

# Strengthening structures: Upgrading specialized support and competitive pressure

The Institute for Competitiveness & Prosperity  
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The Institute for Competitiveness & Prosperity is an independent not-for-profit organization established in 2001 to serve as the research arm of Ontario's Task Force on Competitiveness, Productivity and Economic Progress.

Working Papers published by the Institute are primarily intended to inform the work of the Task Force. In addition, they are designed to raise public awareness and stimulate debate on a range of issues related to competitiveness and prosperity.

The mandate of the Task Force, announced in the April 2001 Speech from the Throne, is to measure and monitor Ontario's competitiveness, productivity and economic progress compared to other provinces and US states and to report to the public on a regular basis.

It is the aspiration of the Task Force to have a significant influence in increasing Ontario's competitiveness, productivity and capacity for innovation. The Task Force believes this will help ensure continued success in the creation of good jobs, increased prosperity and a high quality of life for all Ontarians. The Task Force intends to seek breakthrough findings from their research and to propose significant innovations in public policy to stimulate businesses, governments and educational institutions to take action.

The Task Force's First Annual Report to the people of Ontario, *Closing the prosperity gap*, was published in the fall of 2002. The Second Annual Report, *Investing for prosperity*, was published in the fall of 2003.

Comments on this Working Paper are welcome and should be directed to the Institute.

The Institute for Competitiveness & Prosperity is funded by the Government of Ontario through the Ministry of Economic Development and Trade.



Strengthening structures:  
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competitive pressure

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# Foreword and Acknowledgements

## Strengthening structures: Upgrading specialized support and competitive pressure



I am pleased to present the fifth Working Paper of the Institute for Competitiveness & Prosperity in support of the Task Force on Competitiveness, Prosperity and Economic Progress.

The Institute and the Task Force have developed an integrated framework to help guide research and thinking about our capacity for innovation and upgrading. This framework, AIMS, consists of *four factors* – **attitudes** towards competitiveness, growth, creativity, and global excellence; **investments** in physical and human capital for productivity and competitiveness; **motivations** for hiring, working, and upgrading; and the institutional and market **structures** that encourage innovation and upgrading. Together these four factors drive our prosperity growth.

This Working Paper explores the impact of our market structures on our competitiveness and prosperity. Much of its focus is on the structures that support clusters of traded industries. Traded industries serve markets outside their regions. In contrast, local industries serve local markets only. Natural resource industries also serve markets outside their region but their location is fixed by natural resources endowments. While traded industries make up only 40 percent of Ontario employment, they account for 50 percent of earnings. This is because traded industries operate in environments that have more specialized support and greater competitive intensity. In addition, as our research indicates, strong clusters of traded industries pull along wages in local industries. They are very important contributors to local and provincial prosperity.

This Working Paper builds on our previous work in clusters by examining for the first time the effectiveness of their performance versus peer states. Like so much else we have discovered in assessing Ontario's competitiveness and prosperity, the province has a good base of clusters of traded industries. However, their performance falls short of the same clusters in the peer states, especially in those that generate the highest productivity and wages. In fact, the stunning finding of our research is that in traded industries Ontario's wages trail our peers' wages by 23 percent.

We found that Ontario has solid general support structures – infrastructure and basic education – that underpin cluster performance. But our research also indicates that our clusters are not benefiting from an adequate level of specialized and sophisticated support – such as university/industry collaboration and specialized research and training. Nor have we created adequate competitive intensity – the pressure created through the presence of sophisticated buyers and significant rivalry. Without these upgraded supports and pressures, too few of our firms and industries have developed world-class strategies and operations that drive productivity and wages to match peer performance.

The challenge for Ontarians is to identify opportunities to strengthen our market structures to provide greater specialized support and more intense pressure for our firms and industries. Such initiatives will contribute to closing the prosperity gap with US peer states.

We gratefully acknowledge funding support from the Ontario Ministry of Economic Development and Trade and collaborative support from the Institute for Strategy and Competitiveness, Harvard Business School.

A stylized, handwritten signature in black ink, appearing to read 'R. Martin'.

Roger L. Martin, *Chairman*

Institute for Competitiveness & Prosperity



# Executive Summary

## Strengthening structures: Upgrading specialized support and competitive pressure

Over the past two years the Institute for Competitiveness & Prosperity has been exploring why prosperity in Ontario is so much lower than in our peer group of the 14 most populous US states. Most recent available results indicate we trail the peer median GDP per capita by \$4,118 or by 10 percent of their level.

Productivity is the key factor behind this prosperity gap. Ontarians need to strengthen our capacity for innovation and upgrading to raise our productivity each year until we catch up to our peers.

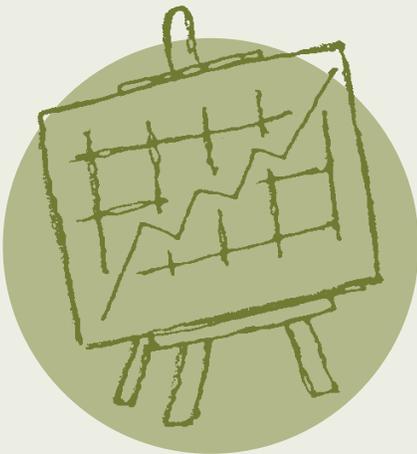
To help us understand the factors behind our capacity for innovation and upgrading we developed the integrated AIMS framework:

- **Attitudes** towards competitiveness, growth, creativity, and global excellence
- **Investments** in human and physical capital
- **Motivations** for hiring, working and upgrading as a result of tax policies and government policies and programs
- **Structures** of markets and institutions that encourage and assist upgrading and innovation.

Our work has led us to conclude that Ontarians have a 10 percent prosperity gap because we **under invest** in physical and human capital. We perform all the basics well. We invest nearly as much in productivity enhancing machinery equipment and software as our counterparts in the peer states, but not at the same rate. We have a solid base of primary and secondary education but under invest significantly at the post-secondary level. Our governments have been shifting their spending from investing for future prosperity towards consuming current prosperity. We have not invested adequately in processes to integrate immigrants effectively into our economy and thus forgo many of the potential benefits from the arrival of skilled people in our province.

This under investment does not appear to be the result of poor **attitudes** towards competitiveness, risk taking, and innovation. In Working Paper 4, *Striking similarities: Attitudes and Ontario's prosperity gap*, we concluded that in general Ontarians' attitudes in these areas matched our counterparts' in the peer states.

**Motivations**, as represented by marginal effective tax burdens, are a clear concern for strengthening our competitiveness and prosperity.





In this working paper we explore **structures** in our economy and their role in enhancing investment and Ontario's prosperity. In the AIMS framework, attitudes, investments, and motivations require public governance and market structures that reinforce Ontario's competitiveness. Governance structures range from attributes related to rule of law at the most basic level to more sophisticated structures and processes that reward innovation and commercialization. We have already reviewed some of the key governance structures affecting Ontario's competitiveness and prosperity in Working Paper 3, *Missing opportunities: Ontario's urban prosperity gap*.

Our focus in this Working Paper is on the market structures that foster the competitive environment that supports and requires firms and industries to innovate and upgrade. To help us understand better how under performing market structures may be contributing to our prosperity gap, we have deepened our analysis of the performance of Ontario's clusters of traded industries.

**Overall, our research indicates that Ontario has many of the structures in place for driving innovation and higher productivity in our clusters of traded industries. But these structures are under performing, delivering poorer results than many clusters in our peer states. One reason is that our structures are not providing an adequate level of specialized support to ensure complete success in our clusters. Another reason is that our structures are not adequately stimulating our clusters and industries with the intense competition and sophisticated demand that drive better results in the peer states. This lack of specialized support and intense pressure directly affects the strategies and decisions among our firms and individuals. Today, these actions are inadequate to close the prosperity gap.**

This is based on three conclusions from our work:

- Ontario's clusters under perform
- Ontario's market structures lack adequate specialized support and intense competitive pressure
- Stronger structures would raise our capacity for innovation and upgrading.

## Ontario's clusters under perform

Economists, urban geographers, and business strategists generally agree that clustering of traded industries in specific geographic areas is a key driver of regional and national prosperity. As we review the work of these academics and practitioners as well as our own research, we concur that clusters of traded industries are key elements of market structures.

In summary, the research strongly reinforces the reality that an environment featuring a combination of support and pressure is the most beneficial in nurturing and growing competitive global companies. While the various researchers point to somewhat different elements of support, specialized human resources and infrastructure figure broadly into their analyses. The presence of such powerful elements of support tends to attract multiple competitors, which helps create rivalry among co-located firms – an important element of pressure. This rivalry among alternative firms encourages more demanding and more sophisticated customers who, in turn, help drive the firms toward more innovative activities. The presence of rival, innovating firms produces a benefit that reinforces better support. Social networks are created across the competing firms, their customers, and their suppliers and this creates a rich environment of knowledge spillovers. These features enhance the supportiveness of the environment for all firms – which serves to attract more firms still, in turn producing more pressure and more knowledge spillovers. Overall, the research points strongly to support and pressure and their interaction as the drivers of competitive performance.

At a base level, the performance of Ontario's clusters of traded industries matches US peers' performance. Consistent with the conclusions of Michael Porter's research into the economic impact of clusters on US regional economies, we find in Ontario that:

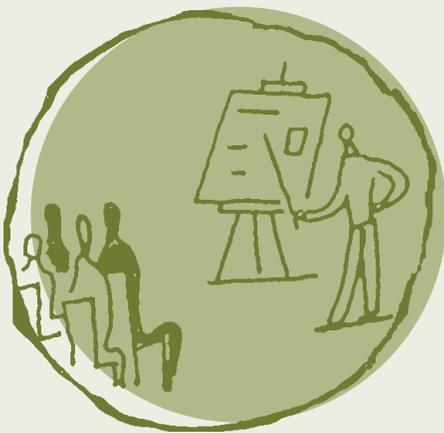
- Prosperity increases along with employment in traded clusters
- Strong clusters are more important than the mix of clusters
- Greater diversification does not necessarily lead to higher regional earnings.

However, as we analyze the performance of Ontario's clusters more deeply, we find that our clusters under perform – using wages as the comparable measure. In nearly every one of the 41 traded industry clusters identified by Porter, Ontario's wage performance trails results achieved in the peer states. Across all industries, our wages trail peer state wages by 13 percent. Within traded clusters, however, we trail by 23 percent. This is an important finding, as Porter has demonstrated that clusters of traded industries have a significant impact on a region's innovation and competitiveness. Although Ontario has a good mix of clusters, they are less effective in generating prosperity than those in the peer states.

Further analysis of the wage differences delivers another major insight. Ontario clusters are close to or exceed the peer group average wage in lower-wage clusters, but trail as the cluster wage level gets higher. For example, in textiles, one of the lowest paying clusters, Ontario wages are 6 percent ahead of peer levels, while in financial services, our second highest paying cluster, Ontario trails the peer average by 37 percent. This is a stunning observation – but it is consistent with so much else we have found as we investigate the prosperity gap. At a base level, we match or exceed US peers' performance. But at the higher levels of peer performance, we trail significantly.



## Ontario's market structures lack adequate specialized support and intense competitive pressure



To understand this under performance of our clusters, we examined the level of support and pressure in our market structures. Each cluster and industry operates within its own structure of specialized support and competitive pressure. Underpinning these cluster environments is a platform of general support.

Michael Porter's Business Competitiveness Index and The World Economic Forum's Executive Opinion Survey, along with our own work in assessing some of Ontario clusters and Canada's global leaders indicate that Ontario industry benefits from a solid base of *general supportive conditions* relative to the United States. These conditions include physical infrastructure and the quality of the educational system. These are important building blocks for a competitive and prosperous economy, and Ontario has strengths here.

However, in the area of *specialized support* our performance attenuates. While we have solid support conditions in the basic educational system, we trail the US in the more specialized and sophisticated conditions such as university/industry research collaboration or the local availability of specialized research and training services. Where we see strengths in physical infrastructure, we trail the US in the support to firms from local supplier quality or financial market sophistication.

Nor do our firms benefit as much as they could from an environment of intense *competitive pressure*. Our review of the research indicates that our industries and clusters tend to lack sophisticated customer demand and intense rivalry.

The net effect of this lack of specialized support and competitive pressure is a gap in the effectiveness of company operations and strategies. This conclusion is based on results from the Business Competitiveness Index and the Executive Opinion Survey. Canadian company operations and strategies are seen to be weaker in factors such as production process sophistication, capacity for innovation, and company spending on research and development.

We conclude that Ontario finds itself in a vicious cycle. Its environment does not hone the strategies and operations of the companies inside it and this creates a weak environment for innovation and upgrading. These structural weaknesses are likely important factors in the under investment by Ontarians in physical and human capital.

## Stronger market structures will contribute to closing the prosperity gap

As we review our findings about structures, we see some clear connections with our earlier diagnoses and prescriptions.

Ontarians are *investing* only to the level they perceive they need to. We now conclude that our market structures are causing Ontarians to invest less than required to close the prosperity gap. Compared to what is found in peer states, Ontarians are operating in an environment that lacks highly specialized support and stimulating pressure. Consequently, firms invest 10 percent less in machinery, equipment, and software – major contributors to rising productivity and prosperity – than their US counterparts.

In addition, the market signals sent to Ontarians lead them to aspire to lower levels of education. As an example of these market signals, bachelor's degree holders earn 38 percent more than high school graduates in Ontario but 64 percent more in the US. Similarly, graduate degree holders receive a much higher wage premium in the US.

Governments receive market signals as well – hence they have shifted spending from investing for future prosperity to consuming current prosperity. And they under invest in higher education.

We continue to see that the impact of higher marginal effective tax burdens on *motivations* to invest is negative. This is especially the case in light of our findings that Ontario firms face structural challenges that hinder innovation and upgrading.

We continue to conclude that our *attitudes* do not represent a significant roadblock to prosperity. While Ontarians see the importance of competitiveness, innovation, and risk taking in a similar manner as our US counterparts we see these through a different lens. With lower levels of competitive pressure we are not challenged in the same way to innovate and upgrade as our US counterparts.

We conclude from our research for this Working Paper that strengthening *structures* is key to closing the prosperity gap. Enhancing the performance of our clusters to match peer results offers substantial potential for achieving the higher productivity Ontario needs to continue to increase social and economic well being for all.

We encourage business leaders to collaborate with their local colleagues to identify cluster strengths and weaknesses and to develop strategies for strengthening their clusters. In particular, their focus should be on identifying opportunities for strengthening specialized support in their cluster.

We encourage governments to ensure policies and programs are aimed at strengthening competitive intensity.

A higher level and quality of specialized support and a more intensely competitive environment will encourage firms and individuals to take decisive actions to achieve higher performance and stronger clusters and structures.

The Institute looks forward to discussing our findings and conclusions with stakeholders in Ontario's prosperity.





Strengthening  
structures: Upgrading  
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## The structure factor counts in investing for prosperity

Over the past two years the Institute for Competitiveness & Prosperity has been exploring why productivity in Ontario is lower than in comparable US states. A key conclusion from our work to date has been that Ontarians are not investing enough to achieve our potential competitiveness and prosperity. This under investment has led to a recurring prosperity gap versus our peer group of the 15 other most populous North American jurisdictions. As of 2001 Ontario's GDP per capita trailed the median of our peer group by \$4,118<sup>1</sup> or just under 10 percent (Exhibit 1). This prosperity gap indicates that Ontarians are not adding equivalent value to the human, natural, and physical resources in the province.

This gap is not the result of less work or effort on our part. In fact, we work as many hours as our counterparts in our peer states. Instead, this prosperity gap is driven by lower productivity. Ontarians need to strengthen our capacity for innovation and upgrading to raise our

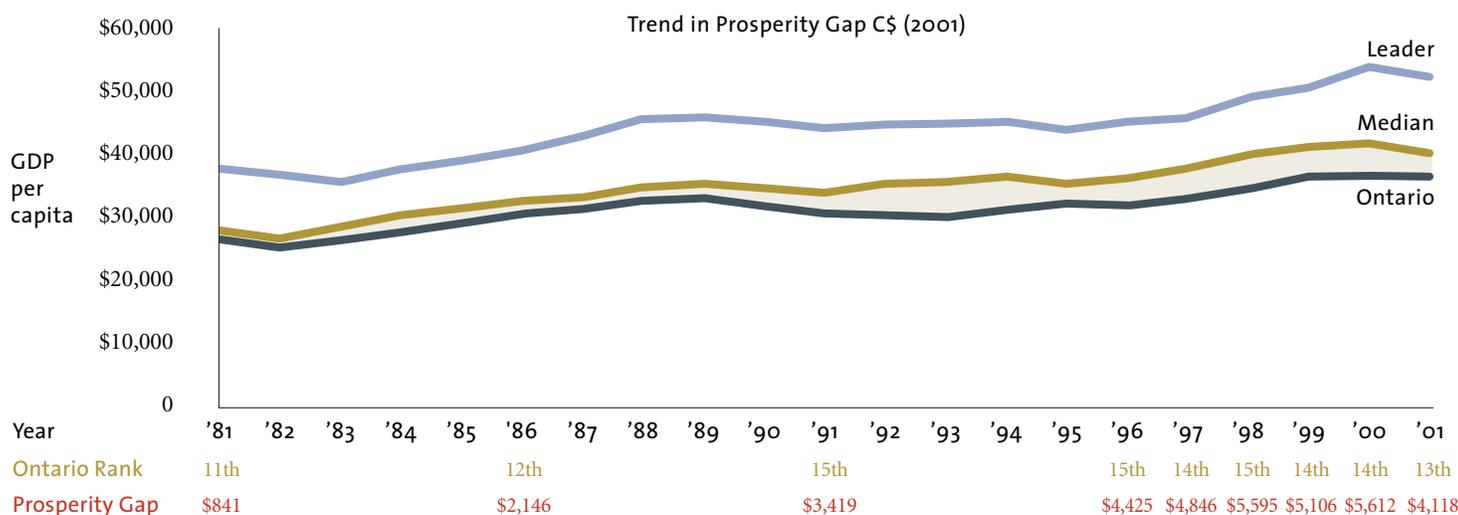
productivity each year until we catch up to our peers. That way each Ontarian will enjoy a more prosperous life.

To help us understand the factors behind our capacity for innovation and upgrading we developed the integrated AIMS framework (Exhibit 2) that includes four interrelated factors:

- **Attitudes** towards competitiveness, growth, creativity, and global excellence
- **Investments** in human and physical capital
- **Motivations** for hiring, working and upgrading as a result of tax policies and government policies and programs
- **Structures** of markets and institutions that encourage and assist upgrading and innovation.

<sup>1</sup> All dollar figures are in this Working Paper are in Canadian dollars; US results have been converted using Purchasing Power Parity (PPP)

Exhibit 1 Ontario has a prosperity gap with its peer jurisdictions



Source: Statistics Canada; US Department of Commerce, Bureau of Economic Analysis, Regional Accounts; OECD PPP adjustments; Institute for Competitiveness & Prosperity analysis

Our previous work<sup>2</sup> using the AIMS framework indicates that under investment is a key driver of our prosperity and productivity gaps. Our surveys and research into Ontarians' attitudes<sup>3</sup> indicates that the major challenge is not in this area. But motivations, as represented by marginal effective tax burdens, are a clear concern for Ontario.<sup>4</sup>

In the AIMS framework, **attitudes**, **investments**, and **motivations** require public governance and market **structures** that reinforce Ontario's competitiveness. Governance structures range from attributes of government related to the rule of law at the most basic level to sophisticated structures and processes that reward innovation and commercialization. Market structures describe the competitive environment that support and require firms and industries to innovate and upgrade. Our work indicates that public governance structures are not contributing to our competitiveness and prosperity.<sup>5</sup> Now, to understand better how under performing market structures may be contributing to our prosperity gap, we have deepened our analysis of the performance of Ontario's clusters of traded industries. This is the focus of this Working Paper. We begin by reviewing how structures relate to the other factors.

### Structures have a unique relationship with other AIMS factors

The AIMS framework is dynamic and interactive. Each element affects the other, and a change in one often leads to change in the others. Structures have a unique relationship with each of the others. Structures provide a critical context for how attitudes are formed and how they affect competitiveness and prosperity. Structures of competitiveness affect the demand for and supply of investments in physical and human capital, which in turn affect the overall capital-labour structure of the economy. And structures are affected by motivations as represented by marginal effective tax burdens.

### Attitudes play out within structures

In Working Paper 4, *Striking similarities: Attitudes and Ontario's prosperity gap*, we explored differences in attitudes between Ontarians and their counterparts in the US peer states in a series of areas related to competitiveness and prosperity – risk taking, innovation, willingness to work hard for prosperity, and others. In general, we found no significant differences between how members of Ontario's and peer states' general public and business communities thought about these

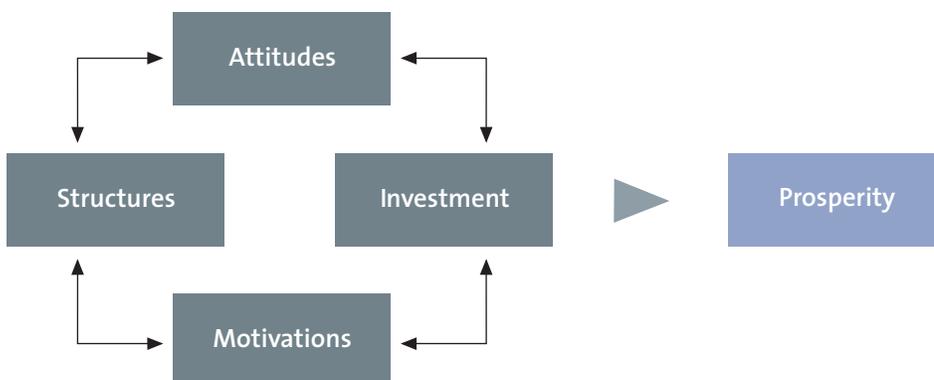
issues. We identified a small number of exceptions. Ontarians are less likely to recommend that young people aspire to higher levels of education; we see more readily the economic benefits of immigration; and we are keener on celebrating the success of local businesses.

We concluded from this work that attitudinal differences are not driving the prosperity gap. However, we hypothesized that attitudes are being played out in different structural environments. We speculated that, while our business people and workers carried similar beliefs and thoughts about competitiveness, innovation, and upgrading, they operate in different competitive markets. We observed that firms and workers benefit from stronger infrastructures of specialized support and are stimulated by more intense competition and sophisticated demand. Individuals and companies with similar attitudes will operate differently within these different structures.

### Structures hinder investments

Our work has shown that Ontario firms, governments, and individuals invest to a basic level compared with our US peers, but then we do not take the extra step to invest the extra amount in machinery, equipment, and software and in post-secondary education that would generate much higher productivity. We hypothesized that, while Ontarians see the world in much the same way as our US peers, our investment patterns are affected by structures. Our work for the Second Annual Report of the Task Force on Competitiveness, Productivity, and Economic Progress, *Investing for prosperity*, indicated that our lower level of wages in Ontario relative to the US stimulated greater use of labour and lower use of capital investment in our economy.

## Exhibit 2 AIMS builds capacity for innovation and upgrading



Source: Institute for Competitiveness & Prosperity

<sup>2</sup> Task Force on Competitiveness, Productivity, and Economic Progress, Second Annual Report, *Investing for prosperity*, November 2003

<sup>3</sup> Institute for Competitiveness & Prosperity, Working Paper 4, *Striking similarities: Attitudes and Ontario's prosperity gap*, September 2003

<sup>4</sup> *Investing for prosperity*, pp. 35-38

<sup>5</sup> Institute for Competitiveness & Prosperity, Working Paper 3, *Missing opportunities: Ontario's urban prosperity gap*, June 2003, pp. 36-40

With respect to investments in post-secondary education, we identified a significant gap in the economic returns to advanced degrees. An Ontarian investing in a bachelor's degree will earn 38 percent more annually than a high school graduate. In the US, the earnings premium is 64 percent.<sup>6</sup> For master's and doctoral degrees the premium versus high school is 57 percent annually in Ontario, while in the US annual earnings more than double. This tells us that our economic structure is not valuing post-secondary education as much as that in the US. This difference is part of the explanation for our different attitudes towards post-secondary education.

### Motivations limit the effectiveness of market structures

In both annual reports, the Task Force concluded that motivations are harmed by high marginal effective tax burdens on labour and capital. In Ontario the federal and provincial governments combine to burden the marginal hour of labour with 24.7<sup>7</sup> per cent of tax costs. This is 1.5 times the burden of the median of the 5 representative states we analyzed, where the marginal effective tax burden is 16.0 percent. As significant as this difference is, our marginal effective tax burden on capital investment is 2.3 times the burden of the 5-state median (29.0 percent versus 12.7 percent). And despite the concern of some observers that recent reductions in Canada's and Ontario's tax burden are creating a "race to the bottom," our research indicates that the gap between Ontario and peer states widened between 2002 and 2003. Recent tax changes on both sides of the border will likely widen even further this Ontario disadvantage in motivations.

Motivations affect structures by reducing the incentive to invest more, primarily in physical capital but also in human capital. This lower

level of investment results in an economic structure where less physical and human capital is directed to adding value to the efforts of our labours.

### Institutional and market structures dampen investment

In previous work we have discussed two types of structures – institutional and market structures.<sup>8</sup> Both factors have an important impact on productivity and prosperity.

### Institutional structures undermine capacity for innovation and upgrading

We have identified some important weaknesses in institutional structures to support upgrading and innovation to increase Ontario's competitiveness and prosperity.

- Our federal and provincial governance structures do not give adequate weight to urban regions, as legislatures at both levels do not truly reflect the distribution of urban and rural populations.<sup>9</sup> This imbalance is likely contributing to the fact that the prosperity gap between Ontario and its peer states is in our metropolitan areas.
- Municipal governance structures are inappropriate for providing more fiscal authority to our larger cities as desired by many observers.<sup>10</sup>
- The structure of our governments' spending has been shifting away from investing for future prosperity, in areas such as education and infrastructure, and towards consuming our current prosperity, in areas such as health care and social spending.<sup>11</sup>

We are continuing our research in these areas to find ways to improve institutional structures for prosperity.

### Focus now is on market structures

An important element of market structures is the presence of vital clusters of traded industries. By specializing and networking, firms and individuals in clusters are able to create the potential for innovation and economic progress – both inside the cluster and across the broader regional economy.

In this working paper, we explore how we can address the structure factor in Ontario – and Canada – to increase investment and raise our productivity and prosperity. To do this we consider the following questions:

- How well are Ontario's clusters of traded industries contributing to our competitiveness and prosperity?
- Do we have market structures that adequately support our clusters?
- Do we have market structures that provide the appropriate intensity of competitive pressure?

**Overall, our research indicates that Ontario has many of the structures in place for driving innovation and higher productivity in our clusters of traded industries. But these structures are under performing, delivering poorer results than many clusters in US peer states.**

**One reason is that our structures are not providing an adequate level of specialized support to ensure complete success in our clusters. Another reason is that our structures are not adequately stimulating our clusters and industries with the intense competition and sophisticated demand that drive better results in the peer states. These structure factors relate directly to strategies and decisions among our firms and individuals that are inadequate to close the prosperity gap.**

<sup>6</sup> *Investing for prosperity*, p. 20

<sup>7</sup> *Investing for prosperity*, p. 36; see also *Closing the prosperity gap*, pp. 36-37 for a discussion of marginal effective tax burdens

<sup>8</sup> *Closing the prosperity gap*, p. 38

<sup>9</sup> *Missing opportunities: Ontario's urban prosperity gap*, p. 38

<sup>10</sup> *Ibid.*, pp. 39-40

<sup>11</sup> *Investing for prosperity*, p. 26

# Structures and clusters



## Ontario's clusters under perform

In Working Paper 1, *A View of Ontario: Ontario's clusters of innovation*, we identified the importance of clusters of traded industries for Ontario's competitiveness. We provided an overview of how clusters drive innovation and productivity, reviewed our findings that Ontario had a higher proportion of its employment in traded clusters, and highlighted some of the key clusters in Ontario and our peer states. We discussed the paradox of our high percentage of employment in clusters and our relatively poor productivity and prosperity. Our recent research has clarified this seeming contradiction. Ontario has an attractive mix of clusters, but they under perform in their contribution to our competitiveness and prosperity. In this section we highlight that:

- Clusters matter
- Ontario's clusters match US base level performance
- Ontario's clusters trail US peers' economic gains

### Clusters matter

Economists, geographers, and business strategists generally agree that clustering of industries in specific geographic areas is a key driver of regional and national prosperity. And a recurring theme in the Institute's work is the importance of clusters of traded industries to a region's prosperity. We continue to conclude that high-performing clusters are important element of closing our prosperity gap with our US peer group. In Working Paper 1, *A View of Ontario: Ontario's clusters of innovation*, we described the theory and evidence behind the importance of clusters of traded industries. The important points of this argument are summarized as follows.

Clustering – or agglomeration – refers to the tendency of some industries to mass together in specific locales. While every town above a certain size has a corner store or a law office, steel mills or movie studios are only found in certain areas. Much of this is the result of scale requirements. But scale is not the only reason agglomeration occurs. Historically, natural factors, such as forests and mineral reserves, led to resource industries in particular locations. Deep water ports and rivers created the conditions for certain types of industries to flourish in other locations. And the presence of highly skilled workers was the driving force for the growth of financial services in London or the fashion industry in Paris. These skills became more and more specialized as the industry clusters developed. Clusters also flourished as firms were driven to improve because of the demands of highly sophisticated customers. London evolved as a world-class insurance centre in no small part because of the significant risk management needs of merchants trading goods throughout the British empire. Clusters also developed because very capable firms were competing aggressively with one another. As clusters developed, technical innovation has been almost continuous, as capable rivals try to outdo one another.

As we look at cluster performance, we see that specialization exists in a limited number of highly related industrial regions and that clusters occur around these specialized industries. Over time these clusters get stronger as they develop unassailable advantages. We also see the importance of two complementary structural factors – specialized support and competitive pressure. Favourable market structures create pressure for firms continuously to upgrade the source and sophistication of their

advantage; at the same time, they support the upgrading process with the appropriate factor inputs and supporting institutions. The combination of this pressure and support is created by the interaction of four features illustrated in Porter's Diamond ([Exhibit 3](#)). The four features of Porter's diamond work together in a self-reinforcing dynamic to drive the clustering of industries.

#### Specialized support requires bountiful factor inputs and supporting industries

Specialized support for innovation and upgrading is provided by the abundant supply of *factor (input) conditions*, including basic factors such as natural resources and capital resources, as well as advanced and specialized factors such as scientific infrastructure and pools of specialized labour. As countries become more advanced, the quality of their microeconomic business environments is increasingly determined by advanced and specialized factors (e.g., research universities) rather than basic factors (e.g., raw material supply) because the basic factors can be readily

purchased from abroad. Support for upgrading is also enhanced by the presence of high quality *related and supporting industries*. Clusters of such industries can help competing firms innovate and create unique ways of meeting customer needs without needing to make all the investments themselves.

People who study clusters agree that clusters increase productivity. But they have differing views about the specialized support required. Strange (2003) points to six structural factors: labour market pooling, because in thick markets it is easier for firms to find workers with specialized skills; input sharing (e.g., airports and harbours); knowledge spillovers (concentration increases innovation); risk minimization; consumption; and information.

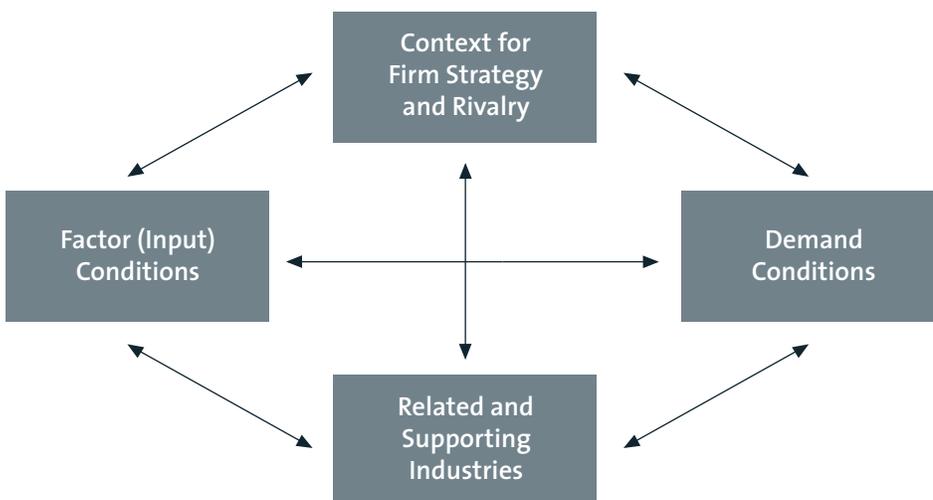
Wolfe and Gertler (2004) in their research into Canadian clusters, argue that clusters increase productivity as a result of specialized support through access to four competitive advantages of clusters: "superior access to specialized inputs, diverse specialization,

improved capacity to innovate through access to knowledge and stimulating the process of firm formation through start-ups and spin-offs." They stress the importance of a strong, diverse talent pool, established pillar companies with global reach, specialized support services, strong knowledge infrastructure, an entrepreneurial culture, access to venture capital and sustained development strategies by civic entrepreneurs and local governments.

Breschi and Malerba (2001) complement the work by Wolfe and Gertler, but place more emphasis on the factors related to informal social interactions to transfer knowledge, a view that Jacobs (1969) and Von Hippel (1994) share. Others support this view that an informal social environment is the reason for the relative success of Silicon Valley versus Route 128 in Boston – both high-tech clusters with very different cluster environments. Rosenthal and Strange (2003) see that Silicon Valley developed as a much more entrepreneurial culture characterized by many small companies with a flexible, highly mobile labour force and significant cooperation and knowledge sharing, whereas Route 128 developed with many large companies "doing their own thing" and being less likely to collaborate. The culture created in Boston is much more characteristic of "corporate America" with a hierarchical structure and limited intra-firm collaboration. It is these social differences that illustrate Saxenian's (1994) point that economic performance, even in locations that are similar in their local knowledge, labour market, and input market characteristics, can diverge significantly.

Feldman (1994) attributes the birth and development of clusters to a different source – entrepreneurship – and points to the support of pools of specialized labour and related and supporting industries. These support the entrepreneurs in spurring innovation and the cluster's ability to upgrade to serve the customer better. She also concludes "that firms producing innovations tend to be located in

### Exhibit 3 Cluster strength is the result of 4 interrelated factors



areas where there are necessary resources: resources that have accumulated due to a region's past success with innovation."<sup>12</sup>

Maskell also emphasizes the importance of specialized support to build and sustain strong clusters, arguing that the primary reason for the emergence of clusters is the enhanced knowledge creation that occurs along two complementary dimensions: horizontal and vertical. Along the horizontal dimension, clusters reduce the cost of coordinating dispersed sources of knowledge and overcoming the problems of asymmetrical access to information for different firms producing similar goods and competing with one another. The advantages of proximity arise from continuous observation, comparison and monitoring what local rival firms are doing, which acts as a spur to innovation as firms race to keep up with or get ahead of their rivals. The vertical dimension of the cluster consists of those firms that are complementary and interlinked through a network of supplier, service and customer relations. Once a specialized cluster develops, local firms increase their demand for specialized services and supplies. Furthermore, once the cluster has emerged, it acts as a magnet drawing in additional firms whose activities require access to the existing knowledge base or complement it in some significant respect."<sup>13</sup> Maskell concludes that the knowledge flows of the highly-educated labour supply drive cluster innovation.

#### Competitive pressure emerges from sophisticated demand and intense rivalry

Pressure for upgrading is supplied by sophisticated and demanding customers, whose demands spur local firms to innovate in order to upgrade their product/service offerings. Particularly valuable are *demand conditions* that anticipate the nature of demand elsewhere

in the world. Beneficial pressure is also supplied by a *context for firm strategy and rivalry* that causes local competitors to feel the need to seek unique and better ways to meet the needs of customers. Such a context typically requires active rivalry among firms competing in the same jurisdiction.

Both Porter and Maskell argue that both specialized support and competitive pressure are important to create a strong cluster. Strange adds that the thick labour market pools in clusters can arise out of rivalry, which in turn increases productivity.

#### The combination of specialized support and pressure drives global competitiveness

In summary, the research strongly reinforces the reality that an environment featuring a combination of support and pressure is most beneficial in nurturing and growing competitive global companies. While the various researchers point to somewhat different elements of support, specialized human resources and infrastructure figure broadly in their analysis. The presence of such powerful elements of support tends to attract multiple competitors, which helps create an important element of pressure, which is the rivalry among co-located firms. Rivalry among alternative firms helps customers become more demanding and sophisticated which in turn helps drive the firms toward innovative activities. The presence of rival, innovating firms then produces a benefit that loops back into better support. Social networks get created across the competing firms, their customers and their suppliers and this creates a rich environment of knowledge spillovers. Both of these features enhance the supportiveness of the environment for all firms – which serves to attract more firms still, which produces more pressure and more knowledge spillovers, and so on. Overall,

the research points strongly in a direction of specialized support and intense competitive pressure and their interaction as being the drivers of competitive performance.

#### Ontario's clusters match US base level performance

In a recent paper, "The Economic Performance of Regions,"<sup>14</sup> Porter found that the performance of a regional economy is influenced by the strength of its clusters of traded industries; the particular mix of clusters is secondary. For this working paper the Institute replicated Porter's US work in the Ontario and Canadian economies. Our conclusions consistently matched Porter's. Specifically, we found that:

- **Prosperity increases along with employment in traded clusters:** Employment in strong traded clusters drives prosperity
- **Strong clusters are more important than the mix of clusters:** Specific clusters are not more desirable than others for regional prosperity; the key to regional prosperity is creating conditions to drive high wages in clusters that already have a significant presence in a region
- **Greater diversification does not necessarily lead to higher regional earnings:** We found that diversification is not necessarily a driver of regional prosperity; in fact, there is some evidence in Ontario that increasing the concentration of employment in fewer clusters improved earnings growth through the 1990s.

We discuss these findings in more detail.

<sup>12</sup> Feldman, Maryann P. & Francis, Johanna L. "Home Grown Solutions: Fostering Cluster Formation" *Economic Development Quarterly*, May 2004, vol. 18, no.2, pp 127–137.

<sup>13</sup> Wolfe, David A., and Gertler, Meric S. *Clusters from the Inside and Out: Local Dynamics and Global Linkages*, Centre for International Studies – University of Toronto, May 2004, p. 7.

<sup>14</sup> Michael E. Porter, "The Economic Performance of Regions," *Regional Studies*, Vol. 37,6&7, pp. 549-578, August/October 2003

**Prosperity increases along with employment in traded clusters**

In a regional economy,<sup>15</sup> the presence of strong traded clusters drives employment across the region. City regions with a higher percentage of employment in traded clusters tend to have higher average earnings across all industries (Exhibit 4). In places with higher employment in traded clusters, average earnings tend to be higher than in Ontario city regions with less employment in traded clusters.

The wages achieved in traded industries affect wages in local industries (Exhibit 5). Since average earnings across the city region and in local industries increase with the proportion of employment in traded industries (and correspondingly decrease with the proportion of employment in local industries), we conclude that in Ontario local wages are pulled along by employment in traded

clusters. As Porter observed, “the causality appears to go from traded cluster wages to local wages, not vice versa.”<sup>16</sup>

It is not enough that city regions have a high share of employment in traded clusters. City regions whose clusters are strong tend to enjoy higher earnings (Exhibit 6). In each city region, we define a strong cluster as one in which employment makes up a higher percentage of employment than is found across Canada. In economic geography terms, we define a strong cluster where the Location Quotient (LQ) exceeds 1.00.<sup>17</sup>

We find that the relationship between cluster strength and regional wages is strongest when we define clusters broadly. This broader definition captures the interrelationship between clusters and the positive network effects of knowledge spillovers between related clusters.

(See *Identifying clusters of traded industries* on page 24, for a discussion of narrow and broad cluster definitions).

The data indicate that stronger clusters derive more of the benefits from agglomeration than weaker clusters. They generate higher regional wages, which indicate higher productivity. Greater competitive pressure and more specialized support are the result of stronger clusters. Porter’s work in the US also indicates that

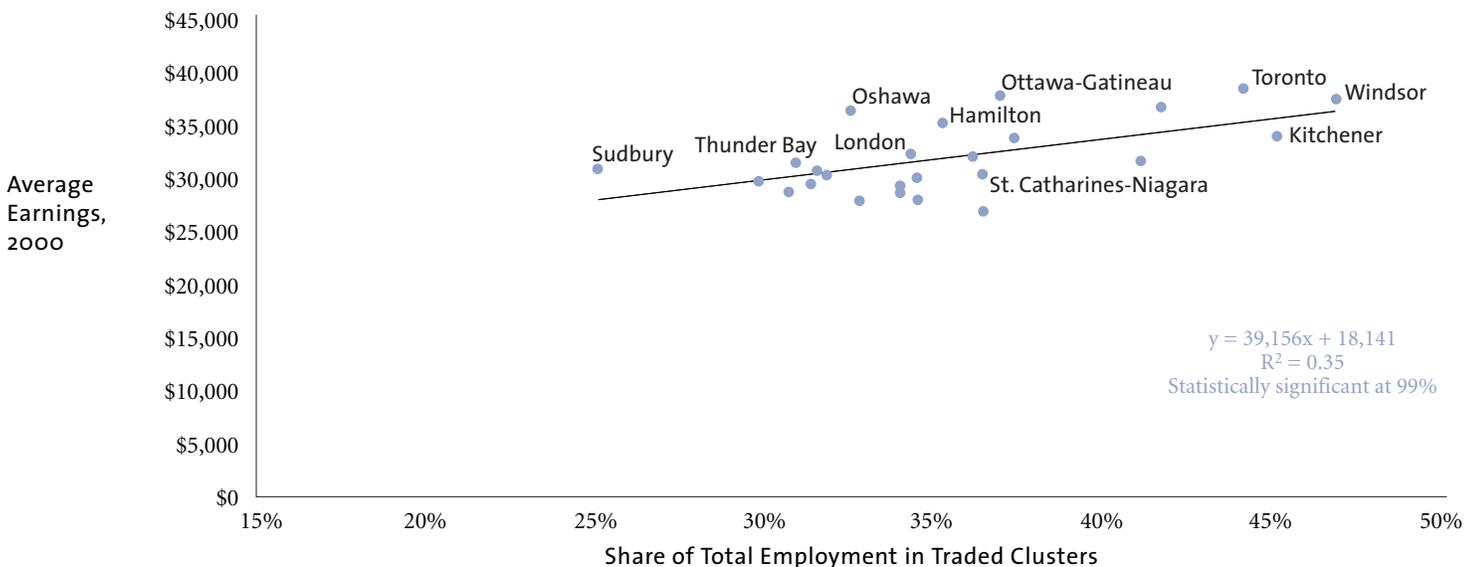
<sup>15</sup> In this discussion we use Census Metropolitan Areas as regions; the US counterpart is Metropolitan Statistical Areas or MSAs. In Porter’s paper his exhibits tend to refer to “economic areas” which are 172 mutually exclusive and collectively exhaustive regions of the US economy. Canadian employment and wage statistics are not available in a similar geographic concept. However, Porter indicates in his paper, findings at the economic area level hold for MSAs.

<sup>16</sup> Porter, “The Economic Performance of Regions,” p. 560

<sup>17</sup> The location quotient measures how much employment in a city is over-represented in a specific industry. A location quotient of exactly one indicates that the industry is represented in the city exactly in proportion to the industry’s representation in the national economy. A location quotient greater than one means employment is higher than would be expected and this indicates strength or concentration of that industry in a city.

**Exhibit 4 Traded clusters in city regions increase overall earnings**

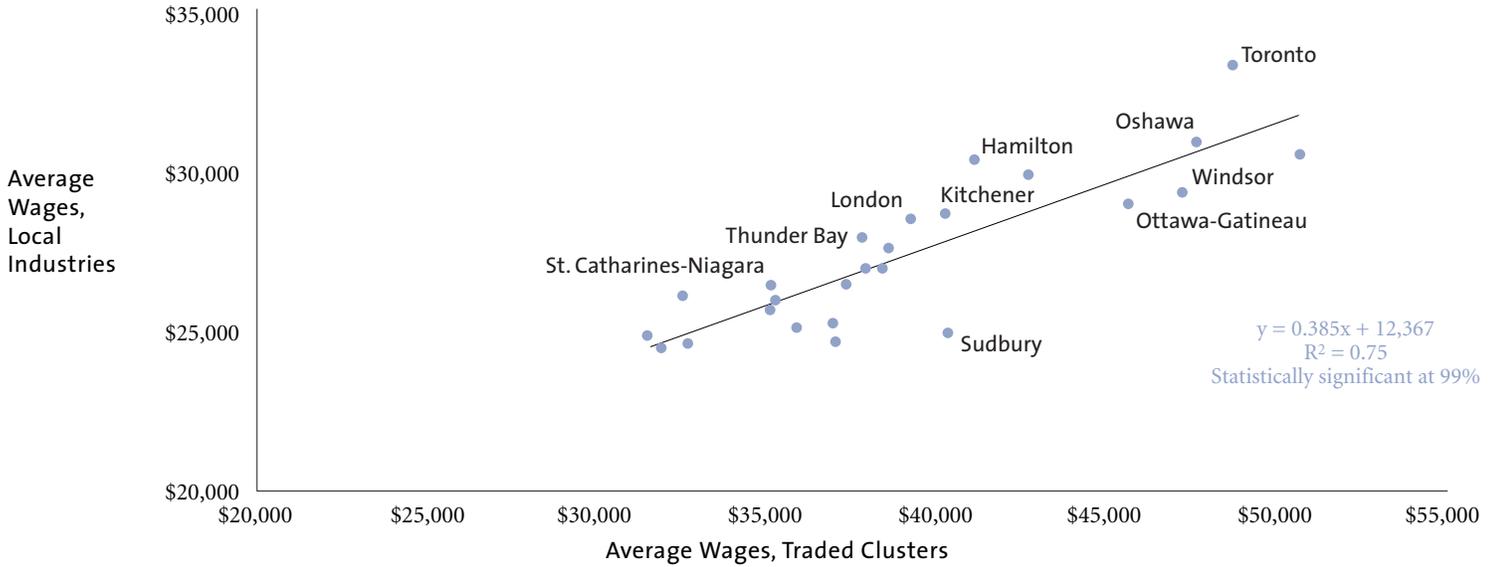
Employment in Traded Clusters and Overall Earnings in Canadian CMAs



Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada  
 Note: Natural resource industries are included with traded industries.

### Exhibit 5 Higher wages in traded clusters pull up wages in local industries

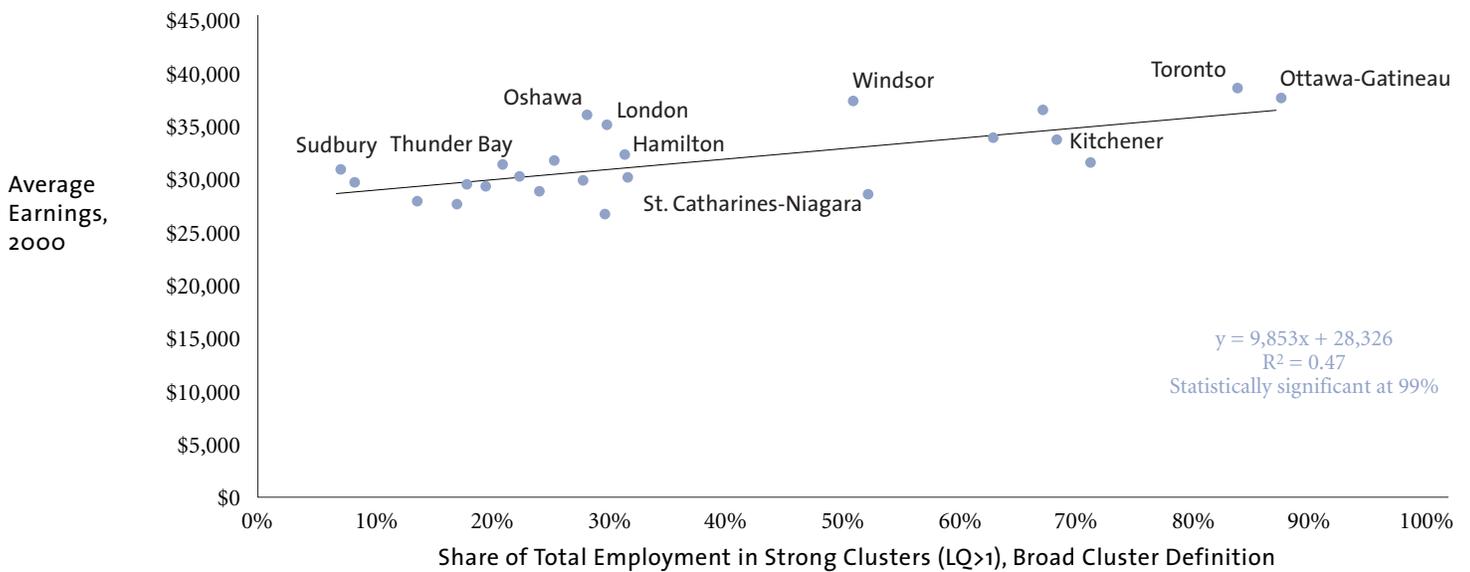
Average Wages, Traded Industries versus Local Industries, 2000  
Canadian CMAs



Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada  
 Note: Natural resource industries included with traded industries

### Exhibit 6 Strong clusters increase earnings in a city region

Average Earnings versus Share of Total Employment in Strong Clusters, 2000  
Canadian CMAs



Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada  
 Note: Natural resource industries included with traded industries.

regional innovation, as evidenced by patenting rates,<sup>18</sup> is also enhanced by the presence of stronger clusters in the local economy.

### **Strong clusters are more important than the mix of specific clusters**

Some economic strategists stress the importance of a specific mix of clusters in driving regional competitiveness. Many regional economic development strategies focus on attracting and building “high tech” clusters. Our analysis indicates that increasing employment in six clusters identified as high tech does not drive regional earnings<sup>19</sup> (Exhibit 7).

We have also isolated the impact of cluster mix and cluster wage level on the overall wage levels in regional economies. We find that differences between city regions are more likely to be the result of variation in average wage levels than the mix of clusters. In the US, Porter points to the Las Vegas Economic Area as a demonstration of these two effects.<sup>20</sup> Las Vegas competes disproportionately in the hospitality and tourism cluster – the lowest wage cluster of all 41 traded clusters in the US. However, because of its strength in hospitality and tourism, the Las Vegas cluster significantly out performs the US average wage. As a result, Las Vegas has the tenth highest average wage of all US economic areas.

The important conclusion from this analysis is that, in Ontario as in the US, regional and provincial economic development needs to focus more on upgrading the competitiveness of all the clusters in which a significant competitive position has been established. Efforts to attract new and more desirable clusters are not likely to have as positive a payback.

### **Greater diversification does not necessarily lead to higher regional earnings**

Some economic geographers and development experts promote regional diversification as a key to regional competitiveness and prosperity. They argue that having all an economy’s eggs in one basket is risky and that diversity in economic activity promotes regional competitiveness and productivity. Our review of the cluster evidence in Ontario and Canada indicates that diversification is neither a positive nor negative force for regional economic development.

On one measure of cluster diversification<sup>21</sup> we find that higher or lower diversification of employment in specific clusters has no impact on regional earnings (Exhibit 8). Some regions with a highly diverse economy, such as Kitchener and Toronto, have high wages, while less diversified regional economies, such as Ottawa, are equally prosperous. Using another measure of concentration – the percentage of regional employment accounted for by the top five clusters – also indicates that greater or lesser diversification has no impact on regional earnings.

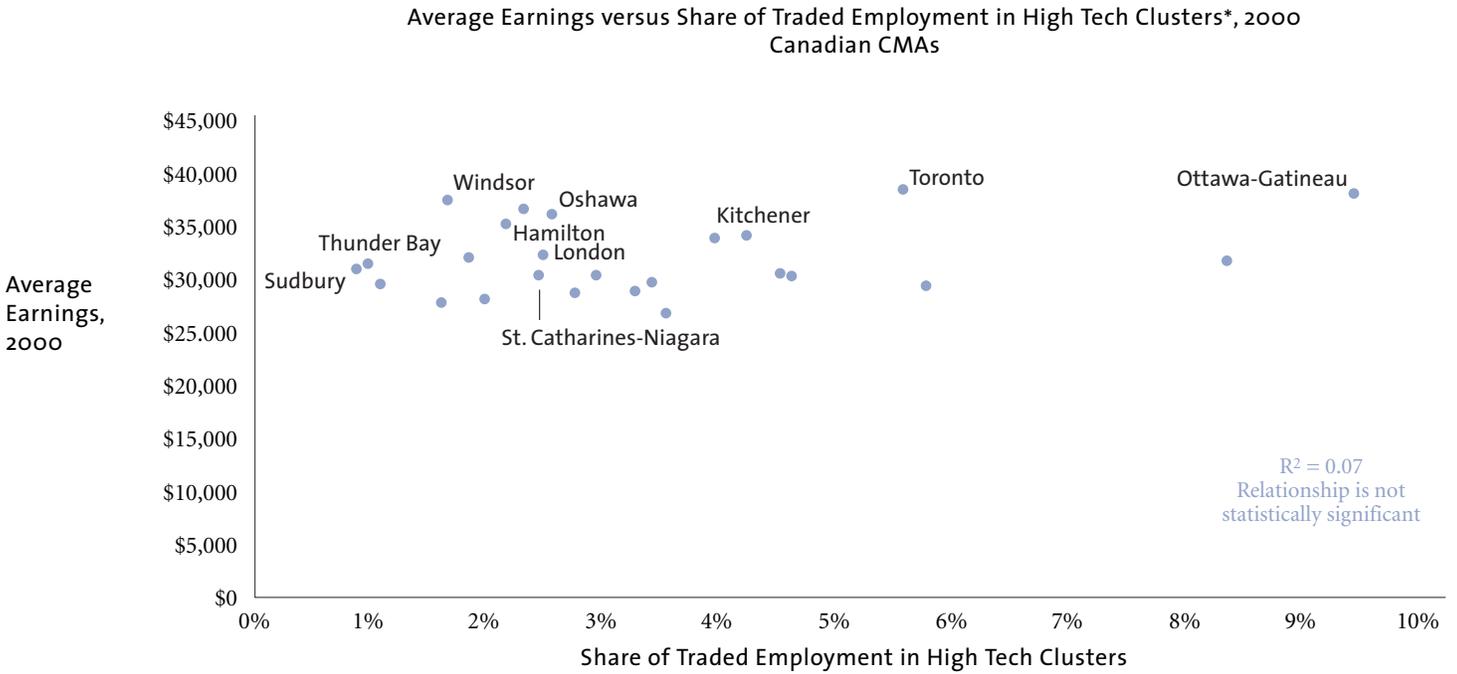
<sup>18</sup> Cluster- and CMA-specific patent data are much more difficult to gather in Canada than in the US; to date the Institute has not been able to replicate the analysis done by Porter.

<sup>19</sup> Porter did find a statistically significant relationship between high tech cluster employment and regional wages; however, he also found no relationship in high tech cluster employment and subsequent employment or wage growth. Nor is growth in high tech share of employment associated with higher wage growth in other clusters. He concludes that, “Rather than focusing solely on developing ‘high-tech’ clusters, our data reveal that regions need to upgrade all the clusters that are present.” *The Economic Performance of Regions*, p. 564.

<sup>20</sup> *The Economic Performance of Regions*, pp. 568-9

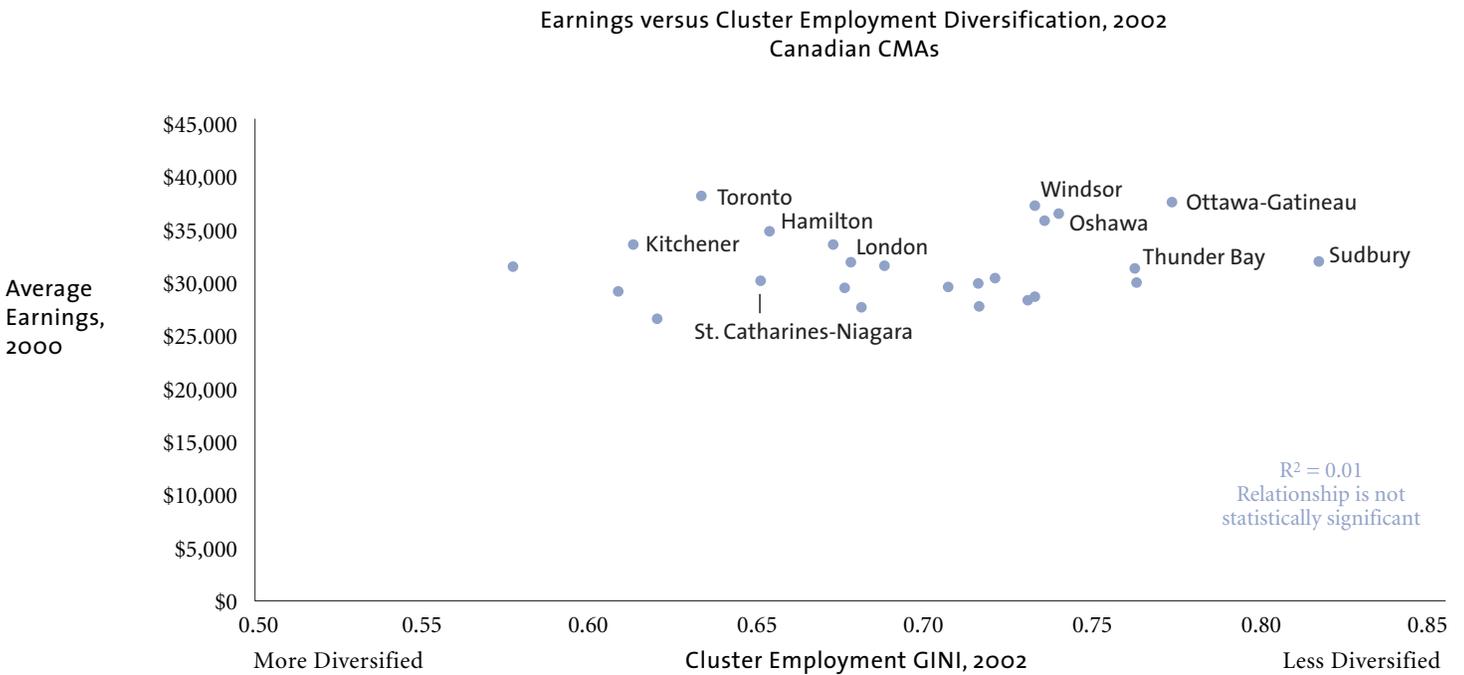
<sup>21</sup> “GINI” a measure of diversification which ranges from zero where the city’s employment is spread evenly across all industries to one where all the city’s employment is in one industry.

### Exhibit 7 Employment in high tech clusters does not affect overall city earnings



\*High Tech Clusters: Aerospace Engines, Aerospace Vehicles and Defense, Communications Equipment, Information Technology, Medical Equipment, Biopharmaceuticals  
Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada

### Exhibit 8 Cluster diversification does not affect city region earnings



Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada  
Note: Natural resource industries included with traded industries.

## Identifying clusters of traded industries

In Working Paper 1, we showed the results of our analysis of Ontario's clusters of traded industries. Our work was based on the Cluster Mapping Project carried out by Michael Porter's Institute for Strategy and Competitiveness at Harvard Business School.

Porter's work begins with the observation that three differing types of industries constitute regional economies. These three types – local industries, resource dependent industries, and traded industries – have different patterns of geographic competition and different effects on regional economies.

Most employment is found in local industries, which provide goods and services to the local market in which they operate. These industries tend to be found in proportionate to the population of the region. They meet local demands and tend not to compete with others outside their regions. Most local industries are services, such as local health care, retailing, and most construction activity. Local goods manufacturers include bottling facilities, newspapers, and concrete products.

A small percentage of employment is found in resource dependent industries, such as mining and logging. These industries are located near the natural resource. Unlike local industries they compete with other firms outside the region. Resource dependent industries account for 1 percent of Ontario employment, but are 8 and 5 percent in Sudbury and Thunder Bay respectively.

Traded industries sell products and services across regions and internationally. Examples include automobile parts and assembly, steel-making, and biopharmaceuticals. Their location

is determined by access to specific factors, such as a trained workforce, suppliers, or customers. Unlike local industries employment varies significantly from region to region.

Porter assessed 879 industries and classified each into one of the three categories based on their employment patterns. He applied statistical techniques<sup>†</sup> to identify the industries that were spread most evenly across the US economy – these were classified as local. Of the remaining industries he identified the ones that were tied heavily to the location of resource endowments. The rest of the industries were classified as traded.

Having classified US industries, Porter then proceeded to identify how industries clustered together. Using a combination of locational correlation statistical methods, the input-output tables, and pragmatism, he identified 41 clusters of traded industries. In many cases he identified overlapping of industries between clusters; on average, each industry could be fit logically into two different clusters. To avoid double counting and to assist analysis of differences between clusters, Porter assigned each industry uniquely to one cluster based on the strongest locational correlation. Each of the 41 clusters can be broadly defined or narrowly defined. In the case of the former, overlap and double counting exist; in the latter, clusters are mutually exclusive and collectively exhaustive of traded industry employment.

Within each cluster are sub-clusters. Narrow sub-clusters comprise industries within the narrow definition and are uniquely associated with a specific cluster. Broad sub-clusters comprise industries in the broad definition.

For example, the automotive cluster comprises eight narrow sub-clusters (e.g. assembly, parts, and forgings and stampings) and eight broad sub-clusters (e.g. machine and tools, and metal processing).

The Institute for Competitiveness & Prosperity drew on the industry assignments developed by Porter to categorize 41 Canadian clusters consistent with Porter's definitions. The major challenge is in equating or "concording" Canadian Standard Industrial Classifications to those in the US. Using employment data from Statistics Canada's *Canadian Business Patterns* we have calculated the size of Canada's clusters – across the country, within provinces, and the 25 Census Metropolitan Areas. We also estimated average wages for each cluster and in each locale using data collected in the 2001 Census.

<sup>†</sup> Three specific criteria were used to identify local industries. First, for each industry he calculated the share of national employment accounted for by states with the industry Location Quotient greater than or equal to 1. All industries that were below 50 percent on this measure were classified as local. Second, for each industry he identified the five states with the highest Location Quotients and calculated the mean. All industries that were below 2 on this measure were classified as local. Third, he calculated an employment GINI coefficient for each industry. All industries below 0.3 were classified as local. For most industries all or none of the three criteria applied. In the small number of industries where two out of the three criteria applied Porter examined the actual distribution of employment and industry definitions to make a judgment call. See "The Economic Performance of Regions", p. 559 for more details.

There is evidence, however, that increasing specialization over time increases earnings growth (Exhibit 9). City regions where cluster employment became more concentrated between 1990 and 2000 have tended to experience higher wage growth. As Porter says in observing the same phenomenon in the US, “this provides provocative though not definitive evidence that specialization of a region in an array of stronger traded clusters boosts regional performance.”<sup>22</sup>

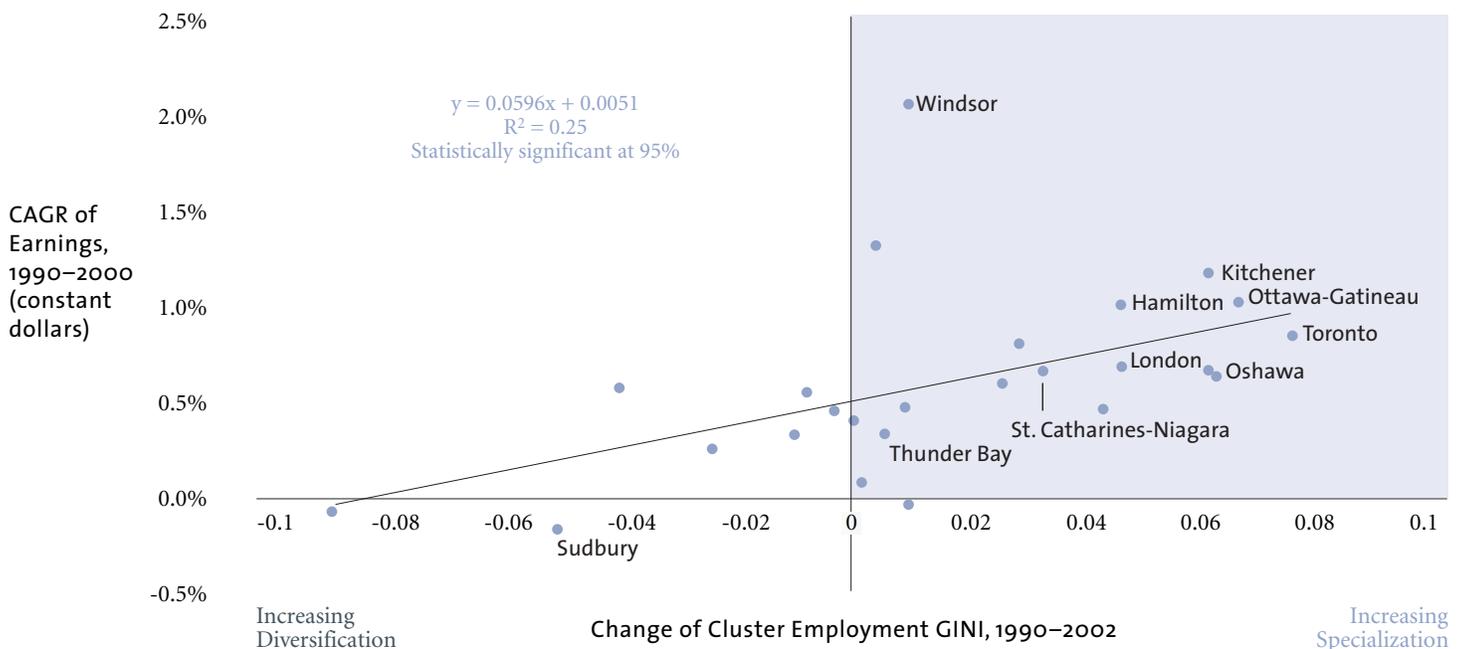
### Ontario’s clusters trail US peers’ economic gains

Wages are a good measure of the effectiveness of industries in generating prosperity, since the level of wages in a region is closely related to its relative productivity.<sup>23</sup> The Institute has calculated wages for each of Ontario’s clusters of traded industries and its local and natural resource industries. As we have shown in earlier work,<sup>24</sup> Ontario’s wages trail peer group results. In breaking down our wages by the three groups, we find that in 2000 Ontario’s average wages in natural resources actually out perform peer states’ results by 20 percent (Exhibit 10). In local industries we trail by 11 percent. But in traded industries Ontario’s wages are fully 23 percent behind those of our peer states.

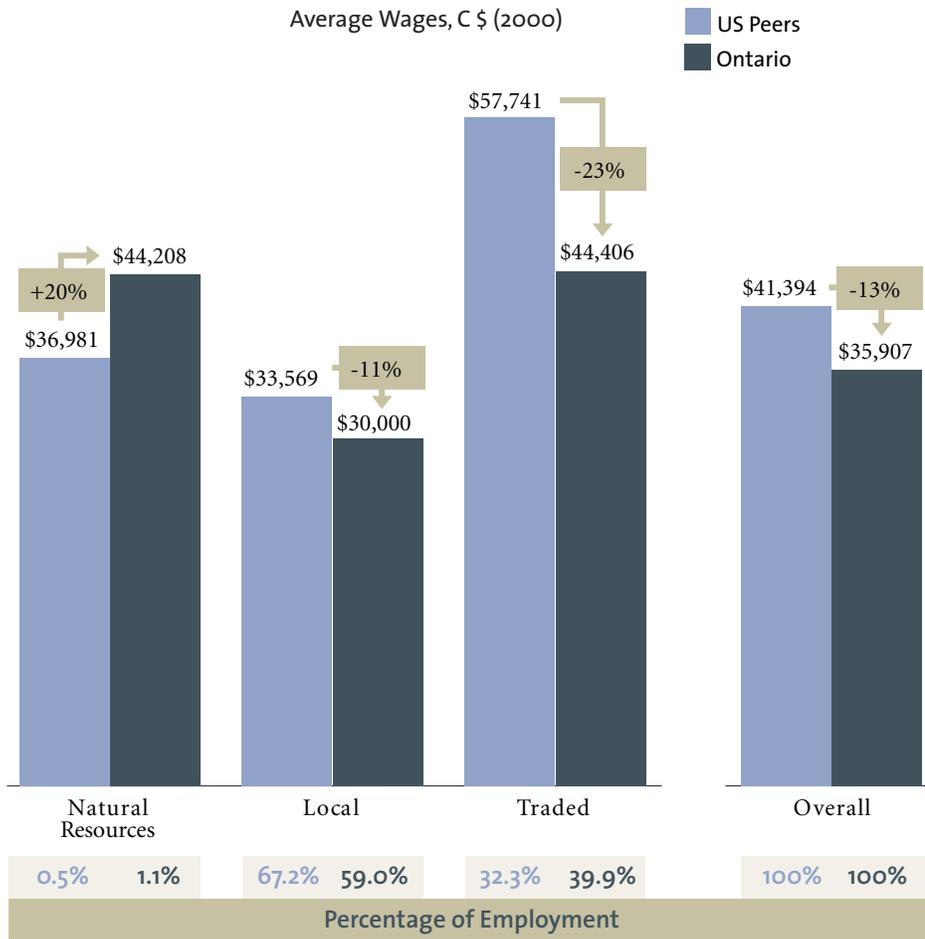
Ontario trails peer state wages overall by 13 percent as the net result of two effects: industry mix and wage levels. In Ontario a lower percentage of employment is in the lower paying local industries – 59.0 percent in Ontario compared to 67.2 percent in the peer states. On the other side of the coin, we have a higher percentage of employment in the higher paying industries. In Ontario a higher percentage of employment (39.9 percent) is in traded industries compared to the peer states (32.3 percent). In natural resource industries,

<sup>22</sup> “The Economic Performance of Regions,” p. 566  
<sup>23</sup> For Canada, we use average employment income, excluding self-employed. The source of information is the Canada 2001 Census. For more information see the 2001 Census dictionary, pp. 28-32. For the US, we use the average wages from the Institute for Strategy and Competitiveness, whose data set is the County Business Patterns and is very similar to what we used for Canada.  
<sup>24</sup> Closing the prosperity gap, p. 27

Exhibit 9 Earnings grew faster where employment became more specialized



### Exhibit 10 Ontario's traded clusters under perform US peers



both Ontario and the peer states have small percentages of employment in natural resource industries (1.1 percent and 0.5 percent respectively). This attractive mix of industries causes Ontario's wages to be 5 percent higher than if we matched the mix of US peers.

However, our wages are lower in most industries. Our advantage in natural resources is a positive and encouraging observation. Nevertheless, employment in these industries is quite limited on both sides of the border. Ontario's lower wage levels cause our overall average (without considering the beneficial effect of our attractive mix of industries) to under perform peer states by 18 percent.

The net effect of Ontario's attractive mix (5 percent over performance) and its lower wage levels (18 percent under performance) is the 13 percent under performance seen in Exhibit 10.

These wage results point to the under performance of Ontario's traded industries. The ratio of wages in traded to local industries average wage is a measure of how effective our clusters are. In the peer states this ratio is 1.72, while in Ontario it is only 1.48. In other words, the benefits of clustering and agglomeration in the peer states generate a 72 percent wage premium, while in Ontario we garner a 48 percent premium. As we have seen repeatedly in our work, Ontario has established a good base for prosperity but falls short in the areas that truly differentiate competitiveness and prosperity.

In nearly every cluster of traded industries Ontario trails the weighted average wage achieved in our peer group (Exhibit 11).

#### Ratio of Average Wages in Traded to Average Wages in Local Industries



Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada  
 Note: US peer results are based on 2001 data for peer states, adjusted by change between 2000 and 2001 for US as a whole. Natural resources 2001 results decreased by 1.0% to estimate 2000 results; local 2001 results decreased by 1.0%; traded 2001 results increased by 0.1%.

## Exhibit 11 Wages in most of Ontario's clusters trail peer state performance

### Top Ten Ontario Employment

Traded Cluster (Ontario employment rank)	Ontario C\$ (2000)	Peer States C\$ (2001)	Ontario as a % of Peer States
Tobacco (39)	50,779	40,717	124.7
Furniture (25)	32,419	29,411	110.2
Prefabricated Enclosures (31)	41,644	38,233	108.9
Textiles (29)	34,213	32,286	106.0
Construction Materials (34)	39,053	37,006	105.5
Plastics (17)	42,097	41,318	101.9
Agricultural Products (23)	34,152	33,775	101.1
Transportation and Logistics (7)	43,167	43,319	99.6
Lighting and Electrical Equipment (32)	41,389	41,924	98.7
Motor Driven Products (27)	41,389	41,928	98.7
Metal Manufacturing (6)	43,822	44,643	98.2
Building Fixtures, Equipment and Services (13)	35,340	37,548	94.1
Footwear (41)	23,861	25,392	94.0
Forest Products (16)	44,281	47,226	93.8
Power Generation and Transmission (22)	58,837	63,987	92.0
Processed Food (11)	37,604	41,423	90.8
Production Technology (14)	44,671	49,232	90.7
Apparel (19)	24,402	26,943	90.6
Fishing and Fishing Products (40)	28,832	32,033	90.0
Hospitality and Tourism (5)	22,478	25,302	88.8
Oil and Gas (20)	64,939	73,555	88.3
Heavy Machinery (18)	41,479	47,698	87.0
Education and Knowledge Creation (3)	36,591	42,915	85.3
Automotive (4)	46,393	54,788	84.7
Sporting, Recreational and Children's Goods (37)	32,667	38,870	84.0
Leather and Related Products (36)	29,473	35,136	83.9
Chemical Products (21)	47,160	58,785	80.2
Jewelry and Precious Metals (35)	34,655	44,105	78.6
<b>Weighted Average Wage</b>	<b>\$44,406</b>	<b>\$56,790</b>	<b>78.2%</b>
Heavy Construction Services (8)	36,293	47,156	77.0
Medical Devices (28)	44,768	58,963	75.9
Communications Equipment (20)	50,899	67,629	75.3
Analytical Instruments (24)	45,221	61,049	74.1
Aerospace Vehicles and Defense (33)	52,179	70,732	73.8
Business Services (1)	50,052	68,205	73.4
Aerospace Engines (38)	49,020	68,074	72.0
Publishing and Printing (10)	37,232	53,339	69.8
Distribution Services (9)	45,005	64,731	69.5
Financial Services (2)	63,375	100,651	63.0
Biopharmaceuticals (30)	40,523	65,024	62.3
Entertainment (12)	32,168	53,614	60.0
Information Technology (15)	51,420	92,107	55.8

\* Canadian dollars, PPP adjusted

\*\* Ontario results: 2000; US results: 2001. Overall difference between 2000 and 2001 results for US traded clusters is 0.1%.

Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada

These latest results confirm our earlier findings that Ontario benefits from an attractive mix of traded industries (Exhibit 12); our challenge is to strengthen the effectiveness of our clusters to enhance Ontario’s competitiveness and productivity.

Further analysis of the wage differences shows that Ontario is close to or exceeds the peer group average in lower-wage clusters, but trails as the cluster wage level gets higher. For example, in textiles, one of the lowest paying clusters, Ontario’s wages are 6 percent ahead of US levels, while in financial services, our second highest paying cluster, Ontario trails the peer average by 37 percent. To be sure, exceptions exist. In the lowest paying cluster, hospitality and tourism, Ontario trails peer state

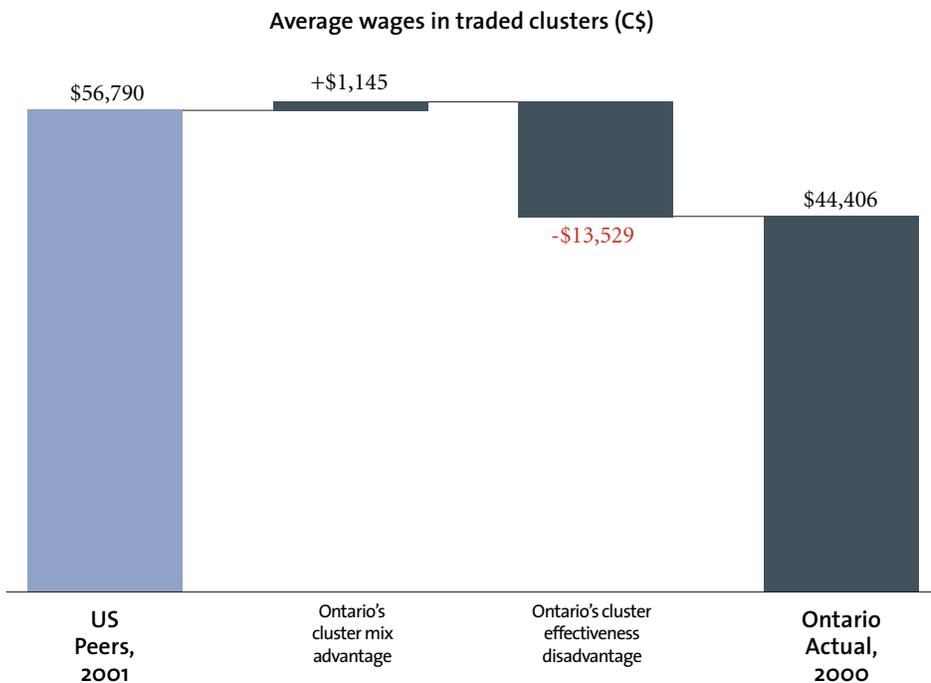
wages by 11 percent. And in the highest paying cluster, oil and gas, Ontario’s wages are 12 percent behind peer state results. Nevertheless, the trend in relative wage performance is for the performance gap to widen as wages increase (Exhibit 13).

We investigated the Ontario-US wage performance inside each of the clusters to determine if our mix of sub-clusters inside the clusters was the cause of the under performance and this is not the case. In financial services, for example, Ontario has an attractive mix of sub-clusters relative to the US<sup>25</sup> – employment in higher wage sub-clusters is a slightly greater percentage of Ontario’s total. And within financial services Ontario’s wages compare favourably with the lower wage sub-clusters in the US –

depository institutions, real estate trusts, and insurance products. However, in the higher wage sub-clusters – securities brokers, dealers and exchanges, risk-capital providers, and investment funds – Ontario wages trail US averages by 56, 44, and 48 percent respectively.

In information technology, another high wage cluster with a significant under performance, Ontario has a favourable mix of sub-clusters. Nevertheless, our wages trail US performance in all sub-clusters. In the lowest-wage sub-clusters, computers, electronic components, peripherals, and communications services, wages in Ontario on average are 28 percent lower than in the US. Strikingly, in the highest wage sub-cluster, software, average wages in the US are \$125 thousand while in Ontario they are less than half that at \$57 thousand.

### Exhibit 12 Effectiveness, not mix, accounts for Ontario’s under performance in traded clusters



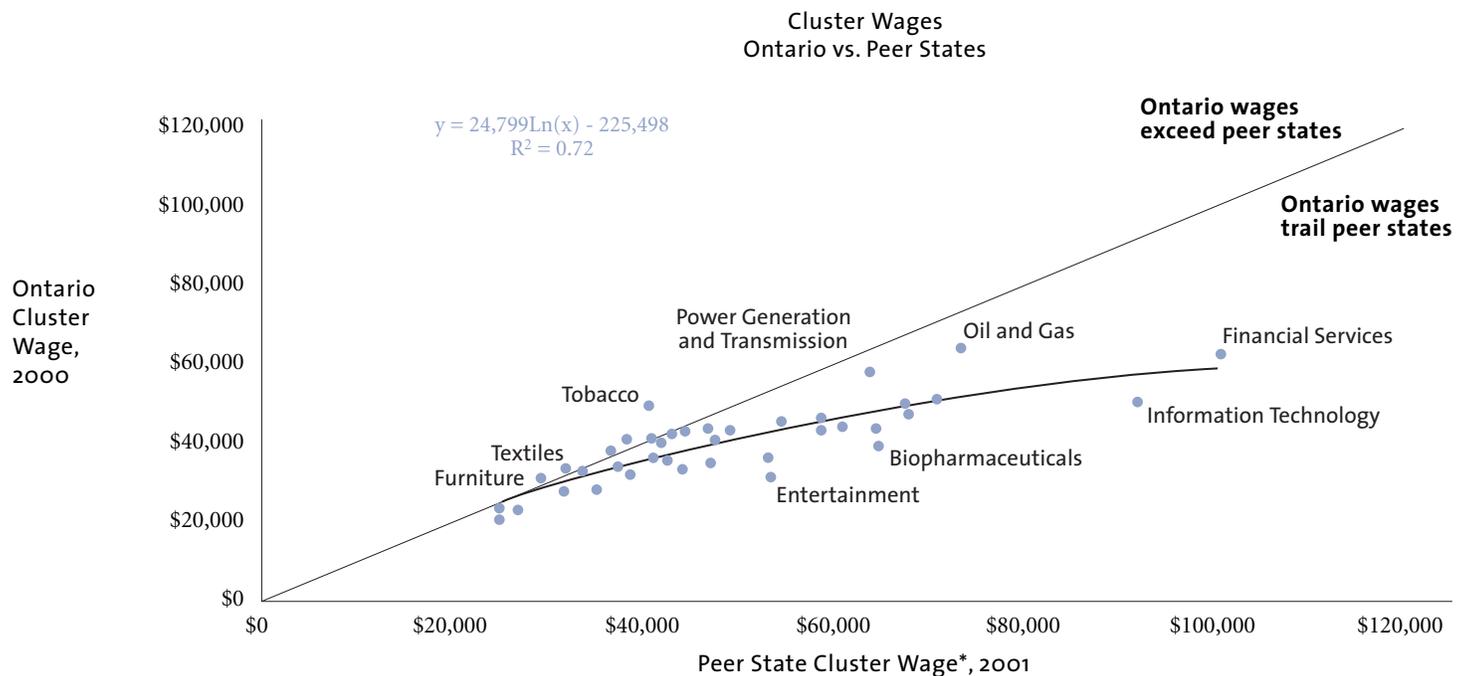
<sup>25</sup> Sub-cluster wage comparisons are between Ontario and the United States, not the 14 peer states.

We see the same pattern in lower wage clusters. For example, in entertainment, Ontario trails slightly or exceeds US wages in the lower wage sub-clusters, entertainment venues and entertainment equipment. But again, in the highest-wage sub-clusters, recorded products and entertainment related services, our average wages are less than half the US average.

This is a stunning observation – but is consistent with so much else we have found as we investigate Ontario’s prosperity gap. At a base level, we match or exceed US peers’ performance. But at the higher end of performance, we trail significantly (Exhibit 13).

**In summary, we continue to see evidence that clusters of traded industries are important elements of our market structures that increase our capacity for upgrading and innovation. While Ontario has an attractive mix of clusters, we are not deriving the full economic advantage from them. In the next section we explore the impact of specialized support and competitive pressure on Ontario’s market structures to seek ways to strengthen our clusters.**

**Exhibit 13** Ontario’s under performance worsens with higher wage clusters



\* Weighted average

Source: Institute for Competitiveness & Prosperity, Institute for Strategy and Competitiveness, Statistics Canada

# Ontario's market structures and firm actions



## Ontario’s market structures lack adequate specialized support and intense competitive pressure

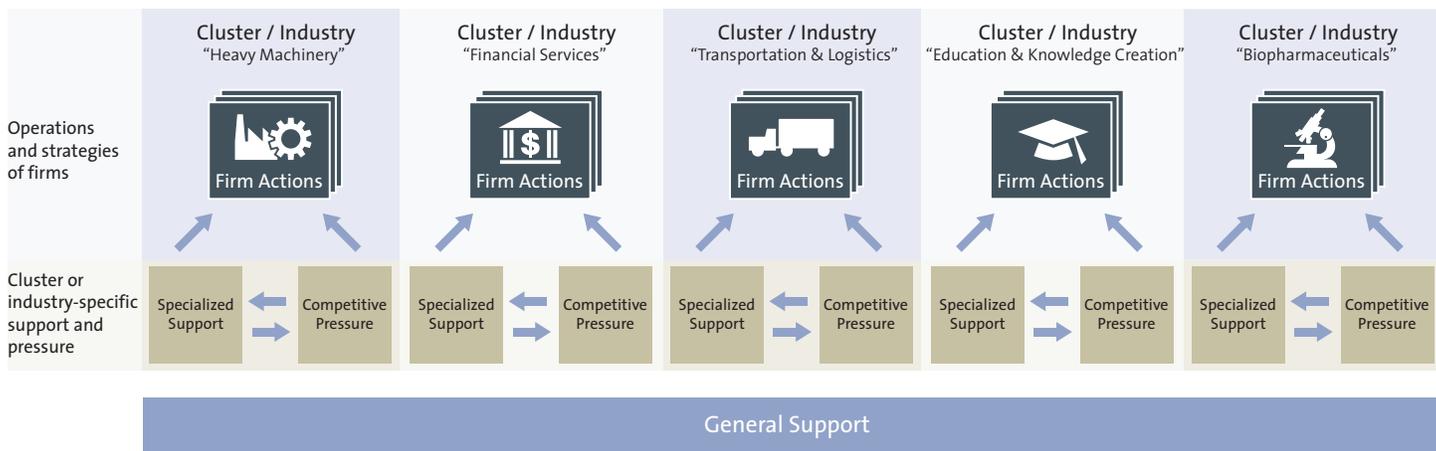
Up to now, we have reviewed the academic conclusions on the importance of clusters to economic progress and summarized this work to identify the importance of specialized support and intense competitive pressure on the success of clusters. We verified the positive contribution of strong clusters of traded industries to Ontario’s competitiveness and prosperity. However, we found that the economic impact of clusters in Ontario was muted in comparison with their impact in peer jurisdictions.

In this section, we assess the structures of support and pressure to deepen our understanding of our cluster under performance.

Each cluster operates within its own structure of specialized support and competitive pressure (Exhibit 14). Underpinning these cluster environments is a platform of general support.

This general support includes factors such as physical infrastructure, legal administrative mechanisms and processes, basic education, and stable macroeconomic conditions. An economy requires excellent general support, but breakthrough performance is the result of innovative firm actions driven by specialized support and competitive pressure. Each industry or cluster has its own environment of specialized support and competitive pressure. Specialized support includes structural factors, such as focused research capability, industry specific financing support, and capable specialized suppliers. Within each industry and cluster, firms respond to the stimulus of demanding customers and intense rivalry – or they cease to exist. Human nature being what it is, individuals and firms generally perform just to the level necessitated by the pressure they are under and the support that enables them to act.

Exhibit 14 Structure of pressure and support drives quality of firm actions



As we assess the four elements of this framework, we conclude that Ontario’s market structures :

- have adequate level of general support
- provide inadequate specialized support
- generate inadequate intensity of competitive pressure
- company actions are weakened.

**Ontario has adequate general factor conditions**

An important structural base for competitiveness is the presence of factors or inputs that provide support to all industries. Such conditions include transportation infrastructure, basic education, reliable police services, legal, judicial and administrative support, and supportive macroeconomic conditions. Drawing on research in two areas – the World Economic Forum’s (WEF) Executive Opinion Survey and our analysis of some of Ontario’s

clusters relative to similar clusters in peer states – we see that we have a solid base of general supportive conditions.

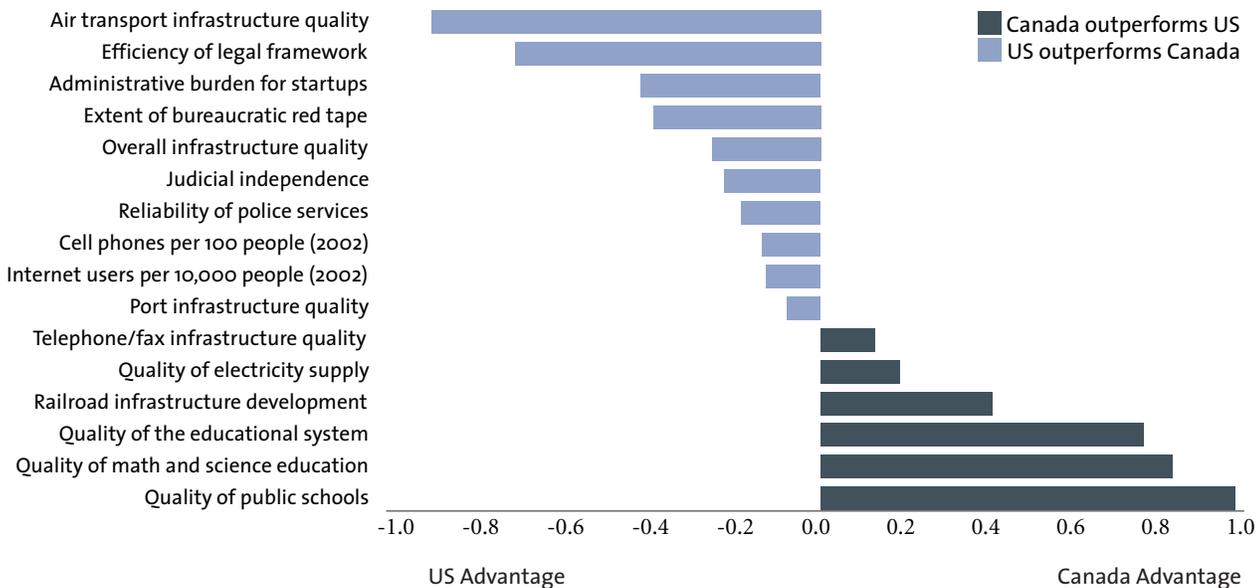
The WEF Business Competitiveness Index (see *How the Business Competitive Index measures structures of competitiveness* on page 44, for a description of the WEF’s methodology) indicates that Canada possesses a solid platform of supporting conditions relative to the United States (Exhibit 15). Although these results are for Canada, we conclude that they generally apply to Ontario as well.

In ten of the 16 measures of general support, the US outperforms Canada and on the other six Canada outperforms the US. In basic physical infrastructure, US executives rate the US higher on “air transport infrastructure quality” and on “overall infrastructure quality” than Canadian executives rate Canada. However, Canada’s infrastructure is rated higher in the areas of telephone/fax, quality,

electricity, and railroad infrastructure. Government-related support in the areas of the legal and judicial framework, administrative burden for startups, and police services are rated higher in the US. Canada’s most significant advantage in the area of general support is the perceived quality of the educational system. For example, Canadian executives give Canada a 66 percent advantage<sup>26</sup> on a 1-to-7 scale on the question “The educational system in your country prepares for coping with the needs of a competitive economy” where 1 is “clearly no” and 7 is “clearly yes.” Canada receives a score of 5.5 while the US receives a score of 4.7 versus the average score of all countries at 3.5.

<sup>26</sup> In calculating the percentage difference we first subtract the average score of all countries in the WEF sample from Canada’s and the US scores.

**Exhibit 15 Canada matches US on “General Support” factors**



We calculated the difference in average scores between Canada and the United States and weighted them by the observed impact of each score on GDP per capita.<sup>27</sup> Taken together and weighted Canada outperforms the US by 14 percent on general support conditions. That is to say the six areas in which we out perform have a bigger impact on prosperity than the ten areas in which the US out performs.

These are important building blocks for a competitive and prosperous economy and Canada has strengths here. However, compared to our US counterparts we have not gone the next step in developing the specialized structures for success.

Ontario provides inadequate specialized support to its clusters and industries

Structures that support innovation and upgrading in clusters and industries are critical

inputs to enhancing competitiveness and prosperity. Complementing this specialized support is an appropriate level of competitive pressure brought on by sophisticated customers and capable rivals. To help us understand the degree to which our firms and the economy benefit from specialized and sophisticated support we reviewed relevant results from the WEF Business Competitiveness Index and conducted two other sets of analysis – a review of some of Ontario’s clusters and an analysis of Canada’s global leaders. All three sources indicate an inadequate level of specialized support.

The Business Competitiveness Index identifies specific support disadvantages

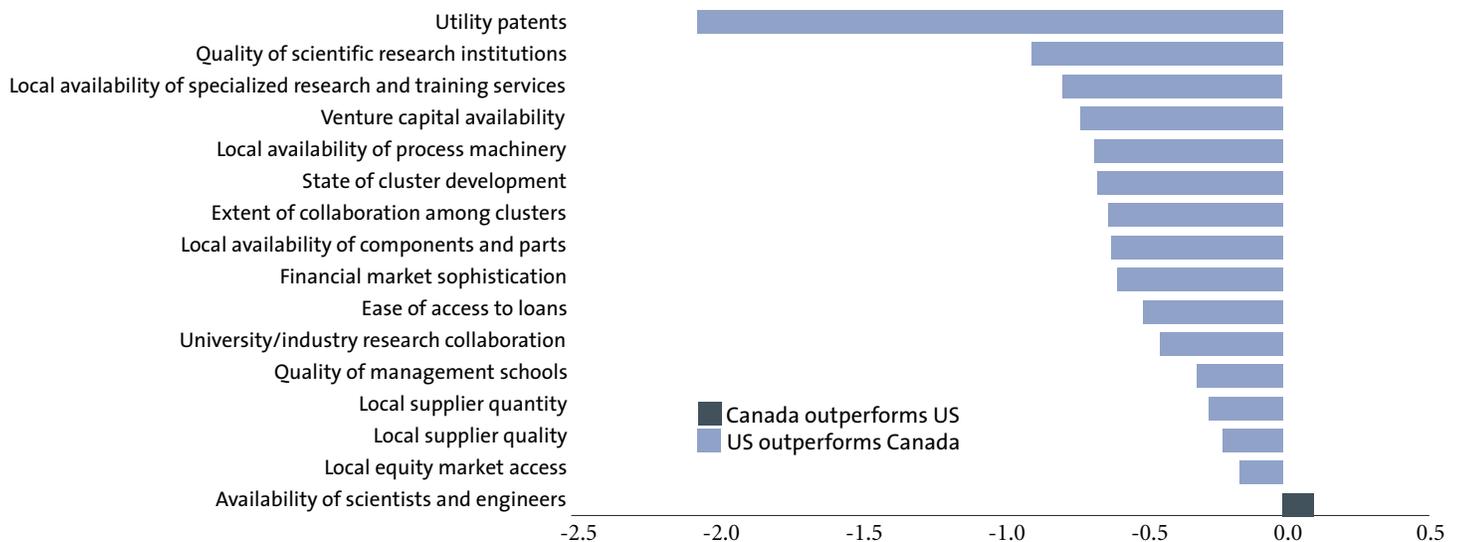
Specialized factors of support are to be found in areas such as human resources, technology, and capital markets. In these areas we find Canada’s performance attenuates across a series of measures from utility patents to local equity market access (Exhibit 16). On no factor does Canada have a significant advantage over the US.

While in the area of general support, we see an advantage in the basic educational system, we trail the US in the more specialized and sophisticated conditions:

- **University/industry research collaboration:** US executives rate the US 26 percent higher than Canadians rate Canada on the question “In its R&D activity, business collaboration with local universities” where 1 is “minimal or nonexistent” and 7 is “intensive and ongoing”
- **Quality of management schools:** US executives rate the US higher by 14 percent on the question “Management or business schools in your country are” with responses ranging from “limited or of poor quality” to “best in the world”

<sup>27</sup> As calculated by Michael Porter. See the sidebar “How the Business Competitiveness Index measures structures of competitiveness” or The Global Competitiveness Report, 2003-2004, World Economic Forum, pp. 42-43.

Exhibit 16 Canada trails US on “Specialized Support” factors



We do have an 8 percent advantage in the perceived availability of scientists and engineers (Responses to “Scientists and engineers in your country are” ranging from “nonexistent or rare” to “widely available”). Where we see an advantage in math and science education in “general support” conditions, we trail in more specialized and support factors:

- **Quality of scientific research institutions:** the US advantage is 68 percent on the question “Scientific research institutions in your country (e.g., universities, laboratories, government laboratories) are” where responses range from “non-existent” to “the best in their fields”
- **Local availability of specialized research and training services:** the US advantage is 50 percent in the question “In your industry, specialized research and training services” with responses ranging from “not available in this country” to “available from world-class local institutions”

While we see strengths in physical infrastructure, we trail the US in the support to firms from:

- **Local supplier quality:** the US has a 14 percent advantage on the statement “The quality of local suppliers in your country” with responses ranging from “poor, as they are inefficient and have little technological capability to “very good as they are internationally competitive and assist in new product and process development”
- **Local supplier quantity:** a 25 percent advantage goes to the US for the question “Local suppliers in your country are” from “largely non-existent” to “numerous and include the most important materials, components, equipment, and services”
- **Financial market sophistication:** a 28 percent advantage for the US in the question “the level of sophistication of financial

markets in your country is” from “lower than international norms” to “higher than international norms.”

On average, Canadian scores are 27 percent below US scores in this part of the Business Competitiveness Index. In summary, the specialized and sophisticated supportive factor conditions and supporting industries have not developed to the same degree of sophistication in Canada and Ontario as in our peer group in the US. We have quite adequate general and basic support but not the support that can drive competitiveness and prosperity to a higher level.

#### Specific cluster analysis also finds specialized support lacking

Our analysis of some of Ontario’s clusters also indicates a solid level of general support and a lack of specialized support. In the last year, the Institute has been evaluating Ontario’s clusters against similar clusters in peer states. We used a template developed by the Institute for Strategy and Competitiveness at the Harvard Business School. We have analyzed five clusters – biopharmaceutical products, automotive, education and knowledge creation, tomato processing, and steel – and these results are available on our Web site.

A recurring theme throughout these analyses is that our clusters generally benefit from a solid base of infrastructure and factor conditions, but that some lack specialized and sophisticated support.

For example, the tomato processing cluster in Windsor Essex benefits from a base level of research support from universities and government agencies. However, in the world’s most vibrant tomato processing cluster in California, the industry benefits from specialized academic and industry research behind tomato processing. Ontario’s biopharmaceutical cluster has a base level of scientific infrastructure and has very capable scientists in local universities. However, compared to Boston’s cluster we do

not have access to specialized venture capital support. To be sure, some of our clusters have the full range of general and specialized support – automotive and steel, for example. However, our analysis to date has not found a cluster where we out perform a US counterpart on the basis of highly specialized and focused support.

#### Global leadership review points to lack of specialized support

To help us understand the competitive environment in which Ontario companies operate, we identified a group of global leaders and analyzed them to discern patterns. We started with the National Post *FP500* and the *Report on Business Top 1,000 Companies* and identified those companies and subsidiaries that are Canadian owned and rank among the top five companies in their industry segments. Usually the top five referred to revenue, but in some cases we used measures that were more typical among industry analysts, for example, assets in financial services or system sales among franchisors or licensors. In certain industries where global competition is not relevant, we used North America as our pool. For example, railway transportation is on a continental basis, not a global basis. Government agencies and Crown corporations are excluded.

Using this approach we identified 72 companies that can be classified as Canada’s global leaders (Exhibit 17). Beyond a systematic analysis of the factors behind the success of these leaders, it is clear that some of them have succeeded because of leadership at critical junctures in their corporate history. Peter Munk took a calculated risk when he acquired Goldstrike for Barrick. Frank Stronach had the drive to make Magna a world leader in automotive parts and took a unique approach to corporate governance. Philip Orsino saw the opportunity for staking out a leadership position in door manufacturing for Masonite. Isadore Sharpe saw a similar opportunity in luxury hotels and resorts.

## Exhibit 17 Canada's global leaders rank among top 5 companies in their industry segments

**Bold** denotes Ontario head office

GLOBAL LEADERS	NICHE
<b>Automobile, Aerospace &amp; Defence Technology</b>	
CAE	flight simulators
<b>Magna</b>	automotive components and systems
Spectra Premium Industries	new steel fuel tanks for the replacement-parts market
<b>Wescast Industries</b>	exhaust manifolds
<b>Chemicals</b>	
Agrium	nitrogen
<b>Chemtrade Logistics</b>	sulphuric acid, liquid sulphur dioxide, sodium hydrosulphite
Methanex	methanol
Nova Chemicals	solid and expandable polystyrenes
PotashCorp	fertilizer
Sun Gro Horticulture	peat, peat-based growing media products
<b>Engineering and Construction</b>	
<b>Marsulex</b>	environmental compliance technology
SNC-Lavalin	engineering and construction design
<b>Zenon Environmental</b>	water filtration technology
<b>Financial Services</b>	
<b>Manulife Financial</b>	wealth management and financial protection
<b>Scotia Mocatta (Bank of Nova Scotia)</b>	metals trading and finance
<b>TD Waterhouse (TD Canada Trust)</b>	online financial services
<b>Food and Beverage</b>	
McCain	frozen french fries
Connors Bros.	canned sardines
<b>CoolBrands International</b>	frozen dessert products
<b>Cott</b>	private label products and services, soft drinks
<b>Weston Foods (Weston)</b>	commercial bakery
<b>Healthcare</b>	
Axcan Pharma	gastrointestinal products
<b>MDS</b>	contract research organizations and medical isotopes
<b>Patheon</b>	drug development and manufacturing services
<b>TLC Vision</b>	laser vision correction
<b>Information Technologies</b>	
<b>ATI Technologies</b>	3D graphics
<b>Celestica (Onex)</b>	electronics manufacturing services
CGI	IT services
<b>Cognos</b>	business intelligence software
<b>Dalsa</b>	high-performance CCDs, CMOS image sensors
<b>Hummingbird</b>	PC-X server software
MacDonald Dettwiller	space robotics technology
<b>Nortel</b>	telecommunications equipment
<b>Open Text</b>	intranet search software
<b>Research In Motion</b>	mobile communications technology
Sierra Wireless	cellular digital packet data technology
<b>Zarlink Semiconductor</b>	TDM/TSI switching chips

(continues)

## Exhibit 17 Canada's global leaders (continued)

**Bold** denotes Ontario head office

Machinery and Heavy Industries	
<b>ATS</b>	industrial automation
Canam Steel	steel joists
Creo	pre-press equipment
<b>Husky Injection Molding Systems</b>	plastics injection equipment/services
Ritchie Bros. Auctioneers	auctioneer of industrial equipment
Tree Island Industries	steel wire products
Media, Communication and Entertainment	
<b>Ashton-Potter (MDC)</b>	postage stamps
<b>Cinram</b>	pre-recorded DVDs, CD ROMs, audio CDs
<b>Harlequin Enterprises (Torstar)</b>	women's fiction
<b>Imax</b>	film and digital imaging technologies
Quebecor World (Quebecor)	commercial print media
<b>Thomson</b>	information solutions
Mining and Metals	
Alcan	aluminium
<b>Barrick Gold</b>	gold
Cameco	uranium
<b>Falconbridge (Noranda)</b>	nickel
Fording	metallurgical coal
<b>Inco</b>	nickel
Major Drilling Group International	mining industry drilling services
Placer Dome	gold
<b>Timminco</b>	magnesium and other specialty metals
Pulp and Paper	
Abitibi	newsprint, uncoated ground wood papers, lumber
Canfor	softwood lumber
Domtar	uncoated free sheet paper
Retail and Consumer Goods	
<b>CCL Industries</b>	contract packaging
Couche-Tard	convenience stores
Gildan	blank T-shirts, sport shirts and sweatshirts
Maax	bathroom fixtures
<b>Masonite</b>	doors
Peerless Clothing	men's suits
Transport Services	
Bombardier	aerospace and transportation
CN	North American rail services
CHC Helicopter	helicopter transportation services
Travel and Tourism	
Intrawest	ski and golf resorts
<b>Four Seasons</b>	luxury hotels

Note: Includes companies with revenue above \$100 million. Industry categories as defined by World Economic Forum.

Source: Institute for Competitiveness & Prosperity; *National Post Business, FP500*, June 2003; *Report on Business Magazine, The Top 1000 Canada's Power Book*, July 2003.

As we review and analyze these companies and their competitive environments, we observe the following trends related to the environment of support in Ontario and Canada.

**Canada’s factor conditions are typically unimportant to global success**

Only a small portion of Canada’s global leaders have achieved global leadership through unique factors conditions – natural resources, specialized skills, and the like – that create a special Canadian advantage. Mining and forestry companies, such as Abitibi, Domtar, and Barrick, are the best examples. However, “uniquely Canadian” factors have not led to global leadership. Our wide open spaces and the need to move goods and people over long distances have not bred global transportation leaders, except for CN. Our Canadian approach to health care system has not

produced many global leaders. (As we discuss elsewhere in this Working Paper commercial success in this sector is held back by unsophisticated government approaches to procurement.) Canada’s history of large infrastructure projects has resulted in only one global leader in that area, SNC-Lavalin. Much of its success is due to Hydro Quebec’s decision to outsource their construction projects. Contrast this with Ontario Hydro who carried their infrastructure projects with in-house resources, thus missing an opportunity to create a local capability with significant global potential.

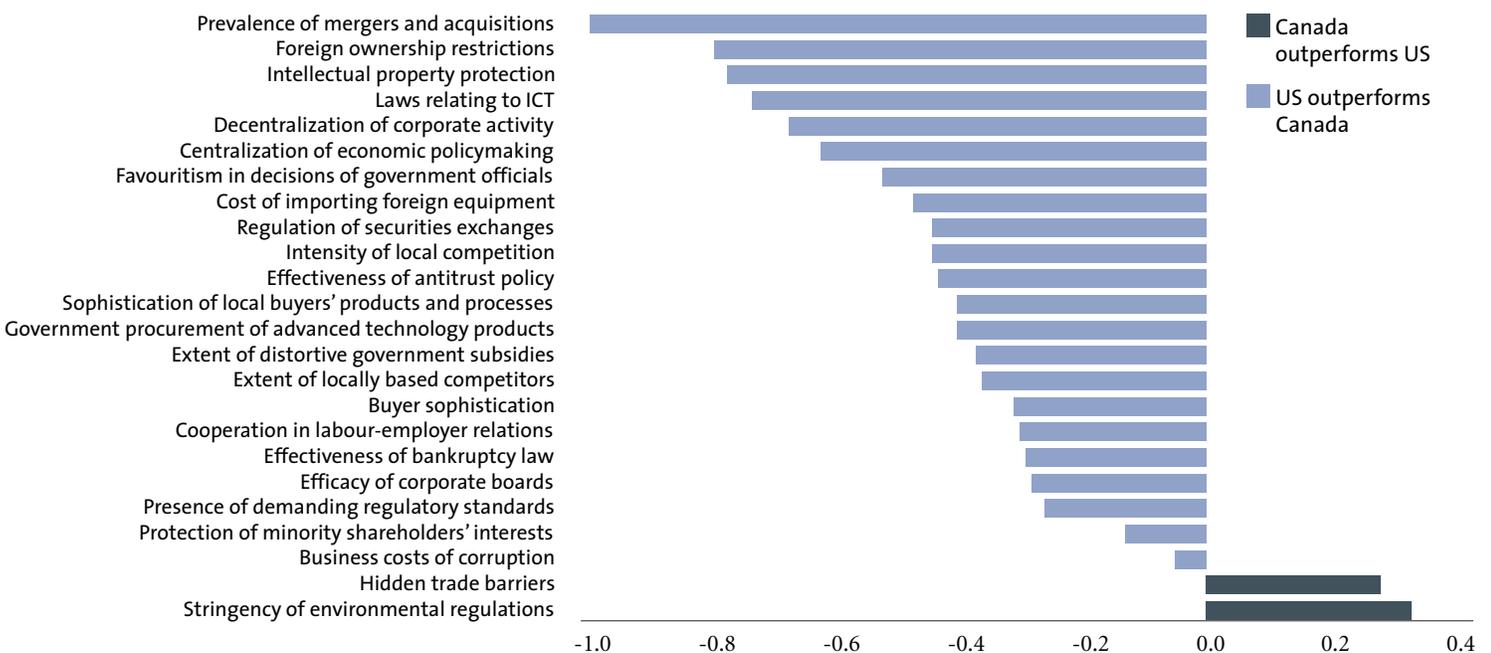
**Government sponsored few national champions**

Only a handful of Canada’s global leaders are the result of a deliberate policy of government support. Some companies, such as Bombardier, CAE, CHC Helicopter, and Nortel have

benefited from government involvement in procurement, export-oriented loans, or other targeted programs. But these sectors tend to be areas around the world where governments support their own firms in the world setting, and some argue that this requirement holds in Canada. This may be true, but in Canada we observe that nearly all our global leaders have achieved this status through their own efforts and with very little government support.

In summary, we conclude that market structures in Ontario do not provide an adequate level of specialized support for our firms and individuals to upgrade and innovate. We have developed a solid set of general supporting structures – good infrastructure, basic education, and administrative mechanisms. But the lack of specialized support is an important factor in Ontario’s prosperity gap. As we turn

Exhibit 18 Canada trails US on “Pressure” factors



Source: World Economic Forum

to the other element of market structures, we find that firms and individuals are not benefiting from competitive pressure from demanding customers and intense rivalry.

### Ontario's market structures provide inadequate intensity of competitive pressure

Successful structures are the result of the complementary interplay between intense competitive pressure and specialized support. Just as Ontario is hindered by the lack of specialized support, we find that competitive intensity is weak – another important factor in Ontario's overall prosperity gap. We reach this conclusion by drawing on the same research as earlier.

#### The Business Competitive Index rates Ontario low on competitive pressure

The WEF Business Competitiveness Index indicates that Canada trails the US in all the important factors related to the degree of rivalry and the sophistication of customer demand (Exhibit 18).

The WEF measures two types of pressure – rivalry and customer demand. On only one of the 18 rivalry factors did Canada surpass the US – “presence of hidden trade barriers.” On a handful of less significant factors, Canada and the US had nearly similar results. But on most factors, Canada trailed the US. Of most significance Canada trailed in:

- **Intensity of local competition:** The US has a 62 percent advantage on the question “Competition in the local market” where responses range from “limited in most industries and price cutting is rare” to “intense in most industries as market leadership changes over time”

- **Intellectual property protection:** The US advantage is 47 percent on the question “Intellectual property protection in your country” (ranging from “weak or nonexistent” to “equal to the world's most stringent”)
- **Prevalence of mergers and acquisitions:** The US advantage is 84 percent on the question “In your country, mergers and acquisitions – particularly hostile takeovers” (from “rare and face serious legal impediments” to “common and allowed by law”).

Similarly, on only one of six factors related to customer demand did survey results indicate an advantage for Canada – “stringency of environmental regulations” as a spur to local innovation. On all five other factors Canada trailed the US:

- buyer sophistication
- sophistication of local buyers' product and services
- government procurement of advanced technology products
- presence of demanding regulatory standards
- laws relating to information communications technologies.

On average, Canada under performs the US by 34 percent in WEF questions related to pressure. In summary, Canada's clusters and firms are not benefiting from competitive pressures provided by demanding customers and intense competition.

#### Cluster studies indicate lack of pressure

Our studies of specific clusters also indicate a lack of intense competitive and customer pressure to spur innovation and upgrading. For example, California's tomato processing cluster benefits from more sophisticated demand. Per capita, Californians consume nearly twice

as much processed tomato products – ketchup, pizza sauce, salsa, etc. – as Ontarians. And Californians are more receptive to and demanding of product innovations. Consequently, the California cluster has more product innovation than Ontario's. In biopharmaceuticals, Ontario's industry is hamstrung by very demanding, but not sophisticated, customers. Government structures and purchasing processes result in significant pressure to hold prices down and to restrict innovative new drugs from the market. The decision to list a new drug on the formulary is driven by drug cost considerations and not by a complete accounting of the health care system. This lack of sophisticated pressure is one of the key factors behind the under development of Ontario's biopharmaceutical cluster versus leading US ones.

In the Waterloo/Hamilton/London education and knowledge creation cluster, customer demand is less sophisticated than the comparably sized cluster in central New Jersey (which includes Princeton and Rutgers). The New Jersey cluster has more access to private sector research and development and to greater local demand for post-secondary education than in Ontario.

Hamilton's steel cluster is an exception to this observation. Through its relationship with the automotive industry, it has very sophisticated demand – compared to the emerging steel cluster in Georgia and Alabama. Similarly, it operates in a more competitively intense environment. These advantages may be reduced as the Georgia/Alabama steel cluster benefits from a growing regional automotive cluster.

#### Global leaders indicate lack of intense competitive pressure

Our review of Canada's global leaders reveals four significant observations about weak competitive intensity.

**Canada’s global leaders lack head-to-head competition**

Very few of the global leaders have come from a domestic environment in which they have competed directly with other world competitive Canadian companies. Outside the mining sector, where Placer Dome and Barrick are rivals in gold and Falconbridge and Inco compete in nickel, we can find no Canadian global leaders in direct competition with each other. Canadian companies that have succeeded in the global setting have had to hone their competitive skills outside Canada. It is quite likely that some Canadian success stories (e.g., Canadian Tire and Shoppers Drug Mart) have not succeeded internationally because they were unable to flourish in the much more intensely competitive marketplace than they faced at home.

**Protected sectors do not breed global leaders**

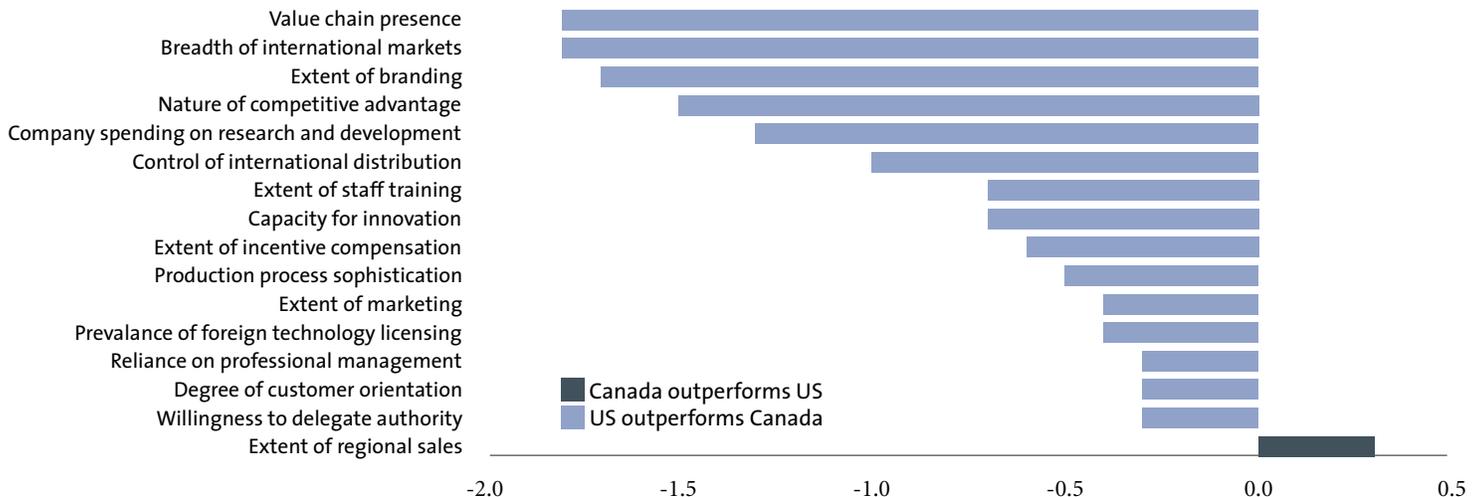
A notable feature of Canada’s global leaders is that very few of them come from industries that have been shielded from foreign competition. Financial services are a prime example of the effects of protection on industries, as they have typically not ranked among strong global companies. Historically Canada’s Bank Act has created barriers for foreign-owned banks to compete on a level playing field with Canada’s domestic banks, particularly in building retail branch networks or through acquisition of local players. Two bank subsidiaries, TD Waterhouse and Scotia Mocatta, have achieved global leadership in more open niches – discount brokerage and precious metals trading. Some argue that these regulations were necessary for protection of deposits or for industry stability. This may be true, but one effect has been that none of our banks have become global leaders. As protection has been weakening, although still significant relative to other industries, some of our banks may

become leaders in the global setting. In another part of financial services, Manulife, through its recent merger, has become one of top five insurance companies in the world in terms of assets.

The transportation industry presents another good example of how loosened restrictions can stimulate global competitiveness. CN become a North American railway leader after it was cut loose from government ownership and was on its own.

In communications, Canada’s industry has been highly regulated. Such regulations range from content and ownership regulations in entertainment media to pricing and technical regulations in telecommunications. Canada’s leaders in the media industry are companies for whom these regulations did not apply. In telecommunications services and infrastructure, Canada has no global leader.

**Exhibit 19** Canada trails US on nearly all “Company Operations and Strategy” factors



Source: World Economic Forum

**Success is often achieved through global aspirations in niche businesses**

Many of Canada’s global leaders have achieved leadership in specialized business segments. Examples include Harlequin in the romance segment of book publishing, McCain in frozen french fries in the food category, Four Seasons in the luxury segment of hospitality, and Masonite in the doors segment of construction. All achieved their significant size by becoming global players – Canada’s domestic market was simply not large enough.

**Unique Canadian tastes are not driving global successes**

None of our global leaders have built global success from a base built on satisfying the unique needs of Canadian consumers.

**Company actions are weakened by lack of specialized support and intense pressure**

Earlier in this Working Paper, we hypothesized that companies’ operations and strategies are only as good as they need to be. If the environment in which companies operate is not providing the specialized support or the intense pressure for innovating and upgrading, then companies will have uninspired strategies and mediocre operations.

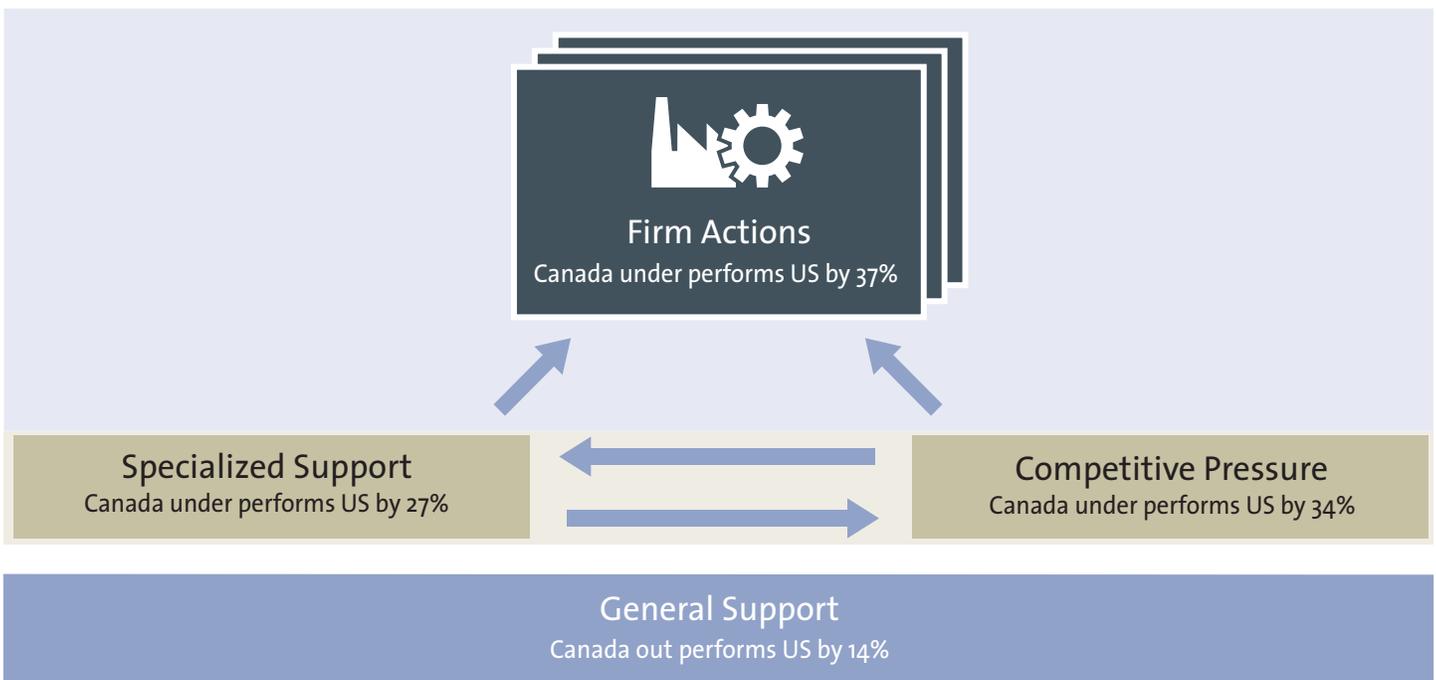
Results from the Business Competitiveness Index indicate that in assessing Canada’s and the US’s relative performance on company operations and strategies this hypothesis is borne out. The Index indicates that Canada’s gap in its national business environment results

in company operations and strategies that are much less effective than those developed by their US counterparts. The “Company Operations and Strategy” sub-index enumerates 16 factors. Canada trails the US in all but one – extent of regional sales (Exhibit 19).

Because of Canada’s weakness in specialized scientific and technological capabilities, company operations were weaker on the following factors:

- **Production process sophistication:** US responses out perform Canada’s by 28 percent on the question “Production processes” where responses range from “labour intensive or previous generations of process technology” to “the world’s best and most efficient process technology”

**Exhibit 20** Canada’s under performance in pressure and specialized support drives under performance in firm actions



- **Capacity for innovation:** US responses outperform Canada's by 46 percent on the question "Companies obtain technology" (responses range from "exclusively from licensing or imitating foreign companies" to "by conducting formal research and pioneering their own products and processes")
- **Company spending on research and development:** US responses outperform Canada's by more than 100 percent in the question "Companies in your country" (from "do not spend money on research and development" to "spend heavily on research and development").

Our lack of customer sophistication causes weaknesses in strategy and operations factors such as extent of branding, extent of marketing, and degree of customer orientation. Our relatively weak management training results in less reliance on professional management and staff training. And our lack of

intense rivalry accounts for weakness in breadth of international markets and control of international distribution.

Taken together all these factors results in weaknesses in:

- **The nature of competitive advantage:** US responses outperform Canada's by more than 100 percent on the question "Competitiveness in your country's companies in international markets is primarily due to" where responses range from "low cost or local natural resources" to "unique products and processes"
- **Value chain presence:** US out performance is more than 100 percent on the question "Exporting companies in your country" (responses range from "primarily involved in resource extraction or production" to "not only produce but also perform product design, marketing sales, logistics, and after-sales service").

On average Canada's firm actions – captured on the Company Operations and Strategy sub-index – fell 37 percent below those of the US (Exhibit 20). In a sense, the poor performance on the specialized support factors (27 percent under performance) and the pressure factors (34 percent under performance) build on each other to create an even worse disadvantage in the quality of company operations and strategy (37 percent under performance).

**Ontario finds itself in a vicious cycle. Its competitive environment does not hone the strategies and operations of its companies and the less than adequate strategies and operations of companies create a weak environment for innovation and upgrading. These structural weaknesses are an important factor in the under investment by Ontarians in physical and human capital identified in our previous work.**



# Strengthening structures

## Stronger market structures will contribute to closing the prosperity gap

At the outset of this Working Paper, we described our AIMS framework for building Ontario's capacity for innovation and upgrading. We also described how the structures factor interacts with each of the other factors in a general sense. As we review our findings in the areas of structures, we see some clear connections with our earlier diagnoses and prescriptions.

### Structures require innovation and upgrading

In our previous work, we concluded that Ontarians achieve 10 percent less prosperity than our peer group because our investment achieves 10 percent less prosperity. We also concluded that, in general, attitudinal differences were not driving this under investment. We did point to Ontario's high marginal effective tax burden on capital as an inhibitor to investing in productivity enhancing machinery, equipment, and software.

Ontarians are investing only to the level they need to. We now conclude that our market structures are causing Ontarians to invest less than required for closing the prosperity gap. Compared to what is found in peer states, Ontarians are operating in an environment which lacks highly specialized support and stimulating pressure. Consequently, firms invest 10 percent less in machinery, equipment, and software than their US counterparts.

In addition, Ontario firms can compete adequately with less well educated workforces since local competition and sophisticated customers are not spurring them on to raise their level of performance. Consequently the market signals sent to Ontarians are to aspire to lower levels of education. As an example of these market signals, bachelor's degree holders earn 38 percent more than high school graduates in Ontario but 64 percent more in the US. Similarly graduate degree holders receive a much higher premium than in the US.

Governments receive market signals as well – hence they have shifted spending from investing for future prosperity to consuming current prosperity. And they under invest in higher education.

## Stakeholders can strengthen structures for Ontario's prosperity

Clusters are local phenomena and strengthening them will require local approaches. We encourage local business, academic, and government leaders to continue the development of local cluster initiatives. Where such initiatives are not in place, focus ought to be on building on existing strengths rather than in creating new clusters. As our research shows, strong clusters have a greater impact on local prosperity than the mix of specific clusters, even seemingly attractive high tech ones.

Where local cluster initiatives are in place, we encourage continued efforts to strengthen specialized and sophisticated support and to intensify local competition. In strengthening specialized support, local cluster initiatives need to identify high leverage areas in human resource training and development, cluster-specific local administrative and information infrastructures, and the scientific and technological capabilities. In all these areas, local colleges and universities are extremely important. We encourage local post-secondary

academics and leaders to look for opportunities to share their research, education, and training capabilities with local clusters; we encourage local business leaders to seek out opportunities to draw on the insights of local post secondary institutions.

For the provincial government, this Working Paper reinforces the significance of the specialized research capabilities at our universities and colleges. We encourage the continuation of efforts to strengthen post-secondary education to match peer state performance.

For both federal and provincial governments, the Working Paper indicates that the potential benefits of deregulation in some of our leading industries, particularly changes that increase the competitive intensity domestically and internationally.

## How the Business Competitiveness Index measures structures of competitiveness

Each year the World Economic Forum releases its ratings on countries' economic competitiveness. Sifting through empirical data and survey results, the World Economic Forum produces indices on various aspects of a country's global competitiveness. The Business Competitiveness Index developed by Michael Porter is a useful measure of the levels of support and pressure in Canada, the United States, and nearly 100 other countries.

The Business Competitiveness Index attempts to measure, compare, and analyze fundamental factors of competitiveness for each of the world's economies. The overall index corresponds very well with GDP per capita (see exhibit in sidebar) indicating that it is capturing important structural and performance differences between countries.

Of particular interest to the Institute, is the relative performance of Canada and the United States (province- and state-level results are not available; however we think Canada-US comparisons are helpful in understanding Ontario-peer state comparisons). Canada under performs the US in the Business Competitiveness Index by 23 percent (the difference between the two countries' positions on the X-axis, 1.338 and 1.734.) Based on the relationship between the index and GDP per capita observed in the exhibit, this helps "explain" the 18.4 percent Canada-US prosperity gap seen on the y-axis of the graph.

The Business Competitiveness Index comprises 70 variables that are measured through empirical observation (e.g., patent activity by utilities)

or the Executive Opinion Survey (e.g., the perceived quality of scientific research institutions). Most of the variables are drawn from the Survey administered by the World Economic Forum through its partner institutions in each country. The Institute for Competitiveness & Prosperity is the partner for Canada. The mail survey is administered to executives in sectors in proportion to the sectors' share of the overall economy.<sup>1</sup> The survey is made up primarily of a series of statements for which the respondents indicate how well their country's economy performs on various factors. The statements are aimed at eliciting views on the respondent's own country and do not ask for comparisons with other countries.

The Business Competitiveness Index has two sub-indices. The National Business Environment sub-index evaluates the quality

of the economic context in which businesses operate. The Company Operations and Strategy sub-index evaluates the sophistication and quality of execution of business strategies within an economy.

To assess the quality of support and pressure in Canada's business environment, we sub-divided the National Business Environment into the respective categories. We further sub-divided the support elements into general support and specialized support. Included in the former were factors such as "overall infrastructure quality" and "efficiency of legal framework". In the latter, were factors such as "financial market sophistication" and "quality of scientific research institution".

In the area of pressure were factors such as "buyer sophistication" and "intensity of local competition".

We did not sub-divide the other sub-index, "Company Operations and Strategy" as there were fewer factors and we concluded that we would gain few new insights by doing so.

In summary, we calculated four measures to compare the structures in Canada and the US: general support, specialized support, competitive pressure, and firm strategies and rivalry. In calculating the four measures we weighted each of the 70 factors in the Business Competitiveness index. These weightings were based on the observed statistical relationship between each factor and GDP per capita.

<sup>1</sup> For a more detailed explanation and analysis of the Executive Opinion Survey see World Economic Forum, *The Global Competitiveness Report 2003-2004*, pp. 167-178

## Business Competitive Index correlates with GDP per capita



Source: Global Competitiveness Report 2003

# References



- Breschi, Stefano and Malerba, Franco (2001). "The Geography of Innovation & Economic Clustering: Some Introductory Note." *Industrial and Corporate Change* 10 (4): 817-33.
- Feldman, Maryann (1994). *The Geography of Innovation*. Boston: Kluwer Academic Publishers.
- Institute for Competitiveness and Prosperity:
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- Available online: [www.competeprosper.ca](http://www.competeprosper.ca)
- Institute for Strategy and Competitiveness, Cluster Mapping Project. Cambridge, Massachusetts: Harvard Business School. [www.isc.hbs.edu](http://www.isc.hbs.edu)
- Jacobs, J. (1969). *The Economy of Cities*, New York: Vintage.
- Maskell, Peter (2001). "Towards a Knowledge-based Theory of the Geographic Cluster." *Industrial and Corporate Change* 10 (4): 921-43
- OECD (2003) *Main Economic Indicators* "Purchasing Power Parities."
- Porter, Michael E. (2003). "The Economic Performance of Regions," *Regional Studies*, Vol. 37 no. 6-7/ Aug.–Oct. 2003.
- Porter, M. and Schwab, Klaus (edited 2004). "The Global Competitiveness Report 2003–2004." The World Economic Forum.
- Rosenthal, S.S. and W.C. Strange (2003).
- "Geography, Industrial Organization and Agglomeration Economies," *Review of Economics and Statistics*.
  - "Evidence on the Nature and Sources of Agglomeration Economies," in J.V. Henderson and J.F. Thisse, eds., *Handbook of Urban and Regional Economics*, Vol. 4.
  - *The Urban Rat Race*, University of Toronto: Working Paper.
- Saxenian, A. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, Massachusetts: Harvard University.
- Sölvell, Orjan, Lindqvist, Goran, and Ketels, Christian (2003). *The Cluster Initiative Greenbook*. Stockholm: September 2003. Available online: [www.isc.hbs.edu/Greenbook.htm](http://www.isc.hbs.edu/Greenbook.htm)
- Statistics Canada
- (2003) CANSIM II: Table 03840002 (Gross Domestic Product, expenditure based)
  - (2003) *Income Trends in Canada 1980-2000*. CD-ROM Cat. No. 13F0022XCB.
  - (2003) *Census 2001. Census: Analysis Series. "Earnings of Canadians: Making a living in the new economy."*
  - (2004) *Statistics Canada Custom Product – Number and Average Employment Income*
- Strange, William C. (2003). *Agglomeration Economies and the Future of Cities*. University of Toronto: Policy of Economic Analysis Program – Institute for Policy Analysis.
- Task Force on Competitiveness, Productivity and Economic Progress.
- *Closing the prosperity gap*. First Annual Report, November 2002. Available online: [www.competeprosper.ca](http://www.competeprosper.ca)
  - *Investing for prosperity*. Second Annual Report, November 2003. Available online: [www.competeprosper.ca](http://www.competeprosper.ca)
- US Department of Commerce Bureau of Economic Analysis (2003). "Regional Accounts Data – Gross State Product Data Table." [online database] Available online: [www.bea.gov](http://www.bea.gov)
- Von Hippel, Eric (1994) "Sticky Information and the locus of problem solving: implications for innovation," *Management Science* 40: pp. 429-439.
- Wolfe, David A., and Gertler, Meric S. (2004) *Clusters from the Inside and Out: Local Dynamics and Global Linkages*. Toronto: Centre for International Studies – University of Toronto.

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