support, and for two major initiatives that would help further embed the organization, and indeed the local and state-wide semiconductor industry, within Austin and Texas respectively.

The first of these is the \$200 million Texas Advanced Materials Research Centre whose goal is to coordinate research between SEMATECH and the state's

universities in order to help establish leadership in new materials and capabilities important to next-generation semiconductors, nanotechnology and biotechnology. The second component, which has yet to be approved, is to establish an \$8 billion national semiconductor foundry in Texas to offer firms 300 mm wafer production capability for the latest semiconductor chips at prices competitive with Asian foundries. An initial economic impact assessment of TTI at maturity in 2015 estimates the benefit cost ratio to be 27:1 with aggregate fiscal revenues over the first ten years of the project totaling some \$18.8 billion compared to a state outlay of only \$700 million.³⁷

University of Texas at Austin

Though the university has been the central institution in Austin's 40 year economic transformation, its involvement in community economic governance has been organized essentially at an individual rather than institutional level. Neal Thompson, and Neil Kocurek and George Kozmetsky are three such individuals that demonstrate this aspect. Others include Ben Streetman, Dean of Engineering, whose participation as an expert in microelectronics gave much credibility to Austin's MCC bid. Streetman later became involved in recruiting SEMATECH and Samsung, and is now a frequent spokesperson for the region's economy.

This professor-led university outreach has become an important dimension to Austin's strategy to diversify its economy. In 2002, Ted Rappaport, a prominent wireless technology researcher, was recruited with the expectation that he would seed a wireless industry cluster in the region as he had done previously at Virginia Tech. Within a year of his arrival, Rappaport had encouraged the relocation of one startup, Alereon Inc., to move to Austin from Huntsville, Alabama with the assistance of a local venture capital firm, Austin Ventures, and has helped spur the creation of a new technology association tied to the ATC, called the Austin Wireless Alliance. His vision, encouraged by a group of Austin leaders, that includes Pike Powers, Ben

³⁷ Perryman Group, *The Potential Economic Impact of the Proposed Texas Technology Initiative* (Perryman Group, March 2003).

Streetman and former Dell president Mort Topfer, is to create in Austin a world-class wireless research and commercialization center.³⁸

One civic entrepreneur described the tie with the university as a set of relationship among people who have gotten to know each other over 25 years. Informal, 'it is nothing other than a group of individuals who are focused on something.' The strategy taken by the community has been 'to leverage relationships of key people like Ben Streetman. If it were a different guy, we would have a series of different results.'

The most formal engagement that the University maintains with the regional knowledge-based economy is through the IC² Institute. As a think tank with ambitions of becoming the world's foremost 'technopolis facilitating organization', the institute continues to conduct research into constructive forms of wealth creating capitalism and involves itself in strategic planning with the Austin community. The institute is also engaged as a 'teaching tank', having pioneered a new graduate program, a Masters of Science in Science and Technology Commercialization which gives students the understanding and ability to commercialize new technology developed from research. Finally the institute acts as a 'do tank', a term that reflects its role in carrying out its experiments in technology commercialization by establishing new organizations such as the ATI.

Associations

The 'associative system' that caters to the Austin high-tech sector is remarkably comprehensive, and includes a wide range of professional, sectoral, business and social organizations many of which are highly specialized.³⁹ AustinChips, for example, is a local association that is committed to fostering a social culture among semiconductor professionals. However, from this system, only two associations are directly involved in community economic governance process. These are AARO and

³⁸ Ladendorf K. 'UT researcher pushing for more wireless businesses' *American-Statesman*, September 14, 2003.

³⁹ Coleman and Skogstad describe the associative system as the collection of associations with a given domain. Coleman W. and G. Skogstad, *Policy Communities and Public Policy in Canada* (Toronto: Copp Clark Pitman, 1990): 21.

the Greater Austin Chamber of Commerce. Having previously elaborated on some of their accomplishments, the following discussion focuses more on their organizational structure, in the interest of bringing some insight into how private associations are able to effectively engage the public sphere from planning through to implementation.

AARO

ARRO was founded in 1980 by the CEO of Tracor, Frank McBee out of a concern that the short-term outlook of the local political system was impeding proper planning and good judgment in the running of the city and in preparing for its future.⁴⁰ Such 'shorttermism' was also felt to be a blight on the Austin business community who had a tendency to overlook the long-term interests and overall economic viability of the community. By the late 1990s, AARO had refined this focus, recasting itself as the keeper of a dynamic strategic vision and facilitator of projects important to that strategic vision. Members were no longer just CEOs but also community leaders who agreed with the precept that 'a healthy economy is fundamental to the quality of life of the area's citizens.'

Yet what has made AARO an effective governance organization is its success at identifying key issues not being addressed at any political level. After drafting a strategy for resolving the issue and AARO encourages a designated member to take up the challenge, with the help of others in the committee, and see the issue through to closure. What drives the particular project forward is the yoke of personal responsibility and reputation of those involved that, many of which require members with enough influence to sit down with elected leaders or other business leaders and talk to them about public policy issues. To increase the chance of success, AARO members take on the responsibility to educate themselves fully in the details of the issues, inviting experts in to give talks and commissioning research.

With 70 members, AARO tackles issues in seven socio-economic areas: education, higher education, lifelong learning, leadership, social equity, transportation, water and health. For each area, a working committee is established,

⁴⁰ Austin Area Research Organization Inc. 1980- Present. Pamphlet.

provided that there is an understanding that something can be achieved by the organization. And having acquired a reputation for getting things done and making a difference, AARO membership has become a mark of prestige, a status that is fostered through a very formal recruitment process that is by invitation only. Yet once recruited, new members typically become thoroughly involved in the issues, with a dedication that stems not only from a commitment to the community, but also from the adrenaline of realizing change.

Since its founding, AARO has maintained a good deal of anonymity, preferring to work from behind the scenes and out of the public eye. Indeed, so successful has it been in this, that the literature on Austin's development has yet to acknowledge the scope and influence of AARO's accomplishments, or even recognize its existence. Yet its projects are very relevant. One of its current challenges is to find a solution for integrating the many migrants from Mexico, most of whom have little to no post-secondary education, into the region's knowledge economy. In a recent White Paper published by the organization⁴¹, it is estimated that failure to enroll an additional 50,000 students in higher education by 2015 would ultimately translate into a 6% decrease in household income, costing \$2.4 billion in annual income. Much of this is because of poor enrollment rates in the Hispanic community, leading to concern of the future viability of the high-tech community.⁴²

Chamber of Commerce

The Chamber of Commerce, having been founded in 1878, has and continues to be the most prominent association in Austin, as well as the most visible and active in the region's economic governance. Much of its activities thus far discussed have been related to its role as a recruitment organization that takes on the responsibility for drawing in major firms - 'anchor tenants' - to the area, increasing employment opportunities and helping establish critical mass within a chosen industry. Yet it has

⁴¹ Austin Area Research Organization, 'Closing the Gaps In Higher Education In Central Texas: An Investment in the Future of Central Texas', Austin Texas, 2003.

⁴² A recent study predicted that if past demographic trends were to continue, the educational attainment rates of the adult population with post-secondary will fall some 10 percentage points to 55 percent by 2040, with ramifications for the Austin area economy and way of life. Sources: AARO, *Closing the Gaps*.

also taken on leadership in several other civic domains. It has, for example, been a lobby group for several infrastructure programs, having successfully pushed for a major expressway through the region, a new airport and for the establishment of the Austin Community College (ACC).⁴³ In the late 1990s the Chamber ran summer job programs, and began to offer career awareness and job shadowing for area teenagers. And for adults, it has assisted in providing training and workforce education programs, where it has established the Capital Area Training Foundation which brings industry together with area high schools and the ACC to develop training curriculum, as well as to support internships and scholarships.⁴⁴

Yet one of the initiatives that is considered to have made the most impact, next to recruitment, has been in the area of public relations. Since the 1960s, the Chamber has been actively engaged in creating a profile for Austin, which by the 1980s, included the services of two public relations firms whose job was to ‘keep Austin in the limelight’ and ultimately to establish the ‘Austin story’ in the national consciousness.⁴⁵ These efforts were complimented by press tours to other parts of the country involving such notables as Michael Dell. These tours were also given to visiting journalists from respected national newspapers. The result of all of this was a self-sustaining stream of publicity from national and international media that no longer required any further effort.

From the standpoint of local strategic governance, however, it has been the Chamber’s leadership on strategic planning, made all the more influential by strong leadership of the Chamber itself, which has been important. Since the first report in 1957 prepared by the university, the Chamber has commissioned the SRI, which established the concept of ‘gold collar jobs’ and closer partnership with government, an ICF Kaiser strategy on cluster development in 1997, and a fourth, in 2003, from Market Street Services which recommends a course of action for the post-technology-bust economy. These strategies, having had community input, have all had tangible

⁴³ With a current student population of some 27,000, ACC has been notably successful with job training, providing programs in conjunction with more than 200 local high-tech firms, including the Semiconductor Manufacturing Technology program which has enrolled some 400 students. Source: Robbins, *The Town*, 12.

⁴⁴ Robbins, *The Town*, 13.

⁴⁵ Robbins, *The Town*, 10.

results in realigning the community-wide coordination efforts, including the strategic hiring of Ted Rappaport, for example, and a more targeted recruitment approach.

Municipal government

The role of the municipal government in the governance process has evolved considerably over the decades, as has the community governance itself. Once having largely a peripheral role in offering subsidies to firms earmarked by the Chamber and in controlling where economic development would occur, the city is now much more integrated into the community governance dialogue and supportive of the understanding that the quality of life in the region is very much a function of a healthy economy. And it has been able to change in part because the citizens themselves have come to acknowledge this relationship.

One indicator of this shift to a more active engagement in the economy has been much greater cooperation with the Chamber, one that has led to a greater alignment of municipal policy to the Chamber's recruitment efforts. A more significant reflection of the changing role of the city, however, has been the formulation, in 2003, of its first economic development policy, one that has taken a much broader more integrated approach that recognizes the interdependency between the economy and the vitality of the region, as reflected in the strength of the music industry, quality of environment and in the promotion of S.M.A.R.T. Housing (Safe, Mixed Income, Accessible, Reasonably Priced and Transit Oriented).⁴⁶

At the heart the new policy is, however, the 'Shared Investment Policy' through which the city is encouraged, under the 'right circumstances', to use incentives as way of leveraging firm resources into areas affecting the quality of life goals listed above. Designed to secure expansions or relocation within Austin, the policy offers such inducements on the condition that firms contribute themselves to these goals either by carrying out certain projects in the community, supporting community culture, or by relocating to an area marked for redevelopment by the city. In considering such packages, the city evaluates firms on a comprehensive set of

⁴⁶ Staff Report – Recommendations from the Mayor's Task Force on the Economy, June 4 2003.

criteria, the three most essential being overall economic and fiscal impact of the firm, 'goodness of fit' and environmental/ infrastructure impact.⁴⁷

This marks a significant commitment by the municipal government to partner with industry in an effort to embed the region's existing economic assets and build further on this. As one city official noted, 'we don't think of incentives as incentives but as shared investments [which] is an indication that the city is becoming more of a partner. It is a different way of thinking about it.' As a result, the city has also become more engaged in the economic governance process. Likewise for participating firms, who, in the process of investing in the community, become more engaged and more interested and understanding of their relation and dependence on the region's vitality.

It should be noted that the use of incentives are not in themselves new to Austin. By one estimate, 15 incentive packages were assembled for major employers in the region over the past 20 years, including Sematech, Motorola, Samsung, and Austin Semiconductor LLP. These are what the city calls 'marquee' MNC production and R&D facilities. What has changed is the scope of socio-economic goals now considered in preparing these packages, and the recognition that firms have a role to play in fulfilling these goals.

STRATEGIC GOVERNANCE AS A NETWORK

At this point, a more analytical definition of the strategic governance process observed in the Austin region can be advanced in order to provide a reference point for a more detailed examination of its structure and dimensions. To this end, Austin's strategic governance can be described as *a community-based arrangement of actors who, guided by a common socio-economic vision, take a direct interest or function in shaping the long-term economic prospects of a locality*. The intent is one of industrial adjustment, and the initiatives through which this is achieved include the mobilization and development of knowledge assets – both local and supralocal, and the embedding of these assets within the region. Such embedding occurs through engaging these

⁴⁷ City of Austin, 'Shared Investment Policy Guidelines', 2003.

assets within the governance process itself and in fostering a social environment conducive to the retention of both organizations and individuals.

As to its structure, it is essentially an informal network of individuals and organizations that interact with one another on the basis of their specific capabilities and jurisdictional authority necessary for achieving a particular outcome. Moreover it is a network animated by multiple nodes of leadership in the pursuit of tangible public goals, which are articulated through an on going civic conversation. In this sense, it is similar to what Marcussen and Torfing call a 'deliberative governance networks' whereby the exchange of ideas happens freely and symmetrically with the view of developing 'new and common understandings of the social world'.⁴⁸ Indeed, it is the common understanding of a particular socio-economic vision, together with a strong sense of community survival, that brings coherency to this flexible governance arrangement. This community vision is essentially the 'logic of membership' as defined by Schmitter and Streeck in referring to the interests and motivations that bring the various actors to be apart of an associative governance process.⁴⁹

It should be noted that such logic of membership is not obvious to those that are ultimately included, thus highlighting the deliberative character of the network. In Austin, two organizations have been founded with the goal of engaging high-tech executives to connect to the community who would not otherwise have done so. The 360 Summit, an annual conference founded by local entrepreneur Peter Zandan, began in 1997 and was the first attempt to bring together the top technology executives, with the old guard - city officials and other community leaders - to discuss issues related to Austin's high-tech community. According to its founder, the primary message initially delivered to the young, strongly libertarian, group of wealthy entrepreneurs was simply to get involved in the community in any way possible. The high-tech community, for all the many benefits it brought to the region, had pushed up housing prices, increased traffic and made Austin a more crowded place, ultimately negatively impacting the quality of life that had attracted many in

⁴⁸ Marcussen and Torfing, 'Grasping Governance Networks', 2003.

⁴⁹ Schmitter, P. and Streeck, W., 'The Organization of Business Interests. A Research Design to Study the Associate Action of Management', Berlin: WZB-Discussion Paper IIM/LMP, 1981.

the high-tech industry to come to Austin. The 360 Summit was thus a way of recognizing the impact and encourage the tech leaders to seek ways to better integrate into the region.

The second such organization is the Austin Ideas Network, an organization which was established during the 2000 360 Summit. As a project-based, volunteer organization, the Austin Ideas Network channels the resources of tech community to address problems of social equity in the community. Projects have focused on creating more affordable housing, improving air quality and reducing traffic, and on increasing access to technology for low-income youths and adults.

Flexibility

This basic structure is complimented by several other aspects that have animated the dynamics, and arguably, the success of the governance network. One of these is the flexibility of the network itself and which manifests through both membership and scale. Although there are a number of core actors, as previously discussed, the actual number of individuals and organizations that are engaged in the process varies according to the particular goal at a particular point in time. Such flexibility in membership is invariably tied to the scale at which the governance process takes place. Actors are engaged for their respective institutional or territorial jurisdictional authority over a particular infrastructure issue. This may therefore result in either local or supra-local negotiations. In some instances, such engagement can be with adversarial actors – as it was in AARO’s work to resolve the water shortage problem and in Kocurek’s efforts to establish a conference centre. This flexibility is arguably at the heart of the network’s adaptability and effectiveness.

Multilevel

The second feature is its multilevel capacity, which in essence is an extension of the notion of flexibility. But in the case of Austin, it is the concept of community that better explains how the network effectively engages upper levels of the state, not simply flexibility of membership. The federal level has largely been engaged through links with congressional representatives with ties to Austin. One of the earlier

examples is Neal Thompson's relationship with Congressman and Austinite, Lyndon Baines Johnson, through whom Thompson successfully negotiated the twenty-year lease with the federal government for the grounds of the Balcones Research Center. Later, when the lease was up, another former UT alumni and Austinite, Congressman Jake Pickle, became closely involved with Thompson in negotiating the permanent transfer of the property from the federal government. Congressman Pickle would later play a key role in Austin's MCC bid as well. As part of their strategy to win the consortium, the Governor's taskforce brought Pickle in to help legitimize MCC by pushing for a revision to the NCRA which prohibited collaboration among firms for R&D purposes. As one member remembered: "Pickle's commitment that he was going to make that legislation his cross I think helped get MCC here in Austin."⁵⁰ Pickle was again pivotal in securing financing for SEMATECH in 1987 which was at risk of being killed by a coalition of House members from the coastal states who did not approve of having SEMATECH funded by the defense budget.⁵¹

According to Gibson and Rogers, such political clout stems from congressional seniority of most Texas congressional members. Loyal re-elected term after term, representatives rise to high-ranking positions within the House and Senate, as has Pickle who managed some 30 years as congressman of the same Austin area district as Lyndon Johnson.⁵²

Success at engaging the state government is also based on long-term collaborative relationship building. Pike Powers, who had been executive assistant to Governor White during the MCC era, would continue to maintain close ties to later Governors of the state. The Texas Technology Initiative was very much an outcome of his regular contact with Governor Perry, who was pushed to establish the Texas Enterprise Fund out of which TTI would be funded. Indeed, as part of the Texas Enterprise Fund, which was the first interventionist fund of its kind in the state, the Governor brought economic development into the Governor's office, helping institutionalize the type of high-level collaborative relationships required for major

⁵⁰ Gibson and Rogers, *R&D*, 471.

⁵¹ Gibson and Rogers, *R&D*, 497.

⁵² Gibson and Rogers, *R&D*, 469.

economic development efforts such as SEMATECH and TAMRC. In the words of one Texas Senator, Texas now has an “economic development strike force led by the governor that will allow us to aggressively pursue the type of business opportunities that are going to re-ignite our Texas economy.”⁵³

Leadership

Effective leadership is undoubtedly one of the most important elements to making the strategic governance network function in Austin, a point made by several of the civic entrepreneurs interviewed. As a decentralized network of actors, leadership is initially required to build consensus over a strategic vision for the region to ensure that all are working towards similar goals. Much of this ‘alignment of strategic intent’ in the Austin region is achieved among civic leaders through formal and informal deliberation - defined here as ‘preference-changing reflection in the service of public interest’. Goals and objectives are agreed upon either through consultation sessions convened for the purpose of drafting strategic plans; negotiated problem solving where factions are brought together to resolve complex coordination challenges; or through the institutions of municipal government.

Once a course of action has been identified, leadership continues to be essential until implementation is complete. As one civic leader noted, “It all boils down to leadership. One person someplace needs to get capable people to take on projects. And those capable people will make those projects succeed. And then a series of successes will attract other people to take them on.”⁵⁴

Scope

The broad socio-economic scope of the network is itself a reflection of the ‘joined-up’ nature of the decision making that is required for mobilizing and embedding of local economic asset. The Austin region has been undoubtedly strong in this respect, as demonstrated not only in the successful recruiting and retention efforts, but also in the attraction and retention of highly skilled employees. It is now

⁵³ Press release, ‘Senate Votes to Realign Economic Development Efforts’, Senator Jan Nelson, April 24, 2003.

⁵⁴ Cited from Henton et al., *Grassroots*, 154.

widely recognized among the region's leaders that both the quality of environment and Austin's reputation as a vibrant music centre are essential to maintaining the quality of the labor pool. The Chamber of Commerce, following its defeat by the environmentalists in the early 1990s, has since taken to supporting several environmental initiatives including the establishment of the Balcones Habitat Preserve and an air quality campaign that aim to keep Austin in compliance with federal environmental laws.⁵⁵ The city also has come to recognize these aspects, having incorporated both environmental and cultural considerations in its economic development policy pertaining to shared investment.

Continuity

The final dimension of governance network affecting its success is its durability. For all its informality, Austin's strategic governance network has sustained a remarkable degree of vitality and continuity in its leadership nodes. Unhindered by rules of the political system or government funding restrictions, civic entrepreneurs can be one of the few nodes of continuity in a long-term multi-actored governance process. Neil Kocurek is one such example, claiming to have outlived several mayors, city councils and heads of the Chamber of Commerce. "Continuity", he adds, 'is central to community success.'⁵⁶

FAILURES OF STRATEGIC GOVERNANCE NETWORKS

As with any mode of governance, be it market or state, strategic governance networks are also subject to failures. Its dependence on informality, flexibility and leadership from within the associative domain, for all their benefits, are also those attributes that make the network unstable and even unreliable as a governance process. On more than one occasion, the fraternity that has bound the community has waned, giving doubt to the sustainability of the entire process. This type of failure came to the fore in the mid to late 1990s in Austin. At a time when the high-tech industry was booming, the necessity for strategic planning was not apparent to all but

⁵⁵ Robbins, *The Town*, 12.

⁵⁶ Henton et al. *Grassroots*, 56.

a few. George Kozmetsky, by one account, was one of the few individuals who was dismayed by the absence of any planning in this period, concerned as he was with an inevitable downturn. The downturn did indeed come in 2000 and was very significant by most measures. By 2002, the region had lost some 8,800 jobs in manufacturing, mostly in semiconductors, adding to an estimated loss of 30,000 jobs in the technology sectors in the two years following the bust.⁵⁷ As one city official put it, 'Austin had always been comfortable; companies came on their own. [With the downturn], for the first time Austin is seeing a major leaving of jobs in the high-tech industry...All of a sudden it was losing what made Austin, 'Austin' ..."

This failure was, of course, primarily driven by global market conditions and not by local governance failures. Yet for a region conscious of its economic development, there is a sense that prudent planning could have mitigated the downturn. In fact, according to city officials interviewed, it was very much because of the downturn that the City of Austin took on a greater role in how the region recruits firms by engaging the Chamber in a conversation over recruitment priorities. With much of the semiconductor manufacturing relocating to Asia, the city's goal is to make that transition more gradual, fully recognizing that "there is nothing standing in line that can replace the number of jobs or the property tax income that comes from that cluster."⁵⁸

Another aspect to governance failure relates to the dependence of the process on civic leadership. In the words of one city official, "the success of the chamber has come and gone based on the actual staff. If you have a dynamic board chair and a director who knows what they want to do, things will happen. ... But if you get the wrong combination it does not work." A similar comment was made by one civic entrepreneur who emphasized that the entire process of Sematech and MCC was 'nothing other than a group of individuals who are focused on something', adding that, 'the strategy taken by the community has been to leverage relationships of key

⁵⁷ AngelouEconomics, *Technology Forecast 2003-2004*. Austin Texas 2003

⁵⁸ S. Higginbotham, 'Austin feels pressure from N.Y. on chip fabs', *The Business Review*, November 4, 2002.

people like Ben Streetman. If it were a different guy, we would have a series of different results.’

Mitigating failures through institutions

These weaknesses have been mitigated to some extent by an ongoing cultivation of leadership within the region. AARO, together with the 360 Summit and the Austin Ideas Network, are a part of a quasi-institutionalized ‘leadership incubator’ for the region. The latter organization calls upon respective business leaders to engage with the community and take on responsibility for existing or emerging social, economic or infrastructural problems in the region. As Neil Kocurek is quoted to have said, “Our success has come from leaders stepping up, training other leaders, and then passing the torch to them. We support each other.”⁵⁹

Another initiative to make the governance process more sustainable and less dependent on its leaders was the integration at the state level of the economic development department within the office of the governor, previously noted. Carried out at the urging of Austin’s civic leaders, this change formalized the interaction between the governor and the state’s economic development officials, a relationship that has proven crucial in recruitment efforts of ‘marquee’ organizations.

CONCLUSION

The foregoing discussion has attempted to draw out the qualitative reality of Austin’s strategic governance, providing examples that illustrate its emergence from what was essentially a bi-actor coordination effort into a multi-actor governance network. There has been no one event, or even a series of events, that can be singled out as causing its emergence. Rather it has been an interactive learning process, triggered by the MCC bidding competition, and slowly reinforced through the persistent efforts of key individuals willing to take on a public responsibility for the region’s development. Mutual causality between actors, institutions, and opportunity might best explain, in a broad manner, the way in which the governance network

⁵⁹ Henton et al. *Grassroots*, 44.

emerged. And there are undoubtedly some factors antecedent to MCC that have been essential to the coalescing of the network. A history of civic involvement, transpiring with a certain configuration of local, state and federal institutions, for example, must certainly be a part of this explanation (see Chapter 6).

As for the phenomenon itself, a strategic governance network is noteworthy in several respects. The near orthodox idea of ‘the American state as a vigilant enforcer of antitrust rules devoted to protecting and permanently recreating the free market against associative collective action and communal networks’⁶⁰ could not be more of a misrepresentation when analyzing the strategic governance process that steered and shaped investments within the region. In fact, the local level demonstrates a resoundingly coordinated approach to economic development and adaptation, with an enthusiasm for long-term economic planning that would likely have resonated with the ‘command economies’ of the post world war II era.

The Austin case is also significant in the broader context of being one of the earliest adopters of this community-led pattern of economic governance. According to Gibson and Rogers, Austin’s success in recruiting MCC was to several states, especially those involved in a bid, a transition point in their own economic development.⁶¹ The Governor of Georgia, for example, took it as a learning experience, with the primary lesson being the importance of a research university in anchoring a high-tech industry, while North Carolina proceeded to carry out all of the initiatives it had promised in bidding for MCC. And, as the following chapters will suggest, there is some evidence to link such a shift to recent developments in the Toronto region. These organizational innovations south of the border have influenced more than just economic development officers who visit the US, but also the structure of important associations in the GTA, several of which have been modelled on a US equivalent.

⁶⁰ Campbell J., R. Hollingsworth and L. Lindberg (eds). *Governance of the American Economy*, Cambridge: Cambridge University Press, 1991: 9.

⁶¹ Gibson and Rogers, *R&D*, 457.

CHAPTER 5

THE RISE AND FALL AND RE-EMERGENCE OF STRATEGIC GOVERNANCE IN THE GREATER TORONTO AREA

INTRODUCTION

The purpose of this chapter is to assess the extent and character of strategic-governance within the Greater Toronto Area (GTA) as it relates to the region's microelectronics industry. What is revealed is a markedly different pattern of governance to that of Austin, not only in the type of actor but also in scale. Indeed the GTA, despite a continued neglect by upper levels of government in providing specialized research infrastructure, has been a significant benefactor of the federal, and to a lesser extent, provincial government's strategic industrial policies pertaining to microelectronics. Yet the pattern of governance supporting the GTA's microelectronics industry has been far from coherent or stable. After early defence-driven development efforts, the region's industry has had very little strategic leadership, reflecting both a weak associative system and shifting policy paradigms at the federal level which have brought mostly sporadic uncoordinated strategic investments to the region. Nonetheless, the GTA has found itself as a global leader in an area of microelectronics that is well positioned for future growth, that of fabless integrated circuit design.

With the federal level having had such a prominent, though ad hoc, role in the governance of the GTA's microelectronics industry, it is difficult to identify a strong pattern coalescing around regional actors. In fact, overall there is little in the way of a regional consciousness among either firms or governance actors. Given in part the industry's relatively small size, and continued leadership from a federally supported microelectronics organization, most actors consider themselves organized within a national context, and typically look to the national level for solutions to their challenges. There is however, some evidence of an emerging local governance dimension that is beginning to integrate the strategic needs of the high-tech industry within the decision making apparatus at the local level. A new breed of associations,

together with recent initiatives by the University of Toronto, the City of Toronto, the City of Markham, all point to a growing awareness of the importance of regional initiative in mobilizing resources in such areas of research and entrepreneurship.

To begin, this chapter takes a historical look at the microelectronics industry in the Greater Toronto Area with the goal of drawing out the principle strategic actors involved in its development. Though not well known, the history is central to Canada's success in establishing itself as a leader in the industry, second only to the United States in the area of fabless integrated circuit design. With a base line established, the analysis proceeds to examine the contemporary actors, particularly those within the local associative system, to determine the extent and manner of strategic engagement in the regional governance processes as they affect the microelectronics industry and high-technology in general.

STRATEGIC GOVERNANCE AND THE MICROELECTRONICS INDUSTRY IN THE GTA

The Greater Toronto Area is an expansive region located on the north shore of Lake Ontario in Southern Ontario that consists of five political regions and twenty-five municipalities. Accounting for approximately 11% of the country's GDP, the region is Canada's largest, and most diverse economy with automotive manufacturing, finance and food processing among the most prominent of its industries. And having placed thirteenth in a 2003 global patent ranking, the region, as noted in city promotional brochures, is among the most innovative in the country.¹

The GTA is also home to the country's largest ICT sector, which in terms of employment, is more than double that of Montreal, the second largest regional ICT sector, and four times that of third placed Ottawa.² A 2004 study on Toronto's IT industry proudly places the region as the third largest ICT sector in North America after San Francisco and New York with over 3,332 ICT facilities and a labour force

¹ Toronto Economic Development, Economic Indicators, December 2004

² D. Beckstead et al., 'Decade of Growth: The Emerging Geography of the New Economy Statistics Canada, 2003.

of some 148,000.³ Among the largest employers are IBM Canada (11,000), Celestica (4,500), Hewitt Packard Canada (2,000) and Microsoft (900). Manufacturing accounts for approximately 19% of employment and 8% of facilities, compared to software development at 15% and 18% respectively and IT services at 43% and 28%. In the microelectronics subsector, there are approximately 66 firms (2000 estimates), based in the region including the largest fabless integrated chip supplier outside the US, ATI Technologies.

Explanations accounting for the region's technological strength have typically identified a set of factors more relevant to framework governance than to strategic governance. In a recent ICT report on the GTA, for example, the authors point to three locational advantages for the region's IT firms.⁴ The first is total operating costs, which in a 2004 KPMG study, were found to be the lowest among large U.S. metropolitan areas.⁵ The proximity of the GTA to all major North American metropolitan markets is also considered to be a significant advantage for ICT firms, and indeed for the many multinational firms that base their Canadian headquarters in the region. Third is the size, cost, quality and diversity of the labour pool. With five universities and six colleges, the region's educational institutions produce more than 7,000 ICT related graduates annually, the result of which is a labour pool frequently cited as one the region's greatest strengths. City economic development officials in Toronto point to a fourth factor underpinning its high-technology economy, namely the size and sectoral diversity which together generate a strong local demand for many subsectors of the IT industry especially software and multimedia.

Such an explanation is made all the more convincing in the context of the ongoing – and understandable - neglect by federal government's long-standing regional economic development efforts. Since the federal government took a more decentralized approach in its economic development strategy in 1987 with its creation of new regional agencies, Toronto, and southern Ontario more generally, has been the only region in Canada without any representative agency providing economic

³ J. Matuszewski, J and F. Chevalier, 'Greater Toronto Area Information And Communications Technologies Study, E&B Data', 2004

⁴ E&B 2004

⁵ KPMG Competitive Alternatives – 2004

development assistance.⁶ To the west, the federal government funds the Western Economic Diversification fund, to the east, the Atlantic Canada Opportunities Agency, in Quebec, Canada Economic Development, and to the north of the GTA, the government, through Industry Canada, supports the Federal Economic Development Initiative for Northern Ontario. Though each cater to the specific economic needs of the region, which has in the past involved supporting and restructuring existing industries, these regional agencies have been moving towards funding innovation-based initiatives, providing the institutional support for building knowledge-based industries.⁷ Programs supporting SMEs, innovation, commercialization of R&D and entrepreneurship are typical, several of which have been apart of cluster-building strategies. Between 1987 and 2000, total spending amounted to some \$48 billion with annual budgets in the order of \$400 million for the three main agencies, with no comparable spending made in the GTA.⁸

The Federal government has also bypassed the region in its vast network of over twenty Technology Centres and Research Institutes run by the National Research Council. These facilities, which conduct research in a wide range of high-technology areas such as IT, nanotechnology and advanced manufacturing, offer Canadian businesses and universities access to state-of-the-art equipment, research and training programs, as well as design, fabrication and testing facilities. And finally, the one existing federal program that has been centered in Toronto and which has catered explicitly to industrially relevant microelectronics research, has had its funding terminated as of 2005, after 14 years of operation. The program, Micronet, has been one of the most successful of the federal government's Network Centres of Excellence.

At the provincial level, the GTA has fared little better. The province, since the conservatives came to power in the mid 1990s, has taken a largely hands-off approach to the economy, governing very much within the mode of framework

⁶ See Chapter 3 of OECD, *Territorial Reviews: Canada*, (OECD: Paris, 2002) for a complete description of the shift in regional economic development policy.

⁷ OECD, *Territorial Review*.

⁸ 2005 spending estimates for ACOA, WED and CEDQ are \$424, \$390, and approximately \$370 million respectively. FedNor's budget for 2004 was \$74 million. Source: Canadian Tax Payers Federation.

governance, aggressively cutting taxes and reducing expenditures. The conservatives did, however, retain one strategic investment, the Centres of Excellence program, a program similar in design and goals to the Federal Network Centres of Excellence, though not without cutting its budget.⁹

Thus the laissez-faire explanation is not without merit. It does, however, overlook decades of history during which several important strategic efforts were made, the most significant of which have been from the federal level actors over some three decades following World War II. And remarkably, as is evident from the following section, the federal government has been a central coordinator of the GTA's knowledge base without any explicit regional intentions. As with economic development in Toronto in general, the region has benefited despite efforts made to ensure that Toronto and Ontario, would not be the sole benefactor of federal efforts, and not become the much feared vortex that would draw in all the best skilled employees from across the country.¹⁰

EARLY ROOTS: DEFENCE RESEARCH BOARD AND THE UNIVERSITY OF TORONTO

The foundations of the GTA's microelectronics industry can be traced back to both Canada's Defence Department and the academic ambitions of the University of Toronto. After the Second World War, the Defence Department had come to recognize the strong link between peacetime defence planning and industrial capacity in mobilizing the country for future war efforts. It had taken Canada four years to ramp up its industrial effort to be an effective contributor World War II and if Canada were to be prepared for future conflict, it was essential that the country sustain a national capacity to develop and implement science-based weapons systems.¹¹ To this

⁹ Wolfe D., and M. Gertler, "Globalization and Economic Restructuring in Ontario: From Industrial Heartland to Learning Region?" *European Planning Studies*, 9, 5, 2001

¹⁰ Such a fear is well noted in D. Fisher et al. exposition of the creation of the federal government's the Networks Of Centres of Excellence' where they write that one of the reasons for creating such a network was out of concern that Ontario's own program attract all the best scientists across the country possible threatening the regional balance. D. Fisher, J. Atkinson-Grosjean, D. House 'Changes In Academy/Industry/State Relations In Canada: The Creation And Development Of The Networks Of Centres Of Excellence', *Minerva*, 39: 2001, p. 310.

¹¹ J. Vardalas, *The Computer Revolution in Canada* (Cambridge: MIT Press, 2001): 50

end, the Defence Department created the Defence Research Board (DRB) in 1947, charged with providing scientific advice to the Minister of National Defence, supporting the research requirements of the Canadian Armed Forces and contributing to the collective defence research effort of Canada's allies.¹²

Within this mandate, the DRB spearheaded Canada's entry into electronics. In fact, the DRB would become the central actor in fostering both a scientific and industrial capacity in Canada - and incidentally within the GTA - spirited by a strong nationalist sentiment of self-reliance. In mid 1947, it established the Electronic Advisory Committee identified the need for an electronic computer in Canada.¹³ This was the first statement of strategic intention in the area of electronics by the federal government. Moreover, it was a position strongly supported by the military, navy and air force, all of whom expressed concern at the time of having to rely on foreign countries to pursue their research.¹⁴ The Committee also made recommendations on mobilizing Canada's industry for its high-tech needs, noting in a memorandum existing industrial inadequacies:

"It is essential to the Canadian defence programme to enlist the services of Canadian industrial laboratories... Since few Canadian industries are now equipped with the necessary laboratory facilities, it is believed that the Defence Research Board should foster and support the establishment and maintenance of such laboratories by appropriate means with the industries... Such laboratories would form the nuclei of highly qualified groups so essential in the event of future conflicts and without which Canada was so handicapped in World War II."¹⁵

This desire on part of the DRB to develop digital electronic computing capacity in Canada coincided with the University of Toronto own efforts to learn more about the research efforts underway in the US in this area. By 1946, professors had set up an interdepartmental Committee on Computing Machines that recommended a computational laboratory be set up as a training centre for digital computation and

¹² Defence Research Board, National Archives of Canada, R112-0-2-E

¹³ See Vardalas, *Computer Revolutions*, 21-22.

¹⁴ An informal survey of the three services by the electronic Advisory committee revealed the concern that "Until Canada is equipped with a suitable computer centre, she will be obliged to rely upon foreign aid for many of the designs which require large-scale calculations. If it is agreed that Canada should be independent in this respect, then the time has arrived to initiate a computer centre in Canada." cited from Vardalas, *Computer Revolutions*, 22.

¹⁵ Memorandum to secretary, Joint Communications Committee: Canadian Armed Services Electronic Research Requirement, June 19, 1947. Cited from Vardalas, *Computer Revolutions*, 52.

that the university consider developing their own electronic computer. The centre became a reality in 1948 after the university had successfully approached the DRB and the National Research Council (NRC) in its request for support. In providing funds for a five-year program, the University of Toronto, in collaboration with the DRB and NRC, created Canada's first centre of computers, whose goal it was to build an electronic digital computer by the program's end.¹⁶

The Computation Centre's first prototype of the UTEC (University of Toronto Electronic Computer) Mark I was completed in 1951, the same year the Dean of Engineering at the University decided to buy its first computer from Ferranti Ltd., a British firm. With money coming from the DRB and NRC, this computer purchase ultimately undermined the rationale for the Computation Centre's R&D efforts, and was disbanded in 1952. Despite its failure, the effort had nonetheless developed Canada's first concentration of computer expertise within the region. After disbanding, several key members of the engineering group began their own computer firms, the most successful of which was KCS Data Control, which became the country's most successful computer consulting firm by the early 1960s, and whose biggest success came with having designed the world's first computerized urban traffic control system for the City of Toronto in 1962.¹⁷

Multinationals and the development of a microelectronics knowledge-base

A second event in the development of the GTA's microelectronics foundation, came, with some irony, from a collaborative venture between Ferranti's Toronto subsidiary and the Royal Canadian Navy (RCN). Despite having indirectly undermined the University of Toronto's computer R&D efforts in its selling of a computer, Ferranti would develop the region's first industrial capacity in digital electronics in an ambitious seven year project that came to an end in 1955. The project, called DATAR (Digital Automated Tracking and Resolving), promised to coordinate the maneuvers of convoy escorts and anti-submarine groups and was considered an essential R&D endeavor by the RCN if it was to meet its commitments

¹⁶ Vardalas, *Computer Revolutions*, 23.

¹⁷ Vardalas, *Computer Revolutions*, 41.

to anti-submarine warfare taken on after the war. With essentially no technological expertise in Canada to develop the system, the navy sought out Ferranti to carry out the project, which had previously expressed interest in participating in the DRB's program of applied research defence related electronics.¹⁸

Though successful in developing a prototype for DATAR by 1955 that impressed both the US and Royal navies, the collaborative project collapsed for want of customers. Both the US and British navy were in the process of developing their own system, which ultimately prevented the RCN recouping its R&D costs through much hoped for sales to allied navies. But as with the collapse of UTEC, all was not lost with the termination of DATAR. Ferranti Canada had not only built up a group of 30 engineers and scientists in Toronto, including one of its leading inventors from the UK, but had also positioned itself at the frontier of computer development at a time when computers were shifting to solid state transistors. With this foundation, Ferranti-Canada won contracts to build a mail sorting system for Canadian Post Office Department, building on DATAR technology, and later a computerized airline reservation system for Trans-Canada Air Lines. Though the mail sorter was never implemented, Ferranti-Canada had considerable success with the transistor-based computer reservation system, implemented in 1961. With few follow-on sales for its custom systems, the subsidiary entered the general computer industry, choosing to develop computer based on its reservation system technology and quite different from that being sold by its parent firm in the UK. The result, the FP6000, thus became Canada's first computer to be fully designed and built in Canada.

The F6000, however, did not sell. By the early 1960s, IBM was dominant, and the cost of marketing together with the marketing know-how was beyond the capacity of the Canadian subsidiary. Moreover, Ferranti-Canada, which had been set up to provide electrical goods to the growing power industry in Canada, had little support

¹⁸ If their effort to mobilize Canada's electronics industry, the DRB issued a request for proposal to take on R&D projects in four electronic areas. Ferranti, one of nine firms to respond and the only non-Canadian company, offered to set up an electronics group in its Toronto subsidiary. See Vardalas, *Computer Revolutions*, 52.

from its parent firm in its high-tech endeavors.¹⁹ In 1963, Ferranti Ltd. sold all of its civil computer operations to International Computers and Tabulators (ICT) as part of an industry consolidation effort by the British government, putting an end to the Toronto-based Ferranti-Canada.²⁰

Ferranti-Canada, however, was not the only subsidiary of a multinational to have nurtured the technological capacity in microelectronics in the GTA. In fact, the GTA owes much of its original microelectronics knowledge development branch offices of multinational corporations, often criticized for their poor R&D efforts. In the early 1970s, the GTA was home to the national offices of Fairchild Semiconductor, Canadian Marconi, Canadian General Electric and Canadian Westinghouse and Control Data Corporation, many of whom had established themselves in the region in response to the protective tariffs of Canada's National Policy.²¹ Though most were merely sales and marketing offices, a few did have R&D departments, like Ferranti Canada, and would have a lasting impact for the region in the transfer of technology and knowledge.

One such company Canadian Westinghouse, a subsidiary of the large US conglomerate whose Canadian operations had originally been focused on power generation equipment. By the mid 1960s, Canadian Westinghouse decided to form its own department of microelectronics, in the shadow of its parent firm, which had become the 5th largest producer of microcircuits in the world. The company hired a Canadian Ph.D. recruited from IBM to head up the new venture in integrated circuits and began to develop digital, and later, analog circuits. Its first success came with having designed the company's first operational amplifier.

¹⁹ Ferranti refused to market the FP6000 in the UK on behalf of its subsidiary, suffering as it was from heavy its own heavy losses in electronic data processing. See Vardalas, *Computer Revolutions*, 162.

²⁰ The FP6000, which launched ICT's entry into the computer industry, became a considerable success and was later recognized as the first 'true time-sharing, multi-programmable computer on the world market'. Vardalas, *Computer Revolutions*, 165.

²¹ Protective tariffs of the National Policy of the turn of the century. By 1913, there were some 93 US manufacturing plants in Toronto alone, increased US investment in the form of American owned plants, built or acquired by takeover in response mainly to protective tariffs. Source: W. Dean, C. Heidenreich, T. McIlwraith and J. Warkentin. *Concise Historical Atlas of Canada* (University of Toronto Press, 1998): Plate 28.

Much of its chip manufacturing capacity in Canada, however, was the result of a strategic decision by the parent firm in 1968 to divest from all commercial microelectronics manufacturing. In so doing, the Canadian department was given an opportunity to acquire some of the parent's IC product line for continued production and distribution. And this they did for another four years, manufacturing six integrated circuits for an established client base. By 1972, the Canadian operation had become an isolated entity within the firm and was closed down. For those managing the group, this closure gave them the opportunity to spin-out as a separate firm. The group acquired the rights and production assets of one of the circuits from Westinghouse, that of its hearing aid amplifiers. The new company, was called Linear Technology, later renamed Gennum Corporation, and would emerge as world-leading supplier of hearing aid amplifiers.²²

Although Canadian Westinghouse had been recognized by the DRB as part of Canada's industrial capacity in electronics and did get involved in a transistor training program in the mid 1950s²³, the subsidiary was unusual for not having had much involvement with the federal government's early electronic procurement programs. In the late 1960s, the federal government had a renewed concern for the lack of industrial capacity in Canada. By this time, with a new Department of Industry, Trade and Commerce (DITC) established in 1963, and with the Defence department's leadership on technological self-reliance having come to an end, strategic initiative in the area of electronics now came from the civil side.²⁴ One of DITC's first efforts was to mobilize the US multinationals to carry out more R&D and export production in Canada. As Vardalas writes, "under the banner of 'moral persuasion', DITC was determined to prod, coax, and if need be even coerce US computer manufacturers to invest in R&D and high-level manufacturing activities in Canada to a level

²² Source: interview with founder.

²³ The program which was run by the Defence Research Telecommunications Establishment Electronic Laboratory, sought to transfer technology from the Transistor laboratory to industry by brining industry engineers into the lab for 6 months in the hope that they would return as champions of the new transistor technology. Vardalas, *Computer Revolutions*, 92.

²⁴ See Vardalas, *Computer Revolutions*, 173.

commensurate with their sales in Canada.”²⁵ With Toronto home to most US multinational, this strategy would benefit the region considerably.

One of DITC’s first engagements within the context of its ‘moral suasion’ industrial strategy was the US firm, Control Data Corporation (CDC). By the late 1960s, CDC had become a significant force in the global computer company second only to IBM in sales. Its strategy to build high-end scientific computers for governments and universities proved prescient particular given its success with its famous Cray supercomputers. By 1969, the company was preparing for a new generation of supercomputers under a new circuit architecture that would challenge IBM’s dominance of the high-end business market. The mainframe computer was named PL-50 and it would be designed in Canada.

CDC established its Canadian subsidiary in 1962 and in Toronto as did most US multinationals setting up branches in Canada. Overseen by a country manager, CDC Canada was given a clear sales and marketing mandate. Its transformation to an R&D unit was unusual not only for a US multinational but also for CDC which had yet to carry out any R&D outside the US. The decision by its founder, William Norris, to carry out such a big project outside the US, was driven by necessity. With its R&D resources stretch to the limit, Norris looked for the first time to R&D partnerships with other governments as a way of leveraging its costs for what was considered a very critical R&D program. In Canada, with DITC poised with its new strategy, it found a willing partner.²⁶ CDC applied formally for assistance under DITC’s Program for the Advancement of Industrial Technology in 1970 to bring its PL-50 R&D effort to Canada and by the end of the following year CDC Canada’s R&D efforts were well underway.

The deal with the federal government promised CDC \$23.1 million over 5 years, a figure that would account for a considerable 44% of the estimated total development costs. In return CDC would agree to four objectives and one condition.

²⁵ Vardalas, *Computer Revolutions*, 174.

²⁶ CDC had heard of the government’s enthusiasm for US multinational partnerships through ComDev, an Ottawa based defence electronics firm which CDC had purchased completely in 1968, Vardalas, *Computer Revolutions*, 237.

The objectives were that a permanent mainframe R&D facility be established to which the infrastructure and know how be transferred to allow for the full design of the PL-50 in Canada. Also CDC was expected to foster Canadian component supply industry through sourcing within Canada, and agreed to the condition that once designed the full production of the PL-50 would be done in a plant located in Quebec City. For this it would get an additional \$10 million from the Department of Regional Economic Expansion²⁷

After two years, CDC abandoned the PL-50 program due to technological limitations of the proposed STAR architecture. The Canadian group, however, had also been upgrading one of CDC's older models, and repackaging it as the Cyber 70. This computer, which was manufactured in Toronto in an expanded facility in Mississauga, sold surprising well. Indeed, it was sufficiently successful to persuade DITC to reassign PL-50 money to develop a second line of computers that would incorporate the latest circuit technology but with an emphasis on cost and efficiency. The Cyber 173 computer, as it was called, ultimately became CDC's most profitable, cost-effective computer ever built and led to the development of an entirely new line of computers.²⁸

CDC's Canadian group was eventually shut down in 1992, along with the parent firm, which collapsed in the shift away from mainframe to minicomputers, and under intense Japanese competition. The group had nonetheless become a flagship R&D subsidiary for CDC and validated William Norris's enthusiasm for R&D partnerships. International collaboration had become a core component to CDC's R&D strategy in the 1960s engaging as it did in several US and European computer manufacturers. In the early 1980s when Japanese competitions was being felt, Norris was all the more convinced of the importance of collaboration, leading him to launch the first large scale R&D consortia in the United States – MCC (Microelectronics and Computer Technology Corporation). MCC, of course, was the organization that would begin the transformation of Austin's economy in 1983. Though CDC Canada did not have the same impact on Toronto as MCC did for Austin, there was

²⁷ Vardalas, *Computer Revolutions*, 244-245.

²⁸ Vardalas, *Computer Revolutions*, 259.

nonetheless a legacy. Apart from having developed Canada's only mainframe capacity, CDC Canada through its various R&D programs, built up the technological competencies over the years that would persist after it closed. According to anecdotal evidence, most of the engineers stayed put in the GTA and Canada, taking up opportunities in other microelectronics firms.²⁹ As for creating a network of suppliers, as was hoped for by DTIC in the terms of its initial deal, CDC Canada managed to do so for only the less sophisticated components, relying on non-Canadian firms for the production of their semiconductor circuits.

In this respect the economic impact of CDC Canada was similar to that of MCC, which over the course of its life, had little of the anticipated spin-offs. Yet where William Norris' venture in Austin was very much a success was in its mobilizing symbolism that would change the mindset and prospects of Austin's regional economy (Chapter 4). Norris' venture in Toronto, however, had very little of impact of this sort on the region, with little to no evidence of there being much regional recollection of CDC Canada's achievements either among the region's microelectronics firms or IT associations.

The local component

Though multinational subsidiaries, together with the Federal government, did play an important role in developing the knowledge base in the region, the GTA has not been without its own microelectronics startups. In 1955, for example, Polish immigrant Jack Tramiel founded a typewriter company that would later turn its focus to electronics in the 1960s and 1970s, producing electronic calculators. In 1976 the company, called Commodore, moved operations to the US and a year later would go on to revolutionize the computer industry with the inexpensive Commodore computer.³⁰ Commodore, however, was somewhat unusual in having little to no link to the Federal government's microelectronics efforts. Moreover, until the firm left for

²⁹ Celestica, Mitel and ATI Technologies were among some of the destinations for the ex CDC employees. At its peak, CDC Canada had 397 engineers and scientists working, a number which later fell to 125 with the termination of the PL-50 program. Vardalas, *Computer Revolutions*, 269.

³⁰ Jung R. 'Jack Tramiel - Survival and Starting Over', *Fortune* magazine, April 13, 1998

the US, much of its value added manufacturing was carried out in Europe, drawing little on the Canadian economy.

The founding of ATI Technologies is all-together a different story, though one that is nonetheless linked to the success of Commodore. Its founder, Kwok Yuen Ho also an immigrant, though from Hong Kong, came to Toronto in 1983 impressed by "a lot of open space and lots of opportunity".³¹ With an electrical engineering degree from a top Taiwanese university and work experience in several large Hong Kong based electronic firms, Ho, together with two other Hong Kong engineering émigrés, created Array Technologies Inc. in 1985. By the end of the first year, the company had designed a successful graphics-enhancing chip, which it had sold to Commodore at a volume of 7000 a week. Fifteen years later, ATI had grown to become the dominant supplier of graphic accelerator chips, and by 2004, the second largest fabless chip design companies in the world with some \$2 billion in annual revenue. According to a senior executive at the firm, ATI is currently linked to some 12 spin-out microelectronic companies, many of whom remain in the GTA, including Genesis, the second largest microelectronics firm in the region.³²

ATI's links to the GTA, however, extend beyond its spin out companies. In fact, ATI owes much of its early rapid success to the federally-funded Microelectronics Development Centre (MDC) based at the University of Toronto, which provided the firm with its first five microchips. The founders, when starting their firm, had the expertise in graphic cards but very little money and no chip design knowledge or capability. The company's concept was to develop a single chip that would incorporate all graphic standards of the day, thus making all computer applications compatible with the various displays that were on the market.³³ In 1985, MDC was approached by ATI to be their chip designer, which they continued to be until ATI developed their own internal capacity. This was done by employing MDC engineers, once the program had been closed in 1986.

³¹ Business week, 'From Rags to 3-D Chips: How K.Y. Ho traded Chinese woes for high-tech wealth', June 21, 1999.

³² Source: interview, 2005.

³³ Until ATI's innovation, certain computer applications such as spreadsheets, only worked with certain displays. At the time there were 4-5 graphics standards each supported by discrete chips. Source: interview, 2005.

MDC was typical of the new approach to industry support that took root in the 1980s in Canada. Created by the Department of Trade and Industry Canada, MDC was a part of a national program that supported some twelve technology and industry focused centers housed within universities across the countries. Each was given five-years of funding in the order of \$1 million a year after which the centers would close. In the five years of its existence, between 1983 and 1986, MDC was considered only modestly successful.³⁴ It did nonetheless create one of the first ASIC (Application Specific Integrated Circuits) design facilities in Canada, acting as consultants, providing advice and design expertise to help small companies take advantage of microelectronics.

Institutional development and dissipation in the GTA

MDC was only one of several initiatives that would contribute over the years to the thickening of the knowledge infrastructure within the GTA in the area of microelectronics. And although none were a part of any strategic vision from the instigators in supporting and developing the microelectronics industry, they all shared a common focus on training. The most significant of these has been the Canadian Microelectronics Corporation (CMC), a non-profit organization established in 1984. At the time, CMC was an unusual organization, and in fact an institutional innovation that was created specifically for the knowledge needs of the microelectronics researchers and industry. In providing universities across Canada with access to the most up-to-date software, hardware to design chips and access to foundries to manufacture prototypes, CMC has allowed Canadian researchers to stay on the frontier of design. And for the Canadian microelectronics industry in general, this ‘national design network’ as it is often described, has been indispensable in providing industry-caliber training for graduate students who have been able to be productive

³⁴ A part from ATI, the only other startup company affiliated with MDC was Semi-Tech, a company that focused primarily on computer assembly. The founder, James Henry Ting, had within a decade built Semi-Tech Group into one of Canada’s fastest growing businesses and 10th largest employer in Canada acquiring some 120 companies mostly in East Asia. By 2000 however, the company collapsed with some \$2 billion in debt, making it Hong Kong’s largest bankruptcy in history. See <http://www.asianpacificpost.com/news/article/81.html>

immediately upon entering industry. CMC has become globally recognized and replicated in the US, Taiwan and in Europe.

Whereas MDC was an initiative of the federal government, CMC was founded largely under the initiative of a professor in the Department of Electrical and Computer Engineering at the University of Toronto. Together with group of researchers from other universities in Canada, and with support from the country's leading microelectronics firms, Professor C.A.T. Salama approached the federal granting council, NSERC, with a proposal for CMC. NSERC has supported CMC ever since making it the federal governments most consistent and stable initiative supporting the microelectronics industry in the fifty-year history of the industry.

Another influential initiative supported by the federal government and spearheaded by Salama has been Micronet. As a Canada-wide network of microelectronics researchers committed to pre-competitive research, Micronet was one of the original proposals accepted under the federal government the Networks of Centres of Excellence (NCE) program which it launched in the late 1980s. As with CMC, Micronet has been considered an essential program in training engineers and scientists in the microelectronics industry, and central to retaining both companies and individuals in Canada.³⁵ As one interviewee noted, there was a "strong pull to go to the US to access markets, funding and people. If these initiatives had not succeeded, a lot would have gone."³⁶ For all its success however, the federal government terminated the program after reaching the fourteen-year limit established in the terms of the NCE program, with no plans of developing a follow-on program.³⁷

Though both these programs were very much national in their focus, they have allowed the region, centered at the University of Toronto, to build an expertise in a growing niche area of microelectronics. Indeed, the University of Toronto is now recognized as one of the world's leading centers for Field Programmable Gate Arrays

³⁵ According to one observer, without these programs, Nortel would have not been able to expand as fast as they did in Canada, which at one point was hiring half the graduates involved with CDC out of the University of Toronto.

³⁶ Source: interview, 2005.

³⁷ Micronet is accredited with 12 spin offs and is the most highly funded centre of all NCE programs with half of its 4.1 million annual budget coming from industry partners.

(FPGA) design, having recruited a professor attributed with having created “the science of FPGA design”.³⁸ As a result of this expertise, several firms have been drawn to the GTA region including in the world’s largest FPGA company at the time, Xilinx Inc., of San Jose, California, which opened the Xilinx Toronto Development Centre in 1993. Another was Altera, which set up The Altera Toronto Technology Centre after buying a faculty member’s company, Right Track Cad Corporation, two years after it was founded. In reflecting on its rapid success, its founder noted that CMC was indispensable in starting up Right Track Cad, as it allowed access to modern IC processes.³⁹

The provincial role

The Ontario government’s role the GTA’s microelectronics industry has been essentially similar to that of the federal government, providing ad hoc support for industry initiatives and establishing of strategic research networks. And as with the federal government, the provincial government has funded these microelectronics-specific programs outside of any long-term strategy. Its first initiative came after the government established the Ontario Task Force on Microelectronics in 1980, which made a range of recommendations on stimulating high-tech investment and improving the R&D climate. One of the report’s recommendations was to establish a microelectronics technology centre, which the government acted on in 1982 when it funded several technology centers across the province. Funded through the government’s BILD (Board of Industrial Leadership and Development) program, these technology centers were significant to the extent that they represented a shift away from a focus on manufacturing and import substitution that had characterized much of its earlier industrial policies, to a more strategic focus on technology.⁴⁰

³⁸ University of Toronto, *A Joint Submission*.

³⁹ Interview 2005

⁴⁰ Until the early 1980s, the Ontario government’s main R&D support was channeled through its university programs and the Ontario Research Foundation, the latter of which was an independent laboratory established in 1928 in the GTA that offered comprehensive research and development capabilities in industrial technology to companies not large enough to have their own. The technology centres, funded under the Davis government that was concerned over the state of the economy’s competitiveness, was thus a significant departure from past initiatives.

These centers, one of which was the Ottawa-based Ontario Centre for Microelectronics, lost financial support after four years despite having been considered a success. The funds were subsequently reallocated to the Premier's Council Technology Fund from which the Liberal government would later fund its most significant strategic effort to date, the university-based Centres of Excellence (COE).⁴¹ The COE program, which funded seven centers in total, had been developed by the province with the goal of commercializing research through the linking of industrial and academic research. Launched in 1986, it was the first of its kind in Canada and, in fact, prompted the federal government to create their own version, the Network Centres of Excellence initiative.⁴²

Of the initial seven COEs, researchers at the University of Toronto's Department of Electrical and Computer Engineering were dominant in two, the Telecommunications Research Institute of Ontario (TRIO) and the Information Technology Research Centre (ITRC). According to a review by the Department (1998), these centers, which had shorter-term research goals than the Federal networks, both had become tightly linked with local industry.⁴³ In 1997, the two were merged into CITO (Communications and Information Technology Ontario) with reduced government funding and, in 2004, were merged again. Despite such consolidations, the COE program has been the Ontario government's longest running strategically oriented R&D program supporting microelectronics.

External links in the creation of the GTA's knowledge base

By most recent accounts, the biggest benefactor of early federal government initiatives was Ottawa, a region most strongly identified with microelectronics in Canada.⁴⁴ Currently home to the second highest concentration of fabless semiconductor design firms outside of the US⁴⁵, Ottawa is also where much of

⁴¹ Ontario. House debates, Legislative assembly in Ontario, L066, 19 Nov 1986.

⁴² D. Fisher, et al. 'Changes In Academy/Industry/State Relations In Canada', 310.

⁴³ University of Toronto, *A Joint Submission*.

⁴⁴ See J. Mallet, 'Silicon Valley North: The Formation of the Ottawa Innovation Cluster'. Toronto: Information Technology Association of Canada, 2002; and R. Harrison, S. Cooper and C. Mason, 'Entrepreneurial Activity and the Dynamics of Technology-based Cluster Development: The Case of Ottawa', *Urban Studies*, Volume 41, No 5/6, 1045-1070, 2004.

⁴⁵ Arensman R., 'Fabless goes global', *Electronic Business*, 2/1/2003

Canada's federal R&D laboratories had been originally located. One of which, the Communications Research Centre, is credited to having drawn Bell Northern Research, the research arm of Bell Canada (now a part of Nortel), to the region in 1961.⁴⁶

Though most influential in developing Ottawa's microelectronics region, these initiatives did have a spill-over effect on the labour pool within the GTA's own microelectronics industry. In 1962, at the request by the Defence Research Board and the National Research Council, Northern Electric entered into a collaborative program to build a semiconductor manufacturing capacity, the result of which was the creation of the Advanced Devices Centre (ADC). In 1968 ADC was incorporated as a separate company, Microsystems International Ltd (MIL), again in partnership with the Federal government who provided some \$37 million in subsidies and loans.⁴⁷ Through this partnership, MIL became the country's first foray into semiconductor manufacturing. Having subsequently acquired chip-manufacturing processes from Intel and a plant in Malaysia, it became the world's second largest supplier of DRAM memory chips in the early 1970s, after Intel. In 1975, unable to keep up with the fast pace of the semiconductor industry, MIL went bankrupt, and the facilities were repurchased by Northern Telecom. MIL had nonetheless made its mark. Out of its collapse, the Ottawa region established much of its initial microelectronics industry - Newbridge, Mitel, Mosaid, Calian - from the entrepreneurs and experienced pool of engineers and scientist who had worked for MIL. According to a prominent business leader, this same group of ex-MIL employees also helped build the microelectronics industry in the GTA, as several relocated to take advantage of the work opportunities.⁴⁸

⁴⁶ Mallet, 'Silicon Valley North' 2002.

⁴⁷ D. Thomas, *Knights of the New Technology* (Key Porter Books: Toronto, 1983): 26.

⁴⁸ Source: Interview 2005

CHARACTERIZING THE PATTERN OF STRATEGIC GOVERNANCE IN THE GTA'S MICROELECTRONICS INDUSTRY

The foregoing account highlights three salient factors that have characterized the pattern of governance of the GTA's microelectronics industry over the past fifty years. The first is the importance and indeed effectiveness, of the federal government, multinationals and the University of Toronto in fostering the knowledge and research base from which the industry developed. Second, is the remarkable absence of any coherent long-term microelectronics strategy from the early 1970s onwards. And third, is the absence of any significant associative leadership in the development of the non-market institutional capacity supporting industry. The effect has been an undeveloped, if not uncoordinated, 'governance system' with little logical coherence apart from a few nodes of leadership each with a predominantly national outlook.

The lack of strategic leadership has been ironically one of the most consistent attributes of the industry. The several strategic initiatives that have come and gone over the years have been supported by a myriad of departments and agencies (The Royal Canadian Navy, the Defence Research Board, DTIC, NSERC, the National Research Council, the Department of Science and Technology) none of whom have managed to organize their efforts. In 1982, in one of the few federally-funded reports on the industry, from the Labour Canada Task Force on Microelectronics and Employment, the authors describe Canada's efforts as 'rudderless', and recommend that 'urgent' action be taken 'to develop a coherent strategy embodying well-defined goals including the attainable niches for Canada; and a consistent set of public and private sector policies to enable the microelectronic technology to flourish, and thereby extend its full advantages to the Canadian people'.⁴⁹ A similar call was made some twenty years later by one the industry's loudest voice, Doug Barber, president of Gennum, who, writing on the need to address invest in skills, pointedly noted that "Canada will get from 15th place to 5th [in R&D] only if federal and provincial

⁴⁹ Canada. 'In the Chips: Opportunities, People and Partnerships', 1982: 32.

governments take strategic action now in the areas of greatest economic opportunity”, referring as he was to the microelectronics, photonics and wireless industries.⁵⁰

The lack of continuity in the coordination efforts of the industry, made all the more so by the absence of any long-term strategy, complicates efforts to identify any consistent pattern of governance. Both the University of Toronto and the federal government, through the individual agencies and departments, have at various times been sources of leadership with respect to mobilizing resources in support of the industry. And while there has been some consistency among the catalysts of strategic initiatives, particularly from within the University and in industry, there has been little in the way of either formal or informal engagement to support the idea of a coherent governance network. In fact, much of the GTA story has been more about government rather than governance.

There have nonetheless been a few coalescing strategic governance structures that have had an important impact on the regional industry and which underscore the ad-hoc and often non-committal relationship between the government and the industry. One such example was the Canadian Semiconductor Design Association (CSDA). Founded in 1984, CSDA was a private R&D consortia consisting of five Ontario-based microelectronics firms that sought cooperation on core design capability to help overcome resource limitations.⁵¹ This was Canada's first such consortia and came a year after the US-based MCC initiative in Austin Texas. In their second year of operation, CSDA received a one time grant of \$500,000 from NRC's IRAP program helping seed their cooperative work. In 1988, the provincial government stepped in with \$22 million over five years, helping stabilize the initiative through the economic recession of the early 1990s.⁵²

Along with making each other's R&D results available to one another under CSDA guidelines, the consortium supported prototype work and some process development work, funding 50% of costs, with a remarkable degree of success.

⁵⁰ ⁵⁰ D. Barber and J. Ghent, "Getting from 15th to 5th: What will it take" ReSearch Money, April 4, 2001.

⁵¹ The five firms were Mitel Semiconductor, Tundra (then Calmos), Zarlink, Mosaid and Gennum.

⁵² Interview with past director of CSDA, 2005.

According to the director at the time, who kept track of sales records, CSDA had supported the R&D for products that would later go on to generate \$490 million over ten years.⁵³ CSDA is credited to having been very important to its members' survival during the recession by enabling them to continue R&D at a time of constrained revenues. By 2000, the consortium was folded into the Strategic Microelectronics Council (SMC), which was the first and only association to represent the microelectronics industry. Unlike the development-oriented CSDA, however, SMC was a policy and lobbying organization a broader representation beyond microelectronics manufacturing.

The associative dimension

The engagement of associations in the ongoing development of the knowledge and infrastructure of the region has been minimal. Both at the national and local level, associations have been either non-strategic, or simply, ineffective in mobilizing resources in support of the needs of the local and national microelectronics industry. The one exception is, arguably, the eMPOWR initiative taken on by SMC. Faced with a significant shortage of skilled employees, SMC and its 42 members came together around a proposal to convince the federal government to triple the number of graduates and professors with the requisite skills in microelectronics, photonics, optoelectronics, wireless and radio engineering (MPOWR) to the sum of \$480 million over five years.⁵⁴ In its largely unsuccessful efforts, SMC became absorbed into the much larger ITAC (Information Technology Association of Canada) in November of 2001, deciding that it would benefit from the stronger voice of a larger association (ReSearch Money, 2001). Yet once a part of an organization with an even broader focus, the eMPOWR proposal was diluted significantly with a more generic lobbying position for investment in the university disciplines relating to the microelectronics and software sectors. Though the effort was successful in bringing new funding, the actual program was far from the strategic goals of the original proposal: a \$1 million

⁵³ Interview, CSDA, 2005.

⁵⁴ D. Barber, 'eMPOWR Canada – Where are we?' Micronet Annual Workshop, April 19th, 2001.

program administered through NSERC that would provide yearly support for a mere sixty students.⁵⁵

Apart from eMPOWR, which had been nurtured from within a much more specialized association, no other strategic initiative catering explicitly to the microelectronics industry has been successfully established. The two most influential national high-tech associations, ITAC and CATA (Canadian Advanced Technology Association), have had essentially no major role in the strategic governance of the microelectronics industry either at the national or local level. With a national outlook and tradition of policy lobbying, these associations operate within the realm of framework governance, representing the high-tech industry on a number of policy issues related to the federal regulatory context and which reflect the general interests of their diverse membership base.

Local associative system

At the local level, the collection of associations supporting the IT and high-tech industry within the GTA is significant both in size and diversity. At the peak of the IT boom in 2000, one provincial official put the number at 18 to 25, 'depending on how you count them'.⁵⁶ These associations carry out a range of functions from the bringing together of entrepreneurs and investors, as does the Toronto Venture Group through its various events, to education programs promoting careers in science and technology carried out by The Learning Partnerships (TLP). With a GTA focus, this TLP program is one of several education related programs carried is administered through partnerships with business, the education system and the community. The most directly relevant to the IT industry, however, are two regional high-tech associations, the York Technology Association (YTA), founded in 1982, and the Mississauga Technology Association (MTA) founded eight years later in 1990. In addition to being among the longest running associations, they also have the largest

⁵⁵ ITAC News Release, 'eMPOWR And NSERC Announce New \$1million Initiative To Attract Students To Research In Information Technology Hardware, September 4, 2002.

⁵⁶ Source: interview, 2004

of the local associations with membership lists of over 150 and 100 firms respectively.

Yet for all such institutional development, the associations have not been able to integrate themselves under any one governance framework nor act as a coherent system of institutional support for the IT industry and technology sector more broadly. As with their supra-local counterparts, the dominant associations within the GTA, do not have a tradition of collaboration and have been unwilling to share membership lists. The effect has been a lack of support for a single voice for the region's IT industry, a lack of any strategic direction and a duplication of services particularly among the regionally focused technology associations.

Such fragmentation has been a frustration for both firms and the provincial government. In 2002, staff within the Ministry of Enterprise, Opportunity and Innovation (now the Ministry of Research and Innovation) took the initiative to encourage consolidation among the associations by pushing for some form of federation or single organization. The effort, however, did not succeed. According to the senior official who led the effort, one association, Smart Toronto, had endeavored "to play a leadership role but no one wanted to give it to them."

Such 'jealousy at the local level', as one association founder described it, has been only one mitigating factor in attempts to recast the associations into a more coherent system. According to one senior provincial official, industry for its part has typically not wanted any help apart from skills development, preferring tax cuts to creation of local infrastructure.⁵⁷ These preferences have understandably been reflected in the agendas and programs of the associations that typically advocate for a similar set of tax related issues while doing little to engage members in a strategic planning regarding regional institutional development.

This absence of a 'can-do spirit' within the region's associations and the related inability to mobilize industry to strive for a higher degree of civic engagement is well demonstrated in the rise and fall of SMART Toronto, the IT association that represented IT industry and later multimedia, in the City of Toronto. When launched

⁵⁷ Source: interview, 2004

in April 1995, SMART Toronto had been designed as an 'implementing organization' and not simply another policy advocacy and networking group. Indeed, it was given a clear mandate by its founding members: to give the 35 municipalities in the GTA access to the federal government's national broadband network, CANARIE. According to original plans of the federal agency, CANARIE was to bypass the city entirely, which alarmed many Toronto business leaders at the time, concerned as they were with the prospect of Toronto 'falling behind in the information age'.

SMART Toronto was not only successful in building a linking network that made Toronto a node in the national network, but it also established an InfoTech Centre for members to showcase their own network technologies, conduct meetings, participate in training seminars and conduct CANARIE-sponsored pre-commercial research on advanced communications technologies. As the only Toronto technology association, it was also considered an appropriate vehicle for promoting the strengths of Toronto's IT industry, an activity that was considered by its founders as crucial to the competitiveness of the industry. To this end, the association helped sponsor the first GTA-wide report on the IT industry in 2000, called SMART Community, which advertised the many strengths, size and diversity of the IT industry helping support efforts to attract investment to the GTA.

In the technology enthusiasm of 2000, however, the association shifted its emphasis from the provision of physical infrastructure to the more traditional role among GTA associations of providing general services, particularly venture capital networking and more intangible goods such as a sense of community.⁵⁸ This shift away from being an 'implementing organization', together with the high-tech downturn in 2000, ultimately hastened the end of SMART Toronto. In 2003 after a significant drop in membership revenue, the association's remaining members were absorbed into CATA, effectively disbanding the local focus and representation in the City of Toronto. In commenting on its collapse, one of its founders, a former IT executive, noted that many firms cannot see the benefits of associations and typically

⁵⁸ In 2000: SMART Toronto's mandate was "to build Toronto as a centre for digitally enabled creation and distribution. SMART Toronto brings private and public sector interests together to create significant economic, social and cultural benefits." BitStream, Issue 30, October 27, 2000.

view any attempt to develop the IT industry and attracting firms as a risk to retaining their best employees. With local industry much more competitive than cooperative, there has been only a tentative engagement to the associations and generally low degree of civic engagement.

RECASTING OF ECONOMIC GOVERNANCE IN THE GTA: THE EMERGENCE OF A COMMUNITY CONSCIOUSNESS?

For all the discontinuity, competition and instability that has characterized much of the institutional supports at the local level in the GTA, there have been a few developments within the past few years that suggest both a growing consciousness of the local governance space and its importance to knowledge industries, and an emerging strategic focus among a few local governance actors. Such awareness is apparent in the new breed of associations within the GTA, among departmental activities within the University of Toronto, and in strategic initiatives among some municipal governments. As with the local associative system within the GTA, however, these developments affect the microelectronics industry only within its broader relation to the technology or IT sector.

The new landscape of associative governance

One of the first institutional developments that has sought to strengthen the local economic governance capacity came in 1997 following recommendations from the Provincial governments' Greater Toronto Area Task Force Report (1996) published a year earlier. Along with recommendations on municipal amalgamation within the GTA, the task force recommended that a public-private economic development partnership be established to act as a single marketing body for the GTA.⁵⁹ Such an organization would, in addition to international marketing, collect strategic economic data, develop a retention strategy and monitor the general performance of the region as whole thus helping foster cooperation rather than the competition that has been the prevalent mode of interaction among the five regions

⁵⁹ See Recommendation 40 of Ontario, *Report of the GTA Task Force*, (Queen's Printer for Ontario, January 1996).

that make up the GTA. As one of its founders noted, the corrosive effects of regional competition had reached the point where, at a trade mission to Hong Kong in the mid 1990s, three delegations from each of the dominant regions in the GTA had showed up, 'baffling organizing officials' who considered them all to be a part of the City of Toronto.

The recommendation was acted on with the establishment of the Greater Toronto Marketing Alliance (GTMA) in 1997, which was tasked with coordinating and controlling, for the first time, the international marketing efforts of the region's 29 municipalities and regions.⁶⁰ Not only was the GTMA unusual for its representation of all five regions, but also for its representation of three levels of government, private sector actors, and non-profit organizations. And, it was set up with a very specific mandate, namely to raise the profile of the GTA and recruit firms that fit the economic profile of the region.

With a budget of \$2 million a year, approximately 60% of which is from government participants, the GTMA, according to one of its founders, is working but is struggling to achieve its goals. Though successful at preparing reports on the regional strength of its various economic sectors, the organization has not managed to develop a capacity to engage local firms as part of an overall retention strategy. This stems in part from a lack of trust among some firms especially among those that do not desire competitors to locate within the region, and from jealousy among technology associations in protecting their contacts. The effect has been that the GTMA has yet to be seen as an industry partner in the region. Indeed, from interviews among IT actors, the GTMA has typically not been identified as a source of leadership for high-tech industry, and among one prominent legal firm supporting the IT industry, its existence was unknown.⁶¹

Despite these challenges however, the GTMA has been a milestone from the local economic governance standpoint. Prior its establishment, few private sector

⁶⁰ The GTMA has full responsibility for municipal budget allocations earmarked for international marketing.

⁶¹ In an interview with the dominant legal services firm for the high-tech industry in the region, the GTMA was unknown.

individuals and firms had been asked to participate in regional economic development, the result of which has been little private support for such efforts. As GTMA's first annual report notes (1997-98), for the first time the business community has become 'an equal partner with the public sector, to play a key role to promote economic development and to attract new international investors to the GTA'.⁶²

Another indication of the local institutional strengthening in the GTA came with the establishment of the Toronto City Summit Alliance. Perhaps no other organizational development in the GTA better reflects the developing awareness - and challenges - of associative governance at the local level in fostering an institutional capacity for knowledge industries. A coalition of some 50 civic leaders in the Toronto region, the Alliance was formed in 2002 largely from the initiative of its founder, David Pecaut, a civic leader concerned with the many issues in the GTA, both social and economic, that were not being addressed effectively by any one group or level of government. With the help of working groups comprised of its members, the Alliance initially identified three 'implementation efforts' that would begin to address some of these issues, the most relevant to the high-tech industry is a weak capacity to develop further the region's research infrastructure.

Though strong in research, the region's research institutions, according to founding civic leaders interviewed, have been notably inadequate in improving their leveraging of research through commercialization, attracting additional federal and provincial research dollars, and in cooperating with each other to coordinate R&D initiatives and help attract and retain leading researchers. In the words of one civic leader, "[the GTA] is the best example in Canada of neglect at the local level and showing what happens if the local level does not think of where it is going to go and get its act together."

To address these issues, TCSA created the Toronto Region Research Alliance (TRRA), and in so doing has become a significant advocate and actor for locally rooted economic governance within the GTA. Moreover, with an objective to build

⁶² From GTMA, Annual report 1997-1998, GTMA, Toronto.

capacity and infrastructure in specific research areas relevant to the region's economic growth, it is one of the few actors with strategic planning intentions. In support of these efforts, the TRRA is working towards developing a commercialization fund with government and VC funding, assisting in recruiting of anchor firms that complement the region's sectoral strengths, and promoting increased government and private sector investment to 'help bring key projects in the strategic plan to fruition'.⁶³

Though the TRRA has yet to point to any tangible successes, it has been undoubtedly influential. On January 12, 2006, amidst a federal election campaign, Prime Minister Paul Martin announced support for two of TRRA's projects: a National Centre for Biomedical Innovation, to be associated with the MaRS discovery district in downtown Toronto, and more significantly, a new National Institute for Convergent Technologies to be based in Markham. In a Liberal press release, it is duly noted that 'these two facilities will be the first NRC Institutes in the Greater Toronto Area', a note reflecting not only a political move to shore up liberal support in a traditional liberal strong hold, but also the long standing federal neglect with regard to R&D investments in the GTA.⁶⁴ Indeed, the lack of an NRC institute in Canada's largest regional economy had come to epitomize this neglect and had become a galvanizing fact in TRRA's dialogue with NRC and the federal government.⁶⁵

With the defeat of the liberals on January 23rd 2006, the fate of these initiatives, which had been promised \$80 million over the next five years, is not at this time clear. Nor is the stability of the TCSA as a governance institution should current government support be withdrawn⁶⁶. Yet its success at influencing governments and its ability of bringing together all relevant stakeholders for scheduled meetings, suggests that success could very well follow. At the very least, the TCSA has

⁶³ From Toronto City Summit Alliance, 'Enough Talk: An action Plan for the Toronto Region', (Toronto City Summit Alliance, April 2003)

⁶⁴ Liberal Party of Canada, 'Prime Minister Paul Martin Announces Investments in Canada's Innovative Economy' January 12, 2006, http://www.liberal.ca/news_e.aspx?id=11375

⁶⁵ From a discussion with a director an NRC Institute.

⁶⁶ The TRRA is currently supported by corporate donations and seed funding from the Ontario Ministry of Economic Trade and Development and the National Research Council of Canada.

pioneered new associative dimension in the region that has attempted to address a gap in the GTA's governance. As one founder commented on past multilevel relations: "we have had dysfunctional relationships between three levels of government and this has seriously handicapped us. [From the standpoint of the province], Ontario has done less well in adapting to the normal complexities of different levels of government... It is a complex province, which does not present a single view... this provides a convenient excuse for the province [not to take leadership on issues]"⁶⁷

The University of Toronto

Though the University of Toronto as a research institution has not engaged the local industry in any strategic capacity, there is emerging interest, and initiative, from professors within engineering departments in developing the institutional supports for the high-tech industry. In the Department of Electrical and Computer Engineering, for example, a new goal of creating a culture of entrepreneurialism has been added to the department's strategic plan, complementing recently established seminars bringing local entrepreneurial success stories to the students. Two other initiatives in this area include an annual workshop on the basics of starting high-tech companies and the development of a new entrepreneurial course for 2005-06 that caters specifically to electrical engineering. As one faculty member noted, "there are professors who care about these issues in the department and so we do something about it."

The Department's activity highlights the complex engagement that the University of Toronto has with the GTA economy. As Canada's largest and one of its most prestigious research institutions, the University of Toronto's primary concern is with its research reputation at the national and international levels and its role as a first class educational institution. The 1999 Report of the Expert Panel on the Commercialization of University Research, prepared by the federal Advisory Council on Science and Technology only emphasized the University's stance in this respect.⁶⁸ The report provoked university-wide disapproval over its recommendations, one of

⁶⁷ Source: interview with a TTRA founder.

⁶⁸ Canada, 'Report of the Expert Panel on the Commercialization of University Research', Advisory Council on Science and Technology.

which was that researchers identify 'innovation' as their fourth mission, in addition to teaching, research and community service, as a way of improve commercialization of federally funded research.⁶⁹

Yet the University does nonetheless present itself as an economic partner encouraging commercialization through its technology transfer office. Since the 1960s, for example, spin-off companies have grown on average, approximately 90% per decade, reaching a projected 75 new firms for the 2000s, according to its own brochure.⁷⁰ In licensing revenue, the University has received more than \$10 million from 2000 to 2003.⁷¹ Yet for all such activity, the University does not see a role for itself in the local context, preferring to view its economic activity nationally, and pursuing technology transfer efforts as a way of raising funds for its research goals and not to develop any industry cluster. For the faculty within the Department of Electrical and Computer Engineering, however, fostering a local microelectronics industry is considered an important goal. With all but one federal funding source (NSERC Discovery Grant) requiring an industry partner, the ability to engage local firms is a considerable advantage to their own research.

Municipal strategic engagement

As previously noted, municipal governments within the GTA have been largely inconsequential to the microelectronics industry having had little involvement in any strategic development of the knowledge infrastructure. Since the mid 1990s when the provincial government forced amalgamation of seven of the regions municipalities into one City of Toronto, much of its role has been defined by efforts to improve the competitiveness of industry in the framework sense of economic governance. Indeed, the amalgamation itself was done on these terms, with the province, under a newly elected Conservative government, instituting several

⁶⁹ In a letter to the Prime Minister by the Faculty Association argued that: The Panel's recommendations would impede the development of genuinely new knowledge and products. The distinctive contributions of university research - with its breadth of knowledge, far time horizons and independent voice - would be at risk. Important research questions that lack the promise of short-term commercial profits would be marginalized. Scientists would be perceived as beholden to special interests." Source: Newsletter, University of Toronto Faculty association, March 01, 2000.

⁷⁰ University of Toronto, *Creating Knowledge, Delivering results*, 2004-2005 edition.

⁷¹ Licensing revenue estimates from University of Toronto, *Creating Knowledge*.

additional municipal reforms justified on competitive neoliberal grounds. In addition to cutting provincial transfer payments to municipalities, downloading the cost of several provincial programs such as housing and public transit, the province revamped several policy areas affecting municipalities including the deregulation of urban and development controls, loosening of employment standards, and establishing workfare.⁷²

While the City of Toronto continues to view economic development as a process to promote Toronto as an 'investment platform' for industry, there are activities to suggest that such a view is changing. The city, driven, ironically, in part by provincial downloading in the mid 1990s, has begun to consider a more active and comprehensive approach to economic development that includes a more targeted focus on particular industries. According to one economic development officer, there has been in effect a 'silent downloading' of economic development by the virtue of the provinces 'quiet withdrawal' from the area when downloading several of its policy portfolios to the municipal level.

The provincial downloading of programs was thus a transition for changes that have yet to be fully realized by the municipal government. "We have been turned into a province", commented one city official, 'which has given us a new voice in both federal and provincial policy.' One of its first experiences in this new role came with the national debate over bank mergers in 1999 during which the city was asked to give their opinion on the issue. According to the official, this was very much a maturing point for the city, for it was the first time that the city's largest industry, the financial services sector, engaged it on issues of its own competitiveness. "Our council at that time freaked. They did not know how to deal with it. It was very immature. Our city was not ready for those kinds of decisions even though the banks, government all wanted our opinion. This was a defining moment in looking at the potential at playing a greater role in economic issues."

⁷² S. Kipfer and R. Keil, 'Toronto Inc? Planning the Competitive City in the New Toronto.' *Antipode*, 34, 2, 2002.

This shift to a more industry focused economic development approach was reinforced a year later with the release of 'Toronto Competes', a report initiated by the City's Economic Development Office and prepared by the American ICF Consulting group. The report for the first time examined Toronto's economy from a cluster perspective identifying ten such agglomerations. It also advocated a more comprehensive approach to economic development highlighting the links between economic competitiveness and quality of life, and emphasized the importance of neighborhoods, housing mix, schools, and other human services to Toronto's long-term success. And importantly, it emphasized the importance of implementing strategic policies catering to business start-up and expansion and in supporting the institutional support for knowledge industries.⁷³ "In the knowledge economy, investing in 'soft' infrastructure research, education, training and mentoring is also critically important. Building strong interconnected networks of people to advance technology transfer, design, e-communication, arts and culture is essential to developing a sustainable economy."

The most significant indication to date, however, of the City's shift to recognizing an integrated socio-economic governance approach to local knowledge industries came with the release of 'Toronto Region ICT Cluster Strategy' in September of 2005.⁷⁴ Developed by a working group that included various local firms, colleges and associations and city officials, the report articulates a vision for the ICT region for the first time, and provides a series of recommendations for achieving it. The vision is to position the Toronto region among the world's top five 'most innovative, creative and productive locations in the world for ICT business, research and education', a vision which, the reports notes, can be realized by building on such as strengths as the diverse and well-educated workforce, the region's creativity, a well-developed infrastructure and quality of life.

Among its primary recommendations is the establishment of ICT Toronto, which would be a publicly supported association that would foster partnerships

⁷³ ICF Consulting, 'Toronto Competes: An Assessment of Toronto's Global Competitiveness' (Economic Development Office, City of Toronto, 2000).

⁷⁴ The Impact Group, 'Toronto Region ICT Cluster Strategy', Revised draft, September 7 2005.

among the regions various ICT actors to, among other objectives, promote the needs of the sector, raise the media profile, improve a dialogue with the region's educational infrastructure and build industry champions. Other recommendations include advocating for federal or provincial ICT research institutes in the recognition that the GTA is without any NRC R&D institution, and reinforcing the knowledge infrastructure by growing 'knowledge nodes' around the region's universities.

The report is remarkable not just for this broader more strategic approach but also for the fact that it is regionally focused. Though initially a municipal endeavor with an objective to produce a City of Toronto strategy, the working group was ultimately persuaded by the logic of a regional approach, and for the need for local municipalities to cooperate in pooling efforts to support the ICT cluster.

How successful the strategy will be in achieving the recommendations is, according to one working group member, dependent on local political will – in particular, the various city councils for funding support - and a commitment to cooperation which has long been a challenge in the fragmented region.

Emergence of integrated strategic governance in Markham

Whereas the City of Toronto remains in early stages of moving towards a developing a strategic governance network, this is not so for Markham, a much smaller the municipality to the north of Toronto which is home to a significant segment of the GTA's high-tech industry including ATI, IBM, Sun Microsystems and Surface Mount Technology Centre. Indeed, the City of Markham, self-described as Canada's high-tech capital, has been a pioneer in supporting the institutional development for its high-tech industry on several fronts. Most notable is its strong support for the region's first 'floating advisory board' called the Innovation Synergy Centre (ISC) established in 2003. Though a non-profit, government funded organization, the ISC is entirely a private initiative staffed by experienced executives who offer advice to more mature firms – some 140 to date - on a wide range of issues related to management, government R&D programs, business monitoring, marketing and financing. ISC has established formal links with 10 organizations including the National Research Council, York University, YTA, CITO and Markham's Small

Business Centre and Economic Development Office, in effect acting as a broker to the region's economic institutions.

Being a founding partner to ISC is the most recent effort by the City of Markham in transforming its attitude to economic development from a real estate approach of green fields and low taxes to a more integrated institutional approach that mobilizes the knowledge and infrastructural resources to achieve both economic and social goals. The most notable example of this 'joined-up governance' approach was in the city's engagement of IBM in its global search to locate its Software Solutions Laboratory. With no authority to provide IBM locational subsidies, the city suggested IBM consider a site next to its new energy venture, Markham District Energy, which would allow Markham to provide IBM with all of its heating and air-conditioning needs, at cost, in a twenty year contract.⁷⁵

With this offer, together with federal and provincial support for their training and education needs, Markham was successful in securing an IBM facility with a global mandate in 2000, a goal that had eluded the federal government decades earlier with its 'moral persuasion' strategy. Moreover, given the efficient and environmentally superior production of electricity, heating and cooling offered by the new energy system, the City of Markham was able to combine its economic goals with its environmental objectives related to sustainable and efficient energy use. And with IBM as its first client, and Motorola its second, the city has managed to demonstrate the viability of a reliable and sustainable system that is soon to support much of Markham's smart growth development while reducing green house gas emissions.

In the same year that IBM established its research centre, the city produced its first three-year comprehensive economic strategic plan that formalized this more integrated approach to economic development. Along with more targeted marketing, the plan articulates goals to develop high-tech infrastructure with the assistance of associations, leverage major corporate investments, while maintaining a dialogue with the region's firms regarding their needs as well as the effectiveness of

⁷⁵ The district energy venture was made possible by the passing of the Electricity Act of 1998 allowing municipalities to invest in certain energy related businesses.

Markham's strategic programs.⁷⁶ The plan also identifies the major challenges facing the region including traffic congestion and lack of a local university or college. In 2003, this latter concern was partially addressed by creating partnerships with both York University and Seneca College that would bring them into the Innovation Synergy Centre.

Beyond ICT – other signs

To the east of Markham, a similar institution to the Synergy Centre has established itself under the name of the Western GTA Biosciences Convergence Centre in Mississauga. Though not concerned with ICT, the centre is being developed as a node to what is essentially a strategic governance network in the region that seeks to develop the life sciences and technology cluster. Among the key actors of this network are: the centre itself, the University of Toronto at Mississauga, Sheridan College and Humber college. Also relevant are three regional organizations that are to be housed in the centre. These include Mississauga Technology Business Accelerator, a business incubator, and the Healthy City program, which assists in developing local social, educational, recreational and employment opportunities and services to support recruitment, retention, international exposure.⁷⁷

With its emphasis on social as well as economic objectives, the Centre is similar AARO, a key actor in Austin's network. The Centre's mandate implicitly recognizes the links between community, quality of life and economic performance: "to build an integrated series of programs that bridge business, institutional and community interests, that foster entrepreneurial and commercial investment leading to a competitive advantage in the marketplace and a competitive advantage in terms of quality of life for the community."⁷⁸

The centre differs from the Synergy Centre and Austin case study in the fact that its origins lie with the Province of Ontario. Through its Biotechnology Cluster Innovation Program (BCIP), the province supported the development of the centre as

⁷⁶ Town of Markham, 'Economic Development Strategy: The Millennial Strategy Year 2000 to 2003' (Economic Development Office, Town of Markham).

⁷⁷ U. Krull 'Investing to Accelerate Economic Growth', Presented at the ISRN National Meeting 2005.

⁷⁸ Krull, Investing.

part of a strategy to accelerate the development of Ontario's biotechnology industry by supporting commercialization infrastructure projects such as research parks and other initiatives that promote entrepreneurship and innovation on a regional basis.

Though the BCIP program has officially terminated, it has done so only in name. The Ontario government has launched a new phase of its Ontario Commercialization Network program (of which BCIP was a part) to broaden its effort to facilitate commercialization of all technologies, not just biotechnology, across the province. The new program, launched in 2005, funds what it calls 'regional innovation networks' (RIN), which link together regional actors and engages them in a regional strategic planning process. These linkages are also intended to enable access to commercialization services and other relevant organizations such as the Ontario Centres of Excellence and the new Medical and Related Sciences (MaRS) centre. These are multi-stakeholder, regional development organizations designed to create and support partnerships among business, institutions and local governments for the purpose of promoting innovation. There are currently 11 active regional networks, all of which were established under the now terminated BCIP program. These biotechnology-focused networks are to expand their scope to include other areas of technology that correspond to a particular region's industrial strength such as IT and advanced manufacturing.

The RIN program is quite possibly a very significant development for the GTA to the extent that it marks a shift in thinking by the Ontario government. Prior to RIN, the province has been quite reticent about taking a leadership role that would possibly concentrate investments in a particular region, preferring its hands-off approach, which entailed offering seed funding, in an ad-hoc manner, when approached by a viable project such as CSDA or SMART Toronto. The prospects of stable funding for such groups could fundamentally change the associative landscape in the region.

A GTA model?

Despite evidence of more sophisticated actors and institutions catering to strategic mobilization of resources in support of high-tech industries, it is still too early to assess whether these relationships will mature into a strategic governance

network as developed as Austin's. There is undoubtedly a growing recognition of the value of strategic governance networks, as is evident from the province's RIN program and from organizations like the TCSA. Yet how successful these networks will be in achieving their strategic objectives is unknown.

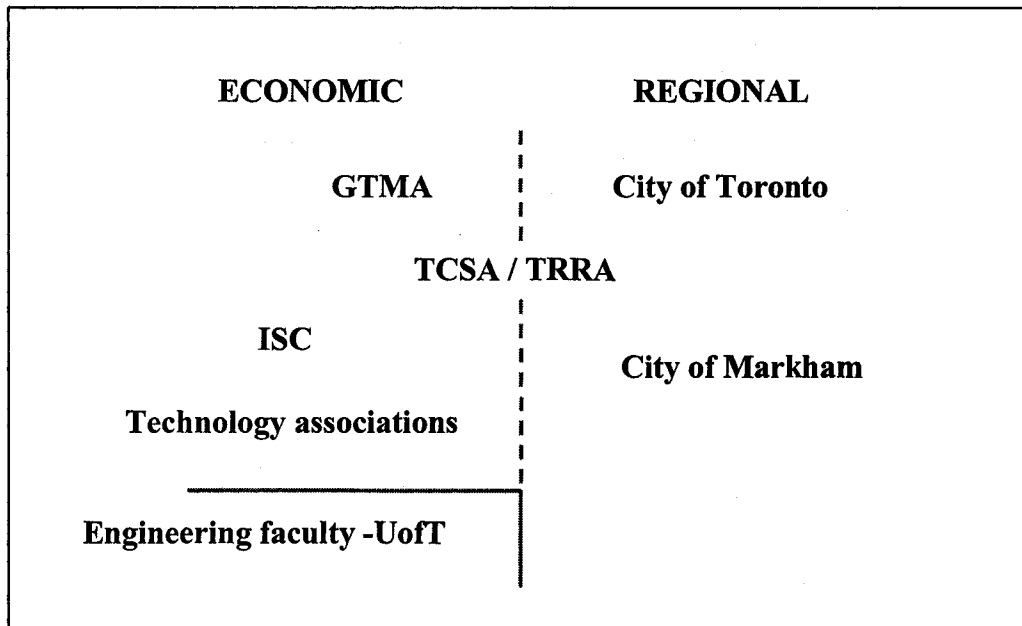
The network that does exist for IT, and microelectronics more specifically, has only weak linkages between the various nodes of actors (see Figure 5-1). Metaphorically, the structure of governance is best likened to an archipelago, whose islands of cooperation are all engulfed in a thick fog that prevents them from seeing the collective whole. It is, for example, simply not part of the local consciousness to have officials with the City of Toronto meet with engineering professors within the University of Toronto to discuss their cluster strategy.⁷⁹ Nor is there much of a shared understanding between the local financiers of high-tech and the GTMA whose task it is to recruit firms internationally and promote local expansions. As for the firms themselves, they often do not recognize the link between their own performance and the local quality of life, or the potential of governments or associations to go beyond framework policies to improve the quality of the infrastructure.

Yet for all such 'disconnectivity', it is possible to identify a few attributes of this emerging strategic governance network. With regard to localizing investment in support of the microelectronics industry, it has been undoubtedly multilevel, and yet with little institutionalization or coordination between levels. And remarkably it is largely without a regional focus. Since the 1980s, the federal and provincial governments have developed similar programs, though without any regional design. In all but one investment, it was the actions of individual professors that made these investments strategic, first by localizing federal R&D dollars and second by putting proposals forth that would build up the knowledge base in microelectronics design. More recent developments, notably the synergy centre in Markham, suggest another localizing aspect with respect to determining the effectiveness of federal investments

⁷⁹ This disconnect between the education and research infrastructure was again reinforced by the City of Toronto's 'Toronto Region ICT Cluster Strategy', which did not seek any input from the researchers at the University of Toronto despite their significant contribution to shaping the industry. Tellingly, one of the recommendations was to engage further with knowledge centres such as the region's universities and colleges.

in deriving economic benefits. For it is typically local actors, such as those spearheading the Synergy Centre, who take on the responsibility for developing the supporting institutions for firm creation and growth which has shown to be especially important for early stage technology firms and which are typically under resourced.

Figure 5-1: Primary actors in the GTA's emerging strategic governance network



As new actors emerge, particularly a more active province, the GTA is in a position to establish a much more integrated governance network that could respond better to the industry's socio-economic needs. The prospect of an ICT Toronto, as recommended in the recent ICT Strategy, would be particularly relevant in this respect. Though such a development may not appear all that important given the region's success, it will likely be essential to the industry's future competitiveness. As several noted in the interviews, there is a feeling that Canada's microelectronics industry is on borrowed time, with little signs that governments are interested in strategy development and investment at the level enjoyed by competing regions in the US, Taiwan and Japan, despite the federal government's much trumped up innovation strategy. As one prominent microelectronics researcher commented, 'the federal government has lost its focus – they thought microelectronics was done.'

With federal withdrawal from the strategic arena, the local level may become the best scale at which to formulate strategic plans that identify long-term economic goals and commitments and guide the development of the necessary institutional capacity to achieve such goals. With time horizons of up to fifteen years, it can be the most stable level of strategic economic governance, disassociated from political priorities and ideologies of senior levels of government. Also the local governance dimension will become all the more relevant to the extent that it shapes the local socio-economic environment, a factor that has become increasingly important in location decisions of firms and in the attraction and retention of skilled employees.

CONCLUSION

This chapter has focused on the organizational structure of the decision-making that has brought strategic investment in the GTA region. It has brought together enough evidence to suggest that the GTA is indeed witnessing the emergence of a locally-rooted strategic governance network that is playing an increasing role in establishing a local capacity in global knowledge intensive industries. This is being done through strategic planning, capability building and in shaping the socio-economic environment in support of strategic firm recruitment and retention efforts.

The role of federal strategic initiatives in building up the regional capabilities in microelectronics is perhaps one of the biggest differences with the Austin model, at least historically. To be sure, many were failures from a business standpoint. However, when understood in the context of knowledge accumulation and learning, they were a success. Without early Defence department R&D efforts, without MIL and MDC, it is very unlikely that Canada let alone the GTA would have a microelectronics industry worth investigating. Indeed, as noted in the introduction, it is remarkable just how rare such an industry is outside the US. In a 2003 global ranking of top fabless IC design firms, for example, there are only three countries with firms in the top 30: the US (20), Taiwan (6) and Canada (4).⁸⁰ This result is in no small way associated with the strategic efforts described in this Chapter.

⁸⁰ IC Insights, 2004.

CHAPTER 6

IN SEARCH OF THE DETERMINANTS OF STRATEGIC GOVERNANCE NETWORKS

INTRODUCTION

One of the central themes of the previous chapters has been the relevance of strategic governance in explaining the regional development and concentration of microelectronics industries in both Austin and Toronto. By developing the infrastructure that supports technology transfer and learning, by localizing R&D investments and embedding these assets into the region, and through strategic retention and recruitment, localities have become an important locus for non-market decision-making. For it is at this level and through these processes that the relevant knowledge infrastructure and institutions are able to better adapt to the ever changing needs of such a knowledge intensive industry.

Yet as is evident from the cases, there are very notable differences in the governance structures that have influenced strategic investment within the regions. Making the reasonable assumption that the regions have each been relatively successful in their respective industry subsector, these differences suggest that there may not be a single idealized structure. The Austin model, described as an exemplar of a strategic governance network, is complex, with an established community localizing and developing knowledge assets through a joined-up approach to governance. This is in contrast to the nascent Toronto organizational structure whose localizing dynamic has had both a supra-local and local dimension, neither of which has been very coordinated.

Why such differences exist is an interesting, if not obvious, question, particularly given the broad institutional constants of the analysis. Both regions of study are formerly governed by similar federal systems, where each level of government has broadly similar responsibilities. Both are also animated by the same Anglo-Saxon capitalist tradition that preferences framework governance over

interventionist forms of economic coordination. This similarity is reinforced by the main continental economic governance structures, NAFTA and the WTO, which place limits on interventionist policies in the interest of promoting fair and freer trade. Moreover, as Chapter 3 has demonstrated, each of the federal governments have taken a similar approach to institutionalizing cooperation between public and private sectors as part of an innovation policy effort to leverage the knowledge base in public sector research organizations. Yet for all these broad similarities, distinct organizational differences do appear to persist at the subnational level.

Answering this question is the task of this chapter. With only two case studies from which to draw upon, any answer will necessarily be more exploratory than definitive due to the statistical limitations in ascertaining which variables are most important, or indeed, which variables ought to be considered. As a starting point, therefore, the analysis limits its focus to five variables determined to be relevant from interview data and from a disciplinary standpoint. Considered are: the difference in size of the regions, the dynamics of the particular subsector specialization (equipment/ manufacturing versus design); social capital; federal government institutions and last, differences in local government related to the configuration of local institutions as well as municipal powers. This latter factor is particularly relevant to understanding patterns of strategic governance due to the evidence that governance of knowledge intensive industries has taken on a stronger local dimension, and in so doing, has intersected with regional governance systems.

However, before embarking on this investigation, the chapter begins with a more detailed discussion of the ways in which the governance patterns differ and how the various differences may influence the manner in which the process of governance actually transpires. This comparison therefore allows for some observations on how these differing aspects affect the actual process of governing, or in Rhodes' terms, of 'authoritatively allocating resources and exercising control and co-ordination'.¹

What is argued from the analysis of these two sections is that structural qualities of each of the networks do have an impact on the effectiveness of the

¹ R. Rhodes, "The new governance: governing without government," *Political Studies*, XLIV, 1996, p. 653.

governance processes, but that these differences, when contextualized within the broader institutional framework, may not necessarily suggest that one arrangement is in fact superior to another in achieving economic adaptation. For there is evidence that these patterns are in fact adaptations themselves of local and supra-local institutional configurations.

STRUCTURAL DIFFERENCES AND THEIR IMPACT ON GOVERNANCE EFFECTIVENESS

In assessing differences in patterns of strategic governance, the following analysis identifies the main organizational deviations in the patterns using the concept of 'governance networks' as a loose template to highlight related structural features. In recent work by Marcussen and Torfing, governance networks are defined generally as 'horizontal articulation[s] of interdependent, but operationally autonomous actors who interact through negotiations... and which contribute to the production of public purpose within a particular area.'² Conceptualized as a network, several structural features are relevant, some of which have been identified from interviews, and others which are theoretically relevant to their operational dynamic. These include the number of actors, the degree of linkages between actors, the locus of governance, centralization within the network, number of associative actors, and the scope of the network, the latter of which is closely related to the degree the network is integrated within the broader regional governance system. These aspects are summarized in Table 6-1 below for both Austin and Toronto.

² M. Marcussen and J. Torfing, 'Grasping Governance Networks', 8.

Table 6-1: Structural differences in patterns of strategic governance

ATTRIBUTE	AUSTIN	TORONTO
Interconnectivity	High	Low
# Actors	High	Moderate
Locus of governance	Local	Mixed
Centralization	Low	Moderate
Strategic scope	High	Low

Actors and Interconnectivity

With regard to structure, one of the most significant differences relates to the degree of linkages among the representative actors. This ‘degree of interconnectivity’ is relevant in that it reflects the extent to which the necessary resources – knowledge, authority, and resources - can be readily mobilized for a particular purpose. The degree of interconnectivity, therefore, has important implications for the effectiveness of the governance structure in coordinated decision making.

In the case of Austin, interconnectivity is high, with most of the relevant actors acquainted with one another to some degree, and cognizant of their respective capabilities and responsibilities. Such interconnectivity, having initially been fostered through the competitive bidding processes, is promoted through many of the region’s institutions that deliberately engage newcomers to the region, such as the Austin Ideas Network, or bring together an increasingly diverse group of civic-minded leaders as does AARO. The Chamber of Commerce has also been effective, to a degree, by a procedure in which leaders are given limited terms, after which they are asked to move on to their previous activities. The result of this rotation in leadership has been a fairly extensive network of influential ex-chamber leaders who have taken up positions at other influential organizations that have often been involved in the governance network at some point.

In contrast, interconnectivity in Toronto is remarkably low despite the relatively numerous associations that have some role in the governance process. This low interconnectivity is made evident by the limited shared awareness of the dominant

actors in the industry and lack of awareness in general of what capabilities exist within the region with respect to microelectronics and the various supporting services. As described in Chapter 5, linkages are often absent or weak at important junctures of the governance structure, such as between the university and the city, and between recruitment associations and the venture capital community.

Locus of governance

Another relevant structural difference is the level at which leadership functions and strategic decisions are made. In Austin, this locus of governance is very much at the local level, dominated by associative actors, with supra-local state actors, typically playing a supporting role by request. In Toronto, it has been mixed, though recent evidence suggests that a shift to the local level with more associative involvement may be underway due, in part, to disengagement by supra-local levels.

Whether this aspect of strategic governance is relevant to governance outcomes is very much a central question in this study. Does having a local-level decision making capability really matter for cultivating and sustaining a knowledge-based and innovative industry such as microelectronics? As is evident for the case studies, what appears to be of primary importance is strategic governance itself, whether this be from local level, as in the case of Austin, or from supra-local levels as in the GTA, where, in the early development stages, the federal government played such an important role.

Yet the fact that the local level is becoming more of a factor in the GTA, and that there is a growing recognition that a more integrated approach to economic governance is necessary to address strategic, economic and regional governance issues, suggests that the locus of governance is indeed an important structural trait to a strategic governance network. Simply put, the local dimension can broaden the strategic scope of the governance process (see below). Another advantage, discussed in greater detail in a later section of this chapter, is the ability of the local level to respond to problems that are beyond the focus of upper level governments and often, national industry associations as well. Supra-local actors are typically unable to respond to the specific demands of a smaller set of constituents due in part to political

pressure to present consistent policy positions across their jurisdictions. This can create a 'responsibility gap' that can often only be filled by actors operating within a local context. Resources for infrastructure may, in fact, be available from upper levels of government, but without local individuals committed to drawing them down, they go unused, caught in a web of 'dysfunctional relationships' between different levels of governments.

Centralization

The presence of multiple nodes of leadership in Austin compared to the few that appear in Toronto is another distinct difference in the two structures and is reflective of a difference in the degree of centralization within the network. In Austin, the multiple nodes of leadership have meant that more issues are identified and acted upon than could be achieved in a more centralized network structure as appears in the GTA. Austin's civic entrepreneurs identified in Chapter 4, for example, have each contributed to different dimensions of the knowledge infrastructure while other organizations have assumed responsibility for the social challenges affecting the industry, such as long-term education and training levels. With these issues often being resolved in parallel to one another, this decentralization can have the effect of expediting the adjustment process as regulatory issues, infrastructural development, training needs, for example, are attended to within a shorter time frame.

In the GTA, civic leaders are more representative of influencers than implementers and do not take on much commitment and responsibility for infrastructural development. Government actors have constituted the more visible nodes of leadership, and correspondingly, the governance structure has been more centralized.

Strategic scope

While the strategic governance process ultimately contributes to the 'production of public purpose', its success can often require the broader engagement of the system of regional governance. Addressing the water supply issue in Austin for example, was considered critical to the long-term viability of the microelectronics

industry and required negotiations with jurisdictional authorities that have little to no direct relationship to the industry. Likewise with quality of life issues; many of the policy issues that have strong implications for the retention and attraction of the highly skilled, are within the jurisdictional domain of the traditional arenas of regional governance. Strategic scope, therefore, reflects the extent to which issues and their solutions relevant to the development of a particular industry are assessed and acted on within the broader context of regional governance.

Structurally, this attribute is apparent in the degree to which strategic governance actors are integrated into the regional governance system. In Austin, the governance process has become increasingly sophisticated in this respect, with a relatively well established set of linkages between the economic and social actors. This enables decisions over strategic recruitment to be made along side social inclusion policies, quality of life factors, and public transit development. The effect is a more horizontal decision making process that recognizes the multifaceted interdependence of the economic and social arenas.

In Toronto, such breadth in strategic scope has yet to emerge, though awareness of such links between quality of life and retention of highly skilled individuals are beginning to spread.

ACCOUNTING FOR THE STRUCTURAL DIFFERENCES

At the outset of this research, the regional size difference, in economic and population terms, was the most notable independent variable identified as possibly significant to influencing governance patterns but which was left uncontrolled for in the two case study comparison. In the course of the research, however, it became apparent that there were other possibly more important independent variables that were seemingly having a bigger impact on the governance patterns but which were not initially accounted for. These are: the industry dynamics of the respective microelectronics industries, the social capital within the region, and differences in federal and local institutions of government. There are invariably other possibly relevant variables, but only those that registered as first order factors in the interviews

are considered here. In the following section, these primary variables are examined in turn, with the purpose of seeking a better understanding of how they may contribute to an explanation of why differences exist in the patterns of governance in the two regions despite the broad similarities in polity and political economy.

Relative size of industry

A study that compares two regions with a very significant population differential – a factor of about five - can elicit some important questions regarding research design. Having a more reasonable comparison, say of two major metropolitan centers, makes more intuitive sense, especially in a study of governance, controlling as it does, for population, economic diversity and other socio-economic factors that are intrinsic to major cities. Yet from a methodological standpoint, controlling for size would marginalize an analysis of the impact of size and how it may influence the pattern of strategic governance. Therefore, to determine whether size is a significant variable, the variation should be significant enough in the comparison to accentuate the difference. And certainly this is the case for this study.

The extent to which size has an impact on the associative dimension of economic governance is most evident from the case study of the GTA. From the standpoint of municipal and provincial officials seeking to engage the GTA's IT industry, there have been too many associations to identify 'a single voice' with which to work. This, in itself, partly reflects the diversity within the IT sector, and indeed of the entire regional economy. IT and its various subsectors (services, software, systems development and microelectronics) accounts for some 17% of the region's \$190 billion economy.³ And though significant, it competes with the third largest financial services centre in North America, the second largest automotive

³ This percentage is based on the 2004 study, prepared by E&B Data and published by GTMA, which found that the ICT industry had revenues of \$32.5 billion with over 3,600 ICT facilities. See http://www.greatertoronto.org/investing_sec_00.htm.

cluster in North America, and a very significant life sciences sector, for regional attention.⁴

The lack of a single voice is also due to the fair amount of jurisdictional jealousy and competition among associations which has made any consolidation among associations difficult. This is in contrast to Austin whose smaller associative system is both more stable and more effective. There is no regional duplication, as in the GTA, of technology associations. And, due to the efforts of George Kozmetsky, several of the most influential associations, such as the IC² Institute and ATC, have been designed to address particular associative functions in support of the high-tech industry without competition from upstarts. Having a smaller community has undoubtedly been of some assistance in making for a more efficient associative system. Not only does it make it easier to be aware of existing actors, but it also facilitates Austin's associative effort to engage new companies, thereby reducing the likelihood of duplication. In Toronto, by contrast, the diversity and size has contributed to a very poor awareness of the primary actors within the IT industry even among key actors themselves, such as the specialized legal service firm discussed in the case study.

From the perspective of the microelectronics industry within the GTA, size matters in a different way. It is not so much the population, or the size of economy *per se* that appears to matter, but the relative size of the microelectronics industry within the regional economy. In Toronto, few studies have recognized the existence of a regional microelectronics industry, preferring to examine the IT industry as a whole. This perspective is also carried over to the associative system, which is either IT or technology focused. The effect of this broad focus at the associative level is that there is little common interest within respective memberships. This contributes to what one microelectronics executive complained of, namely, 'a total lack of priority' within the associations. This dilution and lack of recognition as a sector in its own right, which has resulted in part from its relatively insignificant size within the

⁴ It is worth noting that improving the profile of the GTA's ICT sector has been made one of four main goals of the region's recent ICT strategy. See The Impact Group, 'ICT Toronto: An Information and Communication Technology Cluster Development Strategy For the Toronto Region', 2006.

region, also undermines the ability to make strategic decisions in its support. This effect was most evident after the Strategic Microelectronics Council was absorbed in ITAC, whereupon its eMPOWR initiative was watered down of its microelectronics focus to a broader orientation that included software as well.

In Austin, the visibility of the microelectronics industry, and technology industries more generally, does contribute to ensuring that both the associative governance system and the municipal government are responsive to its needs. Economic activity from the just microelectronics industry alone, for example, represents 27 percent of the Austin economy compared to 17 percent for all of Toronto's ICT industry.⁵ Though the effect of such greater visibility in having the industry's needs met through the regional governance system as a whole is difficult to assess, evidence suggests that it has been significant. In Austin, its technology industry has been a reference point against which many other decisions are made. This differs from large metropolitan regions like Toronto where social issues and large metropolitan issues are much higher on the municipal agenda. In Austin in the late 1980s, for example, several recruitment tools were passed through Council and country governments with microelectronics firms in mind, including tax abatements for Applied Materials, Motorola and Photoronics, the Freeport tax for manufacturing industries based in Travis county, and electricity rate incentives in support of major industrial recruitment and expansion.⁶ Quite apart from the fact that GTA municipalities do not have such powers to grant incentives (see section below: local governance institutions), there is no such example in the GTA of municipalities paying this degree of attention to its microelectronics industry.

To summarize briefly, though the link between size and strategic governance, especially the local dimension, is likely relevant due to its impact on visibility and governance focus, there are undoubtedly other factors at work in differentiating the patterns observed in the two regions, several of which are likely to be as influential.

⁵ Microelectronics in Austin includes semiconductor manufacturing, semiconductor equipment manufacturing, chip design and related R&D services. Most recent estimates of the GTA's ICT industry do not give any figure for microelectronics subsector. For the ICT sector, the E&B study includes all related manufacturing, development and services firms related to IT, software, and communications. Source: Angelou Economics Advisors (1998) and GTMA Fact Sheet 2005

⁶ P. Robbins, 'Creating environmental business in Austin', 7.

Industry dynamics

Unlike the design-oriented microelectronics industry in Toronto, which develops new designs for established chip technology, the industry in Austin has a notable presence of chip manufacturers, semiconductor manufacturing equipment companies and microprocessor firms, such as AMD and Intel, many of whom are carrying out more capital intensive, next generation R&D. Though, it should be noted, with recent off-shoring of manufacturing to Asia, this may be changing.⁷ SEMATECH, for example, is a research consortium catering primarily to developing the latest techniques in semiconductor manufacturing, cooperating extensively internationally and with area firms such as Tokyo Electronics and Applied Materials.⁸ What is argued here is that this basic difference in industry orientation within the two regions is partly attributable to the different degrees of strategic involvement at the local level. In Austin's manufacturing-oriented and microprocessor-focused industry, the interdependencies that exist between firms and research infrastructure is high, as is the corresponding degree of risk and job losses associated with a loss of this industry. This higher risk has necessitated a higher degree of governance, in contrast to Toronto where firms develop specialized integrated circuits while outsourcing the manufacturing to capital intensive chip plants, along with much of the associated risk.

To understand this link, it is useful to consider the complexity of the manufacturing process itself which involves more than a hundred steps of coating, baking and etching, and the fact that much of the innovation in semiconductors is driven by advances in new or improved manufacturing processes.⁹ As Appleyard et al (1996) observe in their comparison with the auto industry, "semiconductor product innovations...often require major changes in manufacturing processes because of tighter links between process and product characteristics that typifies semiconductors.

⁷ As a result of offshoring to Pacific Rim countries, only 5 of 12 semiconductor facilities that operated in Austin during the 1990s now remain in production. According to Angelou Economics, these trends suggest that fabless companies will provide the best opportunity for Austin in the long term. Source: AngelouEconomics, Technology Forecast 2003-2004. Austin Texas.

⁸ According to SEMATECH officials interviewed, these two companies would not have relocated to Austin had it not been for SEMATECH.

⁹ C. Freeman C and L. Soete, *The Economics of Industrial Innovation*, (London: Pinter, 1997): 182.

Moreover, imperfect scientific understanding of semiconductor manufacturing means that changes in the process technologies demand a great deal of experimentation.”¹⁰

This observation of the close links between process innovation and product development has become all the more significant as the industry evolves from the micro to nano dimension, a trend driven by existing limitations in micro-level techniques. As Dr. Kelly of IBM notes, such a shift is reinforcing this interdependency: “As we progress to the 90nm technology node and beyond, the interactions between design and process are becoming critical. No longer can designers develop a solution and ‘throw it over the wall’ to go directly into manufacturing. A more collaborative approach that integrates design, modeling and manufacturing will create innovative partnerships that cross traditional boundaries.”¹¹. Thus not only does cooperation become more important but so does having access to a manufacturing capacity where new design prototypes can be physically brought over to the manufacturing floor to discuss solutions. As one industry expert noted in an interview, “proximity matters: you can’t send a tool through the Internet – it is a run-wafers-through-the-fab process [which requires] an exchange of people and wafer equipment.” And, from a cost standpoint, he added, the expense of equipment and facilities exceeds ‘business justifiable levels’ that allows you to have a separate R&D facility. “If manufacturing goes somewhere else, it [becomes] too expensive to have your R&D in the US - so it goes with the manufacturing.”

The ongoing effort required to maintain a relevant research and manufacturing environment that can sustain a competitive advantage in a high-risk industry has been an impetus for Austin’s strategic governance network. Among Austin’s local leaders is a very real concern that a migration of manufacturing to Asia - led by companies seeking to take advantage of market proximity, government incentives and low cost labour – will lead to a migration of research and design capabilities not just in microelectronics but also nanotechnology.¹² According to one industry expert

¹⁰ Cited from Freeman and Soete, *Economics*, 183.

¹¹ Kelly J. ‘Semiconductor Business Trends’, IBM Albany Symposium, 2004.

¹² This concern was by industry analysts interviewed, as well as by a congressional White Paper on National Security in June 2003, which called for immediate response to the challenge of migrating

interviewed, semiconductor R&D and the manufacturing infrastructure have become facilitators for the development of nanotechnology in its infancy and without a manufacturing capacity, it is unlikely that firms will be able to develop a foothold in emerging nanotechnology markets. Indeed, the need to ensure that Austin maintains an up-to-date research and manufacturing infrastructure was made all the more apparent in 2003 with SEMATECH's decision to locate a research program in Albany New York in response a university's research program and to state subsidies.¹³

And as noted in Chapter 4, the perceived risk associated with a SEMATECH departure, together with the prospect of being unable to compete in the burgeoning area of nanotechnology, ultimately led to the creation of the Texas Technology Initiative. This Austin-led initiative established funding for a new materials research centre based in Austin to address the design limitation of existing semiconductor material, and set out plans for a foundry to ensure that the region's (and country's) industry have local (and domestic) access to an up-to-date manufacturing facility. The necessity for strategic action has thus been an essential mobilizer in Austin's strategic governance network, a necessity that has been largely absent for Toronto's firms.

In 2000, CMC (Canadian Microelectronics Corporation) had begun to advocate for a national foundry claiming that such a megafab in Canada would have a tremendous impact on the domestic industry. In addition to attracting skilled engineers and technologists the plant could also catalyze the creation of more fabless companies.¹⁴ Little came of this effort despite an offer by a Taiwan-based DRAM vendor, Mosel Vitelic, to build a 300-mm wafer fab near Montreal – though on the condition that the Federal government provide cash incentives of \$336 million together with an additional \$235-to-\$269 million in tax breaks from the provincial government, and an equity investment by the Société Generale de Financement.¹⁵ This movement to bring a foundry to Canada was soon dropped after recognizing that

manufacturing capabilities. See J. Lieberman, *National Security Aspects of the Global Migration of the U.S. Semiconductor Industry*, 2003, 3.

¹³ According to officials involved, this decision led to calls from 'tens of companies', confirming that they would set up a facility to be near SEMATECH's New York operation. Source: interview 2003.

¹⁴ CMC, *Microelectronics: Towards and National Strategy for Canada*, 2002.

¹⁵ F. Hung, 'Canada balks at Mosel Vitelic subsidies for 300-mm fab' *EETimes*, 09/06/2000.

the multibillion dollar investment could not be justified at a time of considerable volatility in the industry, and with many of Canada's firms prospering in niche IC design markets.¹⁶ "It came apart in the end because the big industries pulled back and stopped building big facilities", noted one industry actor, and "that the Federal government was not giving any subsidy".

Social capital

With several references made in both the literature and in interviews to the 'can-do spirit' of Texas, and to the competitive protestant orientation of Toronto business culture, it is difficult to ignore the very distinct difference in regional cultures between the two cases and the effect these cultures have on the configuration and workings of governance processes. The distinctive community cohesion exhibited in Austin has been very much a substrate to the negotiations and deliberations that have animated the socio-economic model. In the language of social science, Austin would be described as having a high degree of social capital, whereby the quality and 'stock of active connections among people' is high as is 'the trust, mutual understanding, and shared values and behaviors that bind the members of human networks and communities and make cooperative action possible.'¹⁷

In contrast, most of the evidence for Toronto points to a much weaker stock of social capital, to the frustration of several civic leaders and government officials interviewed. The tendency to compete rather than cooperate is a long recognized cultural dimension of the GTA. Yet it should be noted that Toronto is not entirely devoid of social capital as evident from a strong civil society that is supportive of many of the region's central social issues.¹⁸ Yet where economic rather than social

¹⁶ Source: industry interviews, 2005.

¹⁷ D. Cohen and L. Prusak, *In Good Company. How social capital makes organizations work*, (Boston: Harvard Business School Press, 2001): 4.

¹⁸ The Maytree foundation, for example, is a predominantly GTA focused association with a strong social equity mission. Its initiatives include accelerating the settlement of immigrants and refugees and reducing poverty. See www.maytree.com

issues are relevant, there is little civic virtue that, in Putnam's words, is embedded in a social network of 'reciprocal social relations'¹⁹.

Unsurprisingly, these differences do have strong historical roots. Texas, as one civic entrepreneur noted, 'gets a tremendous boost from its heritage', an assertion that has been well supported in the research of Texas. In a seminal 1969 study of Texas culture, Meinig writes that "all interpreters of Texas agree that the ten years of the republic had an immense psychological impact...The importance of the simple fact of independence has been indelibly stamped upon the memory of the Texan."²⁰ Remarkably, this sense of history, dating back to 1836 when Texas acquired its independence from Mexico, remains alive in the folklore and continues to fuel the attitude that 'it can be done; it has been done' in Austin, and Texas more generally. Yet this attitude is not passively passed on through the generations. As the same civic entrepreneur noted with regard to cultivating the region's leaders, 'you need to educate them [of the history]'

As a city at the centre of Texas, Austin benefits further from its own unique heritage, the spirit of which is perhaps best captured in the unofficial slogan of 'Keep Austin Weird' that appears on t-shirts and bumper stickers throughout the region. Progressive and liberal in its politics, the Austin region has long distinguished itself from much of the rest of a mostly republican Texas with noted support for its vibrant music scene, the Democratic Party and the environment. 'Environmentalists go to school in Berkeley and come to Austin to train', noted one interviewee.

In Meinig's analysis of Texan cultural geography, Austin owes this distinctiveness to a wave of predominantly German immigrants from Europe in the mid 19th century most of whom settled in the hill country of central Texas surrounding Austin. As "strongly community minded" people, who hung together in groups, these Europeans laid the foundation to a very different cultural milieu compared to the other four cultural regions of Texas he identified. This is especially

¹⁹ R. Putnam, *Bowling Alone: The collapse and revival of American community* (New York: Simon and Schuster, 2000): 9.

²⁰ D. Meinig, *Imperial Texas: An Interpretive Essay in Cultural Geography* (Austin: University of Texas Press, 1969): 39.

so when Central Texas is contrasted against East Texas. According to Meinig's examination of immigration patterns, East Texas is essentially the western extension of the older Deep South, displaying as it did "all those elements common to the patchwork of prosperity and poverty characteristic of the older states" such as slavery and large single-crop plantations. Drawing on traveler's reports at the time which frequently made note of the cultural differences between Central and Eastern Texas, Meinig writes: "Both [regions] worked with cotton, corn, and livestock, but the sprawling slave-worked plantation, devoted to cotton, with meager attention to anything else and more acreage in waste than in crop, was as certain an indication of the one as the much smaller, family operated, diversified farm field and pasture, garden, orchard, and vineyard, was of the other."²¹ What would today be considered a comment on social capital, Meinig adds that "while one [region] seemed to be largely a fluid, unstable assemblage of opportunists, the other, from its very initiation in Texas, was a remarkable interlocking network of organized clubs and societies".

By the 1960s, at the time of Meinig's writing, Central Texas had maintained much of its early diversity of peoples such that no uniform influence prevailed as it did in West and East Texas where the rugged Texas Anglo-Protestant of southern heritage had become a stereotype. Religious groups and political leanings of all sorts represented themselves, leading Meinig to conclude that the region had 'a social heterogeneity and consequent flexibility quite unlike anything to be found anywhere else in Texas'.²² Indeed, four decades on, economic geographer Richard Florida finds that Austin continues to benefit from this tolerance, having become a creative locale that is second only to San Francisco among large cities. This finding is the outcome of the author's creativity index which considers the creativity of a region to be correlated to the creative class share of the workforce (those with a certain level of education), high-tech industry, innovation, and diversity, the later of which is a

²¹ Meinig, *Imperial Texas*, 53.

²² Meinig, *Imperial Texas*, 109

reflection of a region's tolerance as measured by the concentration of homosexuals living in the region.²³

There has been no similar study explaining the history of Toronto's social capital as succinctly as Meinig's account of Texas. It is possible, however, to piece together some accounts of Toronto's business culture from the literature on Ontario, and Canada more broadly, that address the issue of how culture has affected collaborative action. As with East and West Texas, Ontario is predominantly of Anglo-Protestant heritage and similarly characterized, at least in the business culture, by the ideal of rugged individualism and independence and the corresponding values of competitiveness.²⁴ In contemporary multicultural Ontario, there is no cultural imagery or mythology of these values as has been carried through time by the Texan cowboy persona. Nonetheless, these values have and continue to permeate the substrate of Ontario social and business culture.

In their study of Canadian industry in the late 1980s, Atkinson and Coleman find that throughout Canada there is a strong firm-centered industry culture that is protective of their autonomy and suspicious of government intervention. The authors find that this attitude is even reflected in their associations which champion their members' independence and maintain a suspicion towards cooperating with the state over issues of economic policy. These values, they argue, were in fact strengthened by Canadian industry's preference for capital market system and retained earnings for investment which enabled them to retain their independence from the banking system and the state. "Without the experience" they argue, "of direct intervention by banks in the internal affairs of business, firms have been free to celebrate the virtues of

²³ R. Florida, *The rise of the creative class: and how it's transforming work, leisure, community and everyday life* (New York: Basic Books, 2002).

²⁴ In their discussion of the prospects of collaborative action in Ontario, Gertler and Wolfe note that Ontario's manufacturing companies have been 'strongly shaped' by the Anglo-American culture of 'rugged individualism, self-sufficiency and competitive rivalry' which has acted as a barrier to cooperation. See Gertler M. and D. Wolfe. 'Ontario's Regional Innovation System' in H. Braczyk, P. Cooke and M. Heidenreich (eds.), *Regional Innovation systems*, 2nd edition, London: Taylor and Francis, 2003

independent management and to be skeptical about the competence of governments in industrial matters.’²⁵

These observations corroborate with comments from several civic leaders in the GTA. One experienced IT leader and association founder, for example, noted that there has never been a culture in Toronto for having private sector support for organizations such as SMART Toronto and that the interest in it was ‘brand new’ at the time of its founding in 1995. Another added that the weak social capital in Toronto stems in part from having a concentration of national firms and subsidiaries. Leaders of national firms see themselves as Canadian leaders and are ‘unsure about their leadership role they should take in Toronto’. As for the region’s many multinationals, their leaders are often more internally focused, and as subsidiaries, do not have much authority to make decisions to enhance or support the local institutional environment. As a result these foreign owned firms, of which there are many, do not contribute much to the social capital in the region. The result is an environment that is more competitive than cooperative.

These arguments by the region’s leaders, explaining why the region’s social capital is weak, should be treated with some caution. Austin too, has many multinational subsidiaries, and officials have also expressed similar difficulties. The difference in Austin, however, is that the region has established leadership institutions to address this very problem. These organizations, like 360 Summit, AARO, and the Ideas Network, deliberately and persistently seek to engage the leaders of newly recruited and recently established firms (as well as the very successful such as the many ‘Dellionaires’) and bring them into the region’s governance system. And in the process, these individuals are educated of their interdependence with the region’s prosperity, and of the need to support the Austin infrastructure and environment. These formal ‘social capital institutions’, which have been important to regenerating leadership and relationships of Austin’s governance network, suggest that social capital is something that is actively cultivated and not simply left to emerge from chance developments.

²⁵ M. Atkinson and W. Coleman, *State Business and Industrial Change in Canada* (Toronto: University of Toronto Press, 1989): 40.

Ontario, it is interesting to note, is not universally of Anglo-protestant heritage. In fact, outside of this heritage is one of the province's most successful high-tech regions, the Waterloo region, which is noted both for its associations and civic involvement by leaders of its major firm, such as Research in Motion. As with Central Texas, Waterloo owes its origin and founding culture to German émigrés.²⁶

Federal institutions of government

Understanding how differences in federal institutions are implicated in patterns of strategic governance is a challenging task and any satisfying account is beyond the scope of this analysis. National political systems in the US and Canada were, at least initially, assumed to be approximate equivalents for the purpose of this comparative study, as both are structured as federalist systems and both engage in a similar style of national strategic governance. Needless to say, Canada and the US have very different federal governments, differences that have undoubtedly affected federal-local interactions, and not least strategic economic initiatives.

For example, in their study of Canadian industrial policy throughout the 1980s Atkinson and Coleman find Canada's Westminster parliamentary system to be a major explanatory factor for why the country has done such a poor job in forging what they call 'anticipatory industrial strategy' for national sectors. The Westminster model promotes a 'weak state tradition' where matters of public policy are shaped through institutionalized contestation and which ultimately discourages the development of an autonomous bureaucracy.²⁷ Only when sheltered from partisan conflict, argue the authors, can bureaucracies develop effective long-term strategies. It is interesting to note that in the case study of the GTA, much of the federal government's strategic efforts took root in military organizations. Once these efforts were moved to the civil side with the establishment of the Department of Industry, Trade and Commerce in the 1960s, little more strategic planning was done for the industry. In the US, the congressional system, from the evidence in this study, has for the most part been beneficial to strategic governance. As discussed in the case study,

²⁶ See J. Nelles, 'Civic Capital in the Waterloo Region: Enabling Regional Economic Governance', Conference paper, Canadian Political Science Association, London ON, June 2005, p. 5.

²⁷ Atkinson and Coleman, *The State*, 57-58.

Texas has had several high-ranking congressional officials in the house and senate with considerable political clout due to their having been repeatedly re-elected to federal office. Such clout was put to use on several occasions of importance to Austin's development, including the passing of the anti-trust laws in the early 1980s and in establishing SEMATECH.

Another significant federal factor is the extent to which regionalism influences locational decisions of major investments in Canada as compared to the US. As Savoie notes in his study on regional economic development, the federal government is pressured to present consistent policy positions to all ten regional economies and to be even handed in its distribution of economic activities: 'Provinces have come to expect Ottawa to work toward a fair distribution of economic activity throughout the country, with some smaller provincial governments claiming that this is in fact the federal government's main responsibilities.'²⁸ Indeed, the fact that as Canada's economic centre, the GTA is the only region in Canada to have no federal strategic funds program is very much a testament to this federal impulse.

In a 1979 paper for the Science Council of Canada, Richard Simeon further emphasizes this regionalist logic in Canada, arguing that any national industrial strategy will have to take on the significant regional disparities in wealth that have long been the pre-occupation at the national level. But he adds that this would be problematic due to competing economic realities such as the benefits of concentrating investments in regions with greater potential to realize growth due to, for example, existing infrastructure strengths and other locational advantages.²⁹

The US federal government has also been concerned with regional distribution albeit for different reasons and to a different degree. As Pugh O'Mara argues in her study of knowledge intensive regions in the US, the federal government, after World War II, became concerned with the dispersion of industrial assets, not for the economic disparities, but out of concern for sheltering major R&D centers from

²⁸ D. Savoie, *Regional Economic Development: Canada's Search for Solutions* (Toronto: Toronto University Press, 1986): 139.

²⁹ R. Simeon, 'Federalism and the Politics of a National Strategy', Science Council of Canada. In *The Politics of an Industrial Strategy: A Seminar*, (Ottawa: Minister of Supply and Services, 1979): 10.

enemy attack.³⁰ Most of US military capabilities had been built up in major cities in the Northeastern and Midwestern parts, and were considered prime targets in an atomic age. This concern led to an industrial dispersion policy which ultimately benefited suburban regions and Southern and Western parts of the country, including notably, Texas. Since its modest support for the Balcones Research Center in 1946, the federal government financed nearly \$US1.4 billion in military contracts from 1966 through 1978 in Travis County alone, with three organizations, Tracor, UT and Texas Instrument, receiving 86% of the total. More recent figures indicate that the region continues to benefit from military spending, with estimates of total federal spending between 1997 and 2001 amounting to \$1.9 billion, 90% of which went to computer related organizations.³¹

This dispersion policy, which benefited Austin considerably by helping it develop its knowledge base, has not, however, been as encompassing as the regionalist forces have been in Canada. It is difficult to imagine, for example, the Canadian federal government leaving the location of a billion dollar federal investment to nation-wide competition, as the US federal government did in the case of SEMATECH. Yet it was this 'economic development sweepstake', as one Austin economist described it, that helped develop the strategic governance network in Austin.

Local institutions of government

Local government in Texas and in the US more broadly has much in common with its Canadian comparator. As Andrew Sancton points out in a comparative analysis of the two systems, Canada's system of local government is closest in form to that found in the US than to any other Western democracy.³² Both have directly elected mayors, mostly non-partisan elections, multiple special purpose bodies (or in the US, special districts) and rely largely on property tax for its revenue. There is nonetheless a fundamental difference, namely the relationship that cities have with

³⁰ M. Pugh O'Mara, *Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley*. (Princeton: Princeton University Press, 2005): 17 & 29.

³¹ Dollar figures are 2001 dollars. See Robbins, *Creating*, 11.

³² A. Sancton, Canadian Cities and the New Regionalism, *Journal of Urban Affairs*, 25 5, 2001.

their state/provincial governments, a relationship that, as many regional studies have highlighted, is a determinant in understanding the effectiveness of local governance systems. And as is argued here, it is a factor in understanding differing degrees of local engagement in strategic governance between Austin and Toronto.

That governmental fragmentation is high in Texas is by no means a new observation. Indeed such fragmentation is characteristic of local government in much of the US where the vast number of local government units - 87,000 in 1997 - is often cited as a significant problem requiring major municipal government reform.³³ The proliferation of independent units of government, argue its critics, has hindered the ability of regions to mobilize resources necessary to solve infrastructure problems, has led to duplication of services, imbalances in income and resources, and not least, to a lack of rational land use planning which has neglected environmental issues.

At root of this proliferation is extensive local autonomy that is institutionalized through various kinds of local governmental bodies each with sufficient independence to create jurisdictional conflicts. In Texas and elsewhere in the US, cities over a certain population have the option to operate under what is called 'home rule', which gives them the authority under the Texas laws to draft and adopt a charter for its own government.³⁴ With a charter, they are released from state legislative control and free to create their own laws provided that they are in agreement with the state constitution and general laws. And it should be noted that, as in Canada, Texas municipal governments are also outside the constitutional jurisdiction of the federal government. In the Austin region, where all major cities have been incorporated, cities are the largest local government body.

³³ See for example, C. Mitchell-Weaver, D. Miller and R. Deal, 'Multilevel Governance and Metropolitan Regionalism in the USA' *Urban Studies* Vol. 37 5-6, 2000; McLeskey *The Government and Politics of Texas* (Boston: Little Brown and Co. Ross B. 1969): 279; M Levine, *Urban Politics: Power in Metropolitan America*, (N. Itasca: F. E. Peacock, 1996): 310-313; F. Firsken and D. Norris, 'Regionalism Reconsidered' *Journal of Urban Affairs*, Vol. 23, 5 2001, p. 471; Mitchell-Weaver et al. 'Multilevel Governances'; and J. Collin, Leveillee, and Poitras, 'New Challenges and Old Solutions: Metropolitan Reorganization in Canadian and US City-regions', *Journal of Urban Affairs* Vol. 24 3, 2002.

³⁴ Home rule originated in the nineteenth century because state legislators, who were predominantly rural, were drafting local charters that did not reflect the sentiments of urban citizens. This tension led to the 1875 revolt of Missouri and subsequently to the home rule provision. Source: F. Gant, I. Dawson, and L. Hagard (eds.). *Governing Texas*, (New York: Thomas Crowell Company, 1966): 265.

The second general-purpose government in Texas is that of the county. These are functional administrative agents of the state, and unlike cities, are limited in their actions to areas of responsibility specifically spelled out in laws passed by the legislature. Typical responsibilities include building and maintaining roads, county airports, constructing and operating jails; and operating the judicial system. City-county relationships in the state are often marked by 'a zealous guarding by each of their own independence', though cooperation is active in some areas such as airports and fire protection.³⁵

These government bodies are complemented by the numerous special districts, which exist as separate entities with taxing authority, and with substantial administrative and fiscal independence from general-purpose local governments.³⁶ Unlike, full service local governments, special districts typically serve only one function and are legally accountable to the state. In Travis County, the largest county in the Austin MSA, special districts have been set as authorities for a broad range of responsibilities including water management (e.g. Lower Colorado River Authority), social housing (Austin City Housing Authority) and municipal utility districts (MUD). In addition to managing water and sewer systems, MUDs have been recently granted authority to develop parks and recreational facilities. The largest group of special districts, however, is school districts, which are responsible for both the K-12 system and community colleges, such as the Austin Community College.

Table 6-2: Local Governments in the Austin MSA, 2002

	Bastrop	Caldwell	Hays	Travis	Williamson	Total
Counties	1	1	1	1	1	5
Area Municipalities*	4	4	12	16	13	49
Special District	11	4	9	55	29	108
School District	4	3	4	8	11	30
Total	19	11	25	79	55	187

* includes cities, towns and villages

Source: 2002 Census of governments, US Census Bureau.

As Table 2 highlights, these various government units total some 187 in the Austin MSA, or about one for every 7200 citizens. This is far less than its northern

³⁵ MacCorkle S. and D. Smith, *Texas Government* (McGraw Hill Book Publishers, 1968): 347.

³⁶ Definition of US Bureau of Census

neighbour Houston, which is a city surrounded by 790 governments in its region, but is nonetheless, a significant number to exasperate coordination problems.³⁷ This is particularly so given the few regional institutions facilitating coordination recognized under state law. And those that exist are all voluntary associations of councils, county and municipalities. For example, the Central Texas Council of Governments, which was established in 1968 to assist local governments in planning for common needs and for regional development, is a voluntary association of cities, counties, school districts, and special districts within the seven-county Central Texas region. Another such organization is the Texas Association of Regional Councils which was organized in 1973 by an 'interlocal' agreement among Texas' 24 regional councils of governments to assist regional councils in strengthening their capabilities to serve their local government members. Though useful as facilitators of new relationships and for educating public and stakeholders of a region's challenges, these voluntary associations are but loose confederations with no institutionalized power. "There is no way, noted one observer several decades ago, 'of ensuring continued support and cooperation except by persuasion... and [they] can hardly be expected to generate the kind of pressure needed to overcome the predictable resistance to new ideas and programs."³⁸

The local governance system in the GTA, is not nearly as fragmented as the Austin region, but is nonetheless reasonably complex. Like the Austin MSA, the region constitutes five regions, or 'regional municipalities' in the case of the four regions with two tiered local government systems. Collectively, these regions consist of 25 area municipalities, and another four upper tier regional governments of Durham, Halton, Peel and York. Together, the local and regional governments take responsibility for many of the functions controlled by special districts in the Austin MSA. The GTA also has numerous special purpose bodies carrying out governmental functions, though these are not quite the same as American special districts, which have taxing authority and, in some cases, elected representatives. As Table 3 points

³⁷ H. V. Savitch and Paul Kantor, *Cities in the International Marketplace: The Political Economy of Urban Development in North America and Western Europe* (Princeton, New Jersey: Princeton University Press, 2002)

³⁸ McLeskey, *The government and politics of Texas*, 281.

out there are approximately 46 such bodies, which is far fewer than the 108 special districts in the Austin MSA (see Table 2).³⁹ With school boards, the number of local governments in the region amounts to one for every 62,000 citizens, or a tenth of the number in the Austin MSA.

Table 6-3: Local Governments in the GTA

	Durham	Halton	Peel	York	City of Toronto	Total
Regional	1	1	1	1		4
Area municipalities*	8	4	3	9	1	25
Special Purpose**	6	6	9	4	21	46
School Boards	2	2	1	2	2	9
Total	17	13	14	16	24	84

*includes cities, towns and townships

** includes boards and agencies

Sources: regional websites, Ontario Institute for Studies in Education of the University of Toronto

Yet not only does the GTA have fewer government units, they also have had more effective regional governance institutions than in Austin. This stems in part from the fact that, in Ontario, there is no ‘home rule’ provision for cities. Under the Canadian constitution, full authority for municipalities ultimately lies with the province, which is able to exercise major changes to local governance institutions, consolidating municipalities, often with little local consultation.⁴⁰ Indeed, the province has often carried out such restructuring in the region, most recently in 1998 with the amalgamation of six municipalities into one single tier City of Toronto.⁴¹

Provincial control over municipalities is extended further by several provincially supported governance institutions that have jurisdiction over local and regional territory and functions. The Toronto Area Transit Operating Authority, Niagara Escarpment Commission, the Toronto and Region Conservation Authority and the Ontario Municipal Board, for example, ensure that “the provincial government has all the authority and administrative capability it needs to decide how

³⁹ There is no formal counting carried out of special purpose bodies in Canada as there are of US special districts by the US Census Bureau. In counting special purpose bodies, only those with sufficient autonomy from municipal councils were counted. These numbers, therefore, exclude all council and advisory committees, which are typically counted as being a special purpose body in government documents.

⁴⁰ Sancton, *Canadian cities*, 544.

⁴¹ See A. Sancton, *Merger Mania: The Assault on Local Government*, (Westmount: Price-Patterson, 2000).

the region will develop.”⁴² In addition to these specialized governing bodies, are broader regional governance authorities for the GTA that have often provided the only formal recognition of the GTA as a functionally integrated political region. Only one of these, the GTMA, is currently in operation, providing coordination on inward investment into the region. This is due to the fact that no other previously established GTMA organizations has survived.

In 1987, in response to concerns that the absence of regional planning and infrastructure investment was affecting the economy, the Greater Toronto Coordinating Committee was created and composed of municipal, regional and provincial civil servants, and soon after, a provincial organization within the bureaucracy called the Office of the Greater Toronto Area.⁴³ These two bodies would help with communication flow among the various stakeholders and build consensus on regional problem solving. A decade later, the Greater Toronto Services Board (GTSB) was established as a supra regional authority for all five regions. Created from the recommendations of the GTA Task Force report, itself commissioned at the time when the region was enduring a prolonged recession, the GTSB was given jurisdiction only over Toronto’s commuter rail system. By 2001, it was phased out as the Ontario government reassumed the responsibility.

The province of Ontario has thus long been directly involved in the restructuring and planning for the region, to a degree that is unknown in Texas. It is undoubtedly responsible, at least historically, for the internationally held view that Toronto is ‘the city that works’.⁴⁴

⁴² F. Frisken, ‘Planning and Servicing the Greater Toronto Area’, in D. Rothblatt and A. Sancton (eds.), *Metropolitan Governance: American/ Canadian Intergovernmental Perspectives* (Regents of the University of California, 1993): 164.

⁴³ Wolfson and Frisken, ‘Local responses’, 369.

⁴⁴ Toronto’s recognition as a city that works is attributed to the provincial government’s efforts in 1953 to create a federated form of metropolitan government for the region municipalities through which it was able to overcome major public service deficiencies. This according to Frisken (1993) made the name ‘Metropolitan Toronto’ synonymous with effective metropolitan administrations throughout North America. See also J. Lemon, *Liberal Dreams and Nature's Limits. Great Cities of North America Since 1900* (Toronto: Oxford, 1996) for a discussion of Toronto as the city that works.

Governmental fragmentation and community involvement

It is within this comparative local institutional context that observed difference in strategic governance can be partly understood. In a fragmented local governance system as in Austin, where jurisdictions frequently overlap and compete, civic entrepreneurs are very relevant to the local governance system in Austin. And once established and accepted as governance actors in their own right, civic entrepreneurs and associated organizations, such as AARO, become fully embedded agents of transformation and resolution for any local and regional issue that falls into the responsibility gap between local and state and federal jurisdiction. And relevant to strategic governance is that many of these issues are relevant to local high-tech industry and the microelectronics industry. This is in contrast to Ontario, where historically, because of provincial responsibility and action, there has been little need for, or acceptance of, civic involvement in regional issue. Thus when understanding why the local component to strategic governance is stronger in Austin than in Toronto it is partly for this reason.

The link between fragmentation and civic entrepreneurship is evident from interviews with Austin's civic entrepreneurs, though it is not fully acknowledged as being so. As noted in Chapter 4, one of Austin's most notable civic entrepreneurs, Neil Kocurek, was described as someone who could identify issues 'with no political boundary line and bring together people from the entire region to talk about these issues.' And his successes in identifying issues with no political boundaries were many: from setting up a convention centre to revamping regional health care networks, outcomes, that within a local system of fragmented authority, have required bringing various governing bodies together to find solutions. The existing fragmentation was very much apparent in a discussion of why AARO was so important in a recent effort to expand the region's transportation system to accommodate the growing congestion from Austin's bedroom communities. In the words of one of its most noted leaders:

“Who is responsible to bring [special districts] together and make things happen? No one. If you ask them to do something, they will do it and do it willingly. But they don't just automatically take up these issues. They will

come and complain, of course: 'the roads are killing us'. And who do they go and complain to? They will complain to maybe the mayor of Austin. But the mayor of Austin can't build roads that are regional. So there isn't anybody to complain to. Somebody, therefore, has to make it happen. This is the role of citizens - citizens who own local businesses want to make those things happen."

This quote says much about the gap in responsibility that civic entrepreneurs address. This same entrepreneur describes another instance where intervention was required. Travis country, which is one of the five counties that make up the Austin area, was at one point repeatedly 'beaten up' at the bi-annual state legislative sessions, outvoted as it was on many of its initiatives. AARO took it upon itself to invite the leaders of the legislature to talk to a committee regarding the source of their misfortune, where they were told that it was, in fact, their neighboring counties that were fighting Travis Country through the legislature, and not the legislature itself. And they were doing so with a very narrow perspective their county interests. This prompted AARO to convene regular meetings to align county objectives and convey an understanding of interdependence, the result of which has been an end to the legislative battles. Again, at issue was the lack of a single jurisdictional authority with the necessary interest and authority in resolving important regional governance issues.

In contrast with Ontario, where citizens 'need not worry much about regional governance within metropolitan areas' since provincial governments are in charge - and 'that is how it should be'-⁴⁵ there has been little political space for civic entrepreneurs. And by the same reasoning, the fact that new civic groups are only just emerging in the GTA with a governance intent is, in part, due to recent neglect by the provincial and federal government, in regional affairs. The Toronto City Summit Alliance emerged in the wake of the collapse of the only regional governance institution, the GTSB, and after significant downloading by the provincial government of numerous services. These included social housing, public health, and childcare, together with local transit, regional rail and bus commuter services and

⁴⁵ See J. Lightbody, 'A new perspective on clothing the emperor: Canadian metropolitan form, function and frontiers'. *Canadian Public Administration* 40, 1997.

land ambulance services. In commenting on why the TCSA was founded, one civic leader noted that there was nothing between two levels of government in Ontario that captured the region, and no 'obvious group' that could address the many interrelated issues that are relevant to integrated knowledge intensive economies. "When you look at the issue of each of the players in the R&D field, university, teaching hospitals, the private sector, venture capitals – they all have their own bodies but nothing that cuts across the constituencies."

All of this is relevant to strategic governance because of the increasing embeddedness of economic governance within the regional governance system. As previously noted, the need to consider strategic industrial issues endogenously to the regional planning process implies that effectiveness of regional governance is interdependent with the effectiveness of strategic governance. The noted differences in governmental fragmentation therefore do explain in part the differences in strategic governance patterns, in particular the diverging strength of the local dimension between the two regions.

Municipal powers

The importance of municipal powers is at the centre of much contemporary debate regarding the health of Canadian cities, not least within the GTA, which is still struggling with the downloading of responsibilities from the province. Both the provinces and federal government have been considering new financial arrangements for cities to help them cope with infrastructural deterioration and ensure that they have the resources to remain globally competitive and help attract investment while retaining and developing local talent. What is not on the agenda, however, are powers widely used by US municipalities to award locational incentives to firms. In Ontario, under the Municipal Act of 2001, municipalities are prohibited from assisting 'directly or indirectly any manufacturing business or other industrial or commercial enterprise through the granting of bonuses for that purpose, and have been since 1887.'⁴⁶

⁴⁶ According to the code a municipality shall not grant assistance by (a) giving or lending any property of the municipality, including money; (b) guaranteeing borrowing; (c) leasing or selling any property

On economic grounds, this prohibition is well supported by several long-standing arguments.⁴⁷ Incentives used for industrial recruitment, domestically, lead only to a zero-sum game, where economic activity shifts from one location to another with no net gain in employment. And from an international standpoint, incentivized recruitment need not even do much to influence the interest of firms in relocating into a country. According to one study, the two to three hundred significant relocation opportunities that arise each year are pursued by some 15,000 local economic development agencies, a degree of competition that reduces any return on investment to well below the opportunity costs. Moreover, as competition increases so do the costs required to successfully recruit, with several municipalities ‘over bidding’ and ultimately taking away resources for, say, investments in quality of life. And no subsidy can prevent firms from relocating a few years on, as have several of Austin’s manufacturing facilities. Indeed, local economic development officials in the GTA’s regions expressed relief to not having such powers, as they did not desire to be involved in interregional competitions for foreign investments that consume considerable resources to questionable advantage.

Yet for all their costs, municipal incentives do appear to have acted as a catalyst to local agency, and strategic governance more broadly, helping open a space for local actors to influence the development trajectory of the local economy. In addition to having used it to develop strategic concentrations of like firms, incentives in Austin have helped begin a dialogue which has helped engage these economic actors into the regional governance system.

Under Chapter 380 of the Local Government Code of Texas, municipal governments may provide loans and grants of city funds, as well as the use of city staff, city facilities, or city services at minimal or no charge for “the development and diversification of the economy of the state, elimination of unemployment or underemployment in the state, and development and expansion of commerce in the

of the municipality at below fair market value; or (d) giving a total or partial exemption from any levy, charge or fee. Source: Ontario, Municipal Act, c. 25, s. 106 2001.

⁴⁷ For a summary of the arguments see, S. Loveridge, “On the Continuing Popularity of Industrial Recruitment,” *Economic Development Quarterly*, 10(2), 1996, pp. 151-152.

state.”⁴⁸ Although completely discretionary, these powers have been widely used in Texas in the understanding that economic development is very much a public purpose, justifying the use of these incentives.⁴⁹ More than 700 tax abatement agreements have been executed by Texas local governments since the early 1980s and are accredited with having created more than 222,000 new or retained jobs.⁵⁰ And in the period between 1996 and 2001, Austin local government awarded industries based in Travis Country a total of \$193 million, much of which has gone to the IT sector.⁵¹

Although these figures suggest liberal use of incentives, they have been awarded to only a small, albeit important, percentage of firms. Over the past 25 years some 15 projects have been incentivized and these have been what the city calls marquee projects, the most recent of which was Samsung in 1995. And in contrast to Toronto, the opinion among local governance actors is near unanimous with regard to their importance. MCC, SEMATECH, for example, would not have been in Austin without such incentives.⁵² As one local actor noted, ‘Austin, unlike many communities, has done a terrific job of being frugal about how incentives are given to companies’, given, as they are, only on the condition that firms contribute to local infrastructure. This policy was most recently formalized in Austin’s first economic development policy where it articulated its shared investment policy which it uses to ensure that incentives are awarded only on the condition that firms commit to the community beyond its primary business. In the 1995 tax abatement agreement with Samsung for example, 20% of the property taxes owed by Samsung have been apportioned to support job training of targeted workers (including cost of child care),

⁴⁸ From Texas, *Handbook On Economic Development: Laws For Texas Cities* p. 149

⁴⁹ According to the handbook, this view prevents cities from simply writing out checks to interested business. Rather they ‘must ensure that the public purpose of economic development will be pursued by the business. So if a city provides a grant or a loan to an industry, the city should enter into a binding contract with the funded industry that outlines what steps the business will take that justify the provision of public funding (creation of jobs, expansion of the tax base by construction or enhancement of the physical facilities etc.). The city should provide in the agreement a recapture provision that if the business does not fulfill its promises.’

⁵⁰ Texas, *Handbook*, 399.

⁵¹ 2001 dollars. From Robbins, *Creating environmental business*, 7.

⁵² According to Admirable Inman and other members of MCC’s site collection committee, cash incentives including those at the local level were very much an important reason for Austin’s successful bid. Source: D. Gibson and E. Rogers, *R&D*, 148.

with 15% as an additional bonus if the company fills 40% of jobs with targeted workers.⁵³ Tax abatement, it should be noted, only began in the early 1990s after amendments were made to state laws allowing local governments to offer incentives to attract new companies and expand existing ones. Prior to this, local governments offered 'virtual' tax abatements whereby companies were 'ignored', provided they built, as they did, on the outskirts of the city.⁵⁴

It is important, however, not to overstate the role that municipal incentives have in catalyzing local agency. The City of Markham's use of a provision in the Electricity Act to guarantee a reliable energy source for IBM to secure its expansion, is an example of how creativity in meeting the needs of potential firms can be as useful as financial incentives. Such a view corroborates with a prominent civic entrepreneur in Austin, who reflecting on the SEMATECH and MCC bid pointed, out that it is not just money that is important but how thoughtful they are and whether they respond to the needs of the client.

Thus for all their controversy, incentive powers do give an added policy instrument to help shape the strategic direction of the economy by giving leverage to actors in negotiating with firms in a specific industry to relocate, or expanded in the region. And in so doing they contribute another dimension to an explanation of why local agency is stronger in the strategic governance pattern in Austin than in Toronto.

CONCLUSION

This chapter has sought out the factors that best explain the different natures and forms of strategic governance network that have emerged in the two case studies. Though several variables are assessed, there are three that are particularly noteworthy. Social capital, together with the configuration of institutions of federal and local government, stand out as the most convincing in understanding why the networks differ. In the case of Austin, these three variables are very much antecedents to the emergence and stabilization of its network. A high level of social capital,

⁵³ The Pew Charitable Trusts, *Financing Child Care in the United States: An Illustrative Catalog of Current Strategies*, 1997, <http://www.nccic.org/pubs/financing-cc/index.html>.

⁵⁴ Robbins, *Town Pennant*, 8.

together with a fragmented local government and an empowered municipal government, has fostered a culture of civic entrepreneurship - and subsequently a strategic governance network - that has become an essential part of the regional governance system. Moreover, the strategic governance network, once developed, has proven to be an effective structure of governance for helping adapt the local economy to ever changing global markets.

In the case of the GTA, a governance network is emerging despite a low level of social capital and in a more centralized institutional milieu. This suggests two conclusions about the nature of strategic governance networks. First, there is no one path in the development of the network, as it can be learned and imitated. Ontario's Regional Innovation Network program is certainly interesting in this respect. Second, the fact that it is being replicated speaks to several intrinsic advantages to having a strong local dimension to strategic governance, namely a more responsive and tailored governance process for economic adaptation.

CHAPTER 7

THE COMPLEX INTERIOR OF A HOLLOWED STATE

This thesis has carved out a subnational dimension of non-market economic governance to highlight a growing phenomenon in the coordination of knowledge economies in North America. This phenomenon is that of local strategic governance as manifested through strategic governance networks. These networks capture the constellation of mostly local actors who take part in a process of strategic coordination of local knowledge institutions and infrastructure to help transform and adapt local industries to the competitive reality of global markets.

In these remaining paragraphs, strategic governance networks are re-situated within the state from where it was extracted. The purpose of doing so is to gain some understanding of how these networks are stabilized and whether they ought to be considered an intrinsic part of the state structure. Can these networks be relied upon as a legitimate site of agency within the state, and if so how? Given the civic dimension and informal nature of the networks, these are not simple questions either for public accountability reasons, or simply because of challenges related to the informality of the networks. Along the way to these issues, the more salient aspects of this work are drawn out and in the final discussion, tied to some implications for the literature.

SCALAR INTERDEPENDENCE OF STRATEGIC GOVERNANCE NETWORKS

In Chapter 3, the distinction was made between framework and strategic governance, clearing a path through the amorphous literature on non-market governance towards identifying and characterizing a distinct local dimension of strategic economic intervention. Framework governance, it was argued, is the steering by indirect and neutral means through the regulatory system and is thus predominantly within the realm of national jurisdiction. By establishing the rules of the capitalist system, framework governance can have a significant impact on the

structure of non-market relations among economic actors. This aspect was demonstrated most clearly by the role that national governments took to institutionalizing cooperation between firms and public sector institutions.

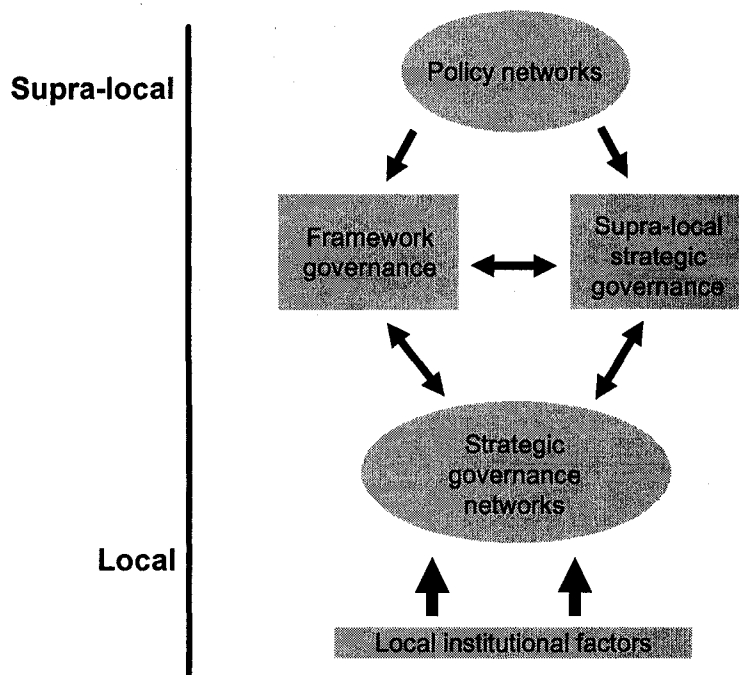
Strategic governance, in contrast, requires discriminating in both sectoral and spatial terms. It steers resources to achieve a specific sectoral outcome in a specific location that would not transpire through market processes alone. Furthermore, unlike framework governance, strategic governance has a distinct scalar dimension. At the national level, governments are key actors in devising programs that respond to competitive and security concerns. They fund R&D programs that target emerging industries in the anticipation of gaining an advantage in design and production capabilities of goods with global demand, thereby reaping a significant profit, and securing high wage employment. And they ensure that a technological capability is maintained in key industries that support national security.

There is also a strong local dimension to strategic governance which has gone unrecognized in much of the political economy literature. This dimension is captured by the concept of a strategic governance network, which has been shown to have several important roles in the overall economic governance of North American economies. By spearheading regional economic planning to guide the development of critical knowledge infrastructure, the local level is important to helping realize, enhance and embed strategic investments by both firms and upper levels of government. As part of this process, the networks are also involved in addressing the interdependency of local policy issues with strategic needs of industry and related investments. By engaging the necessary resources and actors, the education system and physical infrastructure can be mobilized to respond to the needs of a particular investment while ensuring that issues related to environment, quality of life and social inclusion are a part of the deliberative decision making process. These local networks can therefore help ensure that economic change and adaptation does not undermine the base of regional prosperity or character.

Strategic governance networks are, therefore, by no means an isolated structure of decision making (see Figure 7-1). Their relationship to framework governance is

reciprocal to the extent that they are both influenced by, and influencers of, national level economic governance. The engagement of Congress by local Austinites to have the anti-trust legislation changed as part of its bid for MCC is perhaps the strongest example of this type of linkage. Reciprocity however, is also linked to the very existence of the governance network itself. The dominance of framework governance as the mode of economic steering in both the US and Canada, leaves a gap of strategic initiative in the overall governance process which is subsequently taken up at the local level. In this way, framework governance acts as an arena that supports and contains local strategic initiative.

Figure 7-1: Multilevel linkages of strategic governance networks



Reciprocity also characterizes the relationship between the national and local aspects of strategic governance. Here the national level provides resources for the local level in a manner that is akin to the 'vending machine model' of government.¹ By this model, local actors, guided by their strategies, are able to decide which investments, made available from federal or state/provincial governments, best enhance regional strengths in, or aspirations for, knowledge-based industries. In this

¹ See D. Kettl, 'Managing Indirect Government'. In L. Salamon (ed.) *The Tools of Government* New York: Oxford, 2002.

way, the strategic governance networks tailor the structure of the local economy with resources made available by government programs.

This customization process can, in principle, be supported further through local influence over the kind of strategic programs that are made available at the supra-local level. Such a linkage was evident in Texas with the establishment of the Texas Technology Initiative. Through the workings of Austin's strategic governance network, the state government was persuaded to develop the program so as to provide immediate support to SEMATECH in a bid to prevent it from leaving, and to finance a new research institute in Austin to respond to the challenges of next generation semiconductors. It should be noted, however, that the type of strategic programs made available by federal and state/provincial governments can also be influenced by the more traditional policy networks. This type of interaction illustrates the interdependence between policy networks and strategic governance networks in making resources available to support local economic development. An example discussed in the Toronto case study was the eMPOWR initiative, whereby ITAC engaged the federal government to seek support for a specialized training program in the area of microelectronics and software.

With regard to stabilizing strategic network governances within the polity, however, the linkages that the networks have to local factors appear to be most relevant. There is enough evidence to suggest that socio-economic and historical conditions, together with the configuration of local institutions, affect several structural characteristics of the network, not least their effectiveness. The vitality of the key animators, notably civic entrepreneurs, corresponds closely the quality of social capital in the region. And their importance in resolving shortcomings within the regional governance system appears to have both historical and institutional roots. In Austin, civic entrepreneurs are conferred with both responsibility and respect in their attempts address the shortcomings of fragmented system of local government, while in Toronto, with its more effective regional governance system, they have much less legitimacy and influence.

POLITICAL VIABILITY OF STRATEGIC GOVERNANCE NETWORKS

Reproducibility

With the stability of strategic governance networks resting on local institutions that can be unique to the region, it is not clear whether these networks should or can be relied upon as a functional element of state capacity. For the networks to be accommodated by the state as part of their overall governance system, they will have to be reproduced throughout the country and be institutionally anchored more than they are now.

It is not obvious how this can be readily achieved. The informality and flexibility has been shown, at least in Austin, to be an important element to their longevity and effectiveness, two qualities that could be undermined through formally institutionalizing the networks. More experimentation and research will ultimately determine which aspects of the network are reproducible. Strategic governance networks emerged from specific conditions in Austin, elements of which were later emulated throughout North America. Like the successful Silicon Valley, these elements may not fully recreate the dynamics of Austin's governance process, but they may, as in the case of Toronto, reproduce some of its basic features. The Ontario government's Regional innovation network program can be seen as a test of how well local strategic networks can function outside local institutional conditions that are conducive to network support.

Accountability and legitimacy

Quite different to the issue of reproducibility, is the accountability and legitimacy of strategic governance networks in the overall democratic polity. As Sorenson and Torfing write in a recent paper on the issue, "governance networks might contribute to an efficient governance of our complex and functionally differentiated societies, but the question is whether governance networks also lead to democratic governance."² These networks, as the authors point out, suffer from transparency problems, together with a lack of legitimacy and accountability. In

² Sorenson E. and J. Torfing, 'The Democratic Anchorage of Governance Networks', *Scandinavian Political Studies*, 28 3 2005.

short, from the perspective of liberal democracy, strategic governance networks undermine the principles of representative democracy.

The problematic nature of having the locus of decision-making outside the government sphere, as is the case with strategic governance networks, was evident in Austin on several occasions. At one stage, the emerging governance network kept the municipal government deliberately out of the decision making process when recruiting major firms such as 3M. This, at the time, proved quite problematic for the city's infrastructure planning. Another example of the kinds of problems that arise with these unaccountable networks was the backlash of environmentalists against the 'growth at all cost' approach of the chamber of commerce. In both cases, governments had difficulty in managing public action and initiatives due to the fact that actors were outside local government control and policy process.

This problem is, to some extent, mitigated by having government representatives in the network. As Soresen and Torfing argue, this representation anchors it to a democratic body, thus conferring some democratic legitimacy and influence without sacrificing the basic structural aspects of the network that make them effective. For strategic governance networks, which are focused on public problems and thus typically require government cooperation, government involvement is normally essential, if not unavoidable, for it to be effective.

Yet to the extent that strategic governance networks do in fact undermine basic representative democracy, they do not necessarily undermine democracy itself. Indeed, as several scholars have pointed out, governance networks can, in several ways enhance democracy.³ By linking different units of government, for example, these networks can help resolve inter-jurisdictional conflicts associated with territorial bound, non-intersecting governance system of the hierarchical state. This effect was apparent in both case studies as local actors made efforts to bring together the autonomous local government units in Austin, and different levels of government in Toronto.

³ See Soresen (Democratic Anchorage), for a review of this argument. 200

Strategic governance networks can also improve public access and involvement in the governance process. As with policy networks, they are examples of ‘functional democracy’, whereby ‘the parties to these relationships are there by virtue of their representation of a constituency that performs economic or social functions closely linked to the policy issue or domain.’⁴ This kind of functional democracy can also be considered to improve democratic legitimacy to the extent that the public is involved directly. Membership in these largely informal networks is mostly open, and accessible to those with some knowledge and interest.

Finally, these networks can involve a considerable degree of public deliberation in the development of local strategic plans. Due to their informal nature, this deliberative aspect can be essential so as to persuade all stakeholders to collectively work towards the same goal. This process enhances its legitimacy as a democratic governance process, as more local input is factored into the long-term directions of a locality.

The governance gap and continuity

There are two other attributes of strategic governance networks that deserve attention in so far as they contribute to their viability as functional governance institutions. The first is their effectiveness at filling the gap left by other levels of government and actors in the policy process. Upper level governments and, for that matter national industry associations, are typically unable to respond to the specific demands of a smaller set of constituents unless accessibility to their response is made available to all. With a broader mandate, supra-local actors are not well positioned to engage in regionally-focused strategic governance processes.

This is particular so in Canada where the pressure to offer generic and consistent policy positions at the national level is strong. “Provinces”, Savoie notes, ‘have come to expect Ottawa to work toward a fair distribution of economic activity throughout the country, with some smaller provincial governments claiming that this

⁴ Skogstad Policy Networks and Policy Communities: Conceptual Evolution and Governing Realities CPSA 2005 , <http://www.cpsa-acsp.ca/papers-2005/Skogstad.pdf>

is in fact the federal government's main responsibilities."⁵ He adds that Federal government involvement has been necessary to avoid 'me first' provincial economic activities. Under these political pressures, and with their broader portfolio of responsibilities shaping their priorities, upper levels of government are constrained in their ability to take on the necessary leadership to resolve specific issues of importance to local economic affairs. For lower level governments, the problem is the reverse whereby without some form of coordination, they cannot address broader more regional problems that extend beyond its jurisdiction.

Strategic governance networks can address this gap, and provide a degree of strategic attention to the local needs that are too far removed from the basic responsibilities of governments, or are beyond the policy process itself. Several initiatives of civic entrepreneurs, particularly those that are related to creating associative support mechanism, are supported outside of the policy process and are thus beyond the reach of party politics. Moreover, the local level is the most effective scale for joined-up governance where interdependent issues such as quality of life, environment and economic development can be addressed as part of an overall local development strategy.

The provision of continuity in long-term economic development is another important aspect of the viability of strategic governance networks. 'The government looses focus', noted one GTA microelectronics actor, adding that they thought microelectronics 'was done' in the sense that it offered little growth opportunities in the future. And the continuity in Austin offered by local leaders has been essential to the region's success. Having no limited term, as do the mayors and governors, these individuals are able to maintain support for important issues as long as necessary.

⁵ D. Savoie (1986), *Regional Economic Development: Canada's Search for Solutions* (Toronto: Toronto University Press), 139.

SOME IMPLICATIONS

Hollow yet relevant

The proposition that the state is hollowing out under pressures related to globalization was more than a starting point for this thesis. It provided the broad narrative for much of the examination into the changing landscape of economic governance. The commitment to free trade agreements, the institutionalization of cooperation between governments and firms, and the horizontal shift of innovation out of the firm into a 'technonetwork' of public and private entities, were all placing limits on the state's status as an autonomous agent. In this new landscape, states are more partners rather than directors, pursuing their socio-economic objectives through negotiation and persuasion rather than command and control. Moreover, these trends were also evident in the case studies. In Austin, legislative changes to the anti-trust legislation, made at the behest of local actors as part of their bid for MCC, can be considered a trigger event to its rise as a microelectronics hub. Firms were reluctant to enter a R&D consortium, let alone support its establishment in Austin, without the legalization of interfirm R&D collaboration. In Toronto, the 'silent downloading' of economic development by supra-local governments can be thought of in similar terms for the changes it brought to perceptions at the local level and in catalyzing local agency.

Yet the hollow state, for all its circumscribed authority, is certainly not irrelevant. With its growing dependence on knowledge-based economic activity, the state has paradoxically become more important not less. Its role in developing research facilities, supporting R&D, and in adjusting the framework conditions for firms, has made it indispensable in the new landscape of economic governance where firms have externalized important parts of their innovation processes. Public actors and institutions have thus become more widely embedded within the fabric of economy activity, the effect of which has been to give the state more reach and access to related decision-making.

The other missing element to this paradox of less authority and greater importance is the governance networks that states find themselves in, or interacting

with. National and regional governments, by interacting with strategic governance networks, can leverage both their influence and reach over areas of the public domain that might otherwise be beyond their formal jurisdiction. Through engaging and supporting the deliberative process of strategic governance networks, they can contribute to the consensus building that transpires over issues like long-term local planning and development of knowledge-based industries. In so doing, they can, at arm's length, help ensure that national directives be considered without undermining local initiative and responsiveness that characterizes the strategic governance process.

Understanding how governments can best manage these dynamic governance networks that are nested within a formal multilevel hierarchy requires more investigation. As these networks become more developed and widespread in use, they will increasingly define the divide between static framework governance and dynamic strategic governance. Effective interfacing between these two modes could improve policy development at the national and regional level, as well as the stability and effectiveness of these networks in integrating and adapting the local economy to global production flows. With input from the local levels, policies can be developed that cater more effectively to the specific economic challenges, infrastructural deficits and aspirations of localities. And support for the networks, be it financial or administrative, could help mitigate governance network failures. However, before any mutual policy learning can transpire, the legitimacy of strategic economic governance needs to be first acknowledged as a necessary reality, and second, accepted, as a complementary component to framework governance in neo-liberal capitalist states.

The coordinated reality of liberal market economies

Strategic governance networks have more significant implications for the 'varieties of capitalism' literature, an increasingly popular area of research that examines differences in institutional configurations affecting economic performance among capitalist democracies. This work is largely national in its focus and ignores the substantial amount of agency that is captured in this thesis by strategic governance networks.

As noted in Chapter 1, the main proponents of this literature, Hall and Soskice, justify their nationally-based characterizations of ‘liberal market economies’ versus ‘coordinated market economies’ by a premise that many of the most important institutional structures shaping economic activity are within national jurisdiction.⁶ While they do recognize that regional and sectoral institutions have validity, they are dismissed as being secondary to the dominant institutional matrix that shapes firm performance.⁷ What is clear from the case studies, however, is that local and regional institutions can not be so readily dismissed.

Moreover, their characterization of ‘liberal market economies’, of which the United States and Canada are a part, is misleading for knowledge-based sectors. These firms increasingly use the institutional milieu at the local level to resolve important spheres of coordination problems, to use the language of Hall and Soskice. And they do so through non-market means. Vocation and training and inter-firm relations, as defined by the authors, are most notable in this respect. These are two areas of coordination that have been shown to involve a considerable amount of cooperation and networking, which is initiated and institutionalized at the sub-national level.

Thus, to characterize US and Canadian firms as relying predominantly on hierarchies and markets to resolve their coordination problems is simply inaccurate. Non-market modes of coordination, as much of the innovation and economic geography literature suggest, are important to the innovation process for firms in both LME and CMEs. What appears to differ most is their visibility within the economy. Among CMEs, non-market modes are more often supported by the national level (as typified by the East Asian Developmental model) whereas in the US, and increasingly in Canada, these modes are realized and stabilized from below. As a result, the framework governance system is most visible at the national level, though clearly both are integral to the greater economic governance system.

⁶ P. Hall and D. Soskice, *Varieties of Capitalism* (New York: Oxford University Press 2001), 6.

⁷ P. Hall and D. Soskice, *Varieties*, 4.

Beyond policy networks

The finding that there are governance networks implicated in the steering of the national economy other than policy networks adds a new dimension to the analysis of systems of political economy, at least in North America. While they are both rooted by mutual resource dependencies, share similar structural features and generate the same 'uneasy tension with democratic norms of legitimation in representative democracies', they have an entirely different focus.⁸ Strategic governance networks are task driven and deal with public problems which are often outside the policy process, whereas policy networks are policy focused. And where strategic governance networks help understand economic development outcomes, policy networks help understand policy outcomes. In this way, they are complementary to one another and offer a richer understanding of the 'real' political economy than is available simply through a policy network approach.

Beyond the dichotomous debate of structure versus agency

This thesis has not explicitly engaged the debate of structure versus agency either in the case studies, or in the theorizing of non-market economic governance. This neglect has been due mainly to an analytical objective of understanding and interpreting the architecture of contemporary governance as opposed to one of seeking out 'where the causal mechanism lie' in social and economic life.⁹ Nonetheless, the theme of structure and agency and their role in affecting economic outcomes is undeniably present throughout. Indeed, the case studies on their own have much to contribute to this discussion, highlighting as they do, the interplay between formal and informal institutional structures and agency in a concrete historical context of developing and adapting local infrastructure to the needs of the microelectronics industry. What is observed is a co-dependence between structure and actors whereby the latter act within a multilevel institutional context yet also act

⁸ Skogstad G. *Policy Networks* 2005, p. 13

⁹Wendt, A. and Shapiro, I. 'The Misunderstood Promise of Realist Social Theory', in K. R. Monroe (ed.) *Contemporary Empirical Political Theory*. Berkeley, CA: University of California Press. 1997 181

to change and create this very context. State structures, on their own, are therefore inadequate in carrying out the task of economic adaptation.

Such a view has much support in the sociological literature that seeks to bridge the dichotomous gap between structure and agency. Primary causality, in this middle ground, lay neither with structure nor agency but with both, each acting upon the other in an interactive process. Paul Cerny, who builds on Anthony Giddon's theory of structuration, captures this dynamic in defining structuration to 'imply a process of continuing interaction between agent and structure, in which structures which are generally constraining can also change and be changed in certain conditions.'¹⁰

The empirical work of the previous chapters serves to enrich this understanding rather than challenge it. Structure imposes opportunity which can be realized by sources of agency. This was the case of civic entrepreneurs in both Austin and Toronto committing to a course of action in response to a local dialogue about the limitations of existing institutions in sustaining current and future prosperity of the community. Another interesting interaction is evident from the role that institutions play in reproducing agency, which in turn acts to further develop the institutional structures that support agency. In Austin, there are several structural components supporting this interaction including culture, AARO, which serves as an incubator of civic leaders, and 360 Summit, which serves to draw out agency from the market (i.e. success firms) into the public domain. The strength and durability of the strategic governance network in Austin owes much to this self-regeneration dynamic.

One of the main differences between the two case studies was, in fact, the municipal institutional framework which, it was argued, influences the strength of local engagement. In Austin, it was the lack of structure which drove agency within the public domain whereas in Toronto, it was the well developed structure which acted to dampen civic initiative.

These observations are for the most part positive, to the extent that they suggest that social and economic trajectories can be managed and acted upon. Regions need

¹⁰ P. Cerny *The Changing Architecture of Politics: Structure, Agency and the Future of the State*, Sage Publications: New York, 1990, p. xi.

not be consigned to an outdated economic path that is dependent on an existing institutional endowment. Rather, institutional capacity can be created and developed, under the guidance of agency, to achieve desired economic outcomes. This does not imply that such a process comes easily. There are institutional constraints at every scale and at every stage of the process which may not be readily overcome or altered - a lack of a university within a particular locality, for example, or a culture antithetical to cooperation. Moreover, there are external market and technological trends which constantly alter the landscape of economic opportunity as well as the economic potential of region's assets.

FUTURE RESEARCH

The viability of strategic and framework governance as a concept for characterizing systems of political economy outside of North America deserves further investigation. Should it indeed be applicable to most, if not all, advanced industrial countries, the framework would provide a more encompassing account of the empirical realities of political economic systems. Rather than recognizing one organizing dynamic over another as a demarcation point for two distinct systems— i.e. neoliberal versus developmental or LME versus CME - the framework advanced here embraces both as being essential dimensions of a contemporary political economic system. It thus establishes a basis for an entirely new set of questions that is not beholden to a particular level of analysis and which can offer some important insight into the complex, multilevel reality of contemporary political economic systems.

The balance between framework and strategic governance is, of course, likely to differ by country, both in terms of the relative weight of each mode within a system, and their respective balance across levels of government. In the US, much of the strategic, 'developmentalist' dimension is hidden at the subnational level, whereas in Japan, it is visibly at the national level, and widely characterized as such. It is not obvious, however, whether the strategic dimension is any stronger in one country or the other. Among more decentralized European countries, such as Germany, the

configuration would likely differ again with corresponding implications for policy and economic performance.

The institutional manifestation of strategic governance is also likely to vary in cross-country comparisons. This thesis elaborates only on one such manifestation, that of strategic governance networks, the structure of which is likely related to federal systems. Whether these networks exist outside North America is therefore an issue that deserves more research.

First, however, it would be worthwhile to establish more firmly the existence of strategic governance networks elsewhere in North America. Further case studies of regions such as Ottawa, Philadelphia and Atlanta, which are all noted for civic engagement in the economic development process, may be useful in this respect. Also of interest would be a case study of Albany, New York, which, despite a mobilization of resources, failed to lure SEMATECH to the region in 2003. Contrasting this unsuccessful mobilization with the counter-effort from Austin's strategic governance network to keep SEMATECH in place, would provide a very interesting comparative study for drawing out successful attributes of respective networks.¹¹

Finally, developing an understanding of who is included, or excluded, from these networks, how much variety exists in their structures, and just how robust they are, would also be worthy of more research. This understanding, together with examining more closely how these networks interact with other governance structures, including policy networks, would help give a fuller and clearer account of the complexity that characterizes contemporary economic governance.

CONCLUSION

"If you follow the innovation geographically, it does track where the shoe started pinching. It started in New England, which first felt the impact of our

¹¹ I thank Joseph Wong, Department of Political Science at the University of Toronto, for this suggestion.

entry into a global economy, with textiles and the shoe industry. Then it shifted to the Midwest, with the 1982 recession's severity in the rust belt. Now it's moving to the South east, which is losing a lot of those same textile plants that left Massachusetts in the 1950s. And you're just beginning to see it in the Southwest, which has been hit hard by the falling price of oil."¹²

Though economic hardship has by no means been the foundation to all successfully innovative regions (or indeed, to either case study) in North America, the above quote does portray a restless reality felt by regions exposed to global market dynamics. Technological change, driven by the creation of new knowledge and facilitated through trade and a global financial system, puts the geography of global prosperity in a constant state of flux and forces countries and regions alike to adjust and regenerate their main sources of economic endeavors that sustain their standard of living. Such a reality was the original problem for this investigation into how states are responding to this trend when constrained by interdependence and associated loss of authority.

This dynamic also undermines the widespread premise that advanced industrial states are 'developed'. They are, as this thesis has shown, anything but. Through a mode of governance that is complementary to framework governance and as restless as capitalism, these states are able to continually develop and adapt. The local level, unwilling to let the markets 'take care' of their prosperity, instead rely on a strategic process of economic coordination and planning, which has allowed them to capture some wealth that comes with establishing a local presence in a global knowledge industry. And as globalization and knowledge intensiveness of the economy becomes more pronounced, it is more than likely that this dynamic mode of governance will become equally more established.

¹² Bob Friedman, Corporation for Enterprise Development, cited in Osborne (1988) p. 42

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