

# FINDING ITS OWN WAY:

Ontario needs to take  
a new tack

Task Force on Competitiveness, Productivity  
and Economic Progress



## Task Force on Competitiveness, Productivity and Economic Progress

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The Task Force on Competitiveness, Productivity and Economic Progress was announced in the April 2001 Speech from the Throne. Its mandate is to measure and monitor Ontario's competitiveness, productivity, and economic progress compared to other provinces and US states. In the 2004 Budget, the Government asked the Task Force to incorporate innovation and commercialization into its mandate. The Task Force reports directly to the public.

It is the aspiration of the Task Force to have a significant influence in increasing Ontario's competitiveness, productivity, and capacity for innovation. This, we believe, will help ensure continued success in the creation of good jobs, increased prosperity, and a high quality of life for all Ontarians.

The Institute for Competitiveness & Prosperity is an independent not-for-profit organization established in 2001 to serve as the research arm of the Task Force. The Working Papers published by the Institute are primarily intended to inform the work of the Task Force. In addition, they are designed to deepen public understanding of macro and microeconomic factors behind Ontario's economic progress and stimulate debate on a range of issues related to competitiveness and prosperity.

Comments on this Thirteenth Annual Report are encouraged and should be directed to the Institute for Competitiveness & Prosperity. The Task Force and the Institute are funded by the Government of Ontario through the Minister of Economic Development, Employment and Infrastructure.

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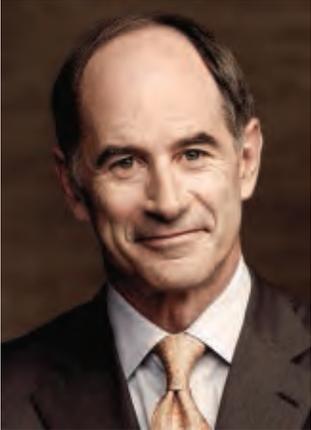
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**ON BEHALF OF ONTARIO'S TASK FORCE ON COMPETITIVENESS, PRODUCTIVITY AND ECONOMIC PROGRESS**, I am pleased to present our Thirteenth Annual Report to the Ontario public. The mandate for the Task Force, and this Report, is to provide government, firms, organizations, and individuals in Ontario with recommendations for increasing competitiveness and prosperity.

The Task Force members and I have been pursuing this agenda since 2001. I am proud of the work we have done, the contribution we have made to the public policy agenda in Ontario, and the information we have provided that has deepened the public understanding of issues around productivity. This is the final Report of the Task Force. As Chairman, I have decided to bring the work of the Task Force to a close after thirteen years of working on this project.

However, this Task Force Report has afforded me one last opportunity to focus on those issues that I believe must be dealt with in order for Ontario to find its own way to economic strength. As a province, we can no longer nibble at the edges of public policy. The poor results are too persistent and the future is too important.

In this Report, the Task Force notes that Ontario has slipped to fifteenth out of sixteen peer jurisdictions on GDP per capita. Furthermore, the prosperity gap is widening, and the province is now falling behind its international peers. Now, more than ever, the public and private sectors in this province should look at the data provided in this Report and move with resolve to take a new tack to get the economy moving in the right direction.

This year, the Task Force has taken a fresh look at employment and wage data in an attempt to inspire action from Ontario's economic leadership. The result is a new section in this Annual Report on the industrial shift. The picture that emerges is one that shows what truly ails the province – clusters underperform and the manufacturing sector is poorly composed yet drives much of the public policy in this province. Our hope is that, by shining a bright light on these issues, government and industry leaders can make clear-eyed investments and decisions about what do to next. The Task Force offers some suggestions of our own.

Next, we move on to a detailed analysis of some fascinating statistics on education. The Task Force is proud of the contribution we have made to education policy in the past, with a specific call for increased investment. This year's Report takes a deep dive into how the province is doing in the areas of math and science. The results are not promising – our kids are falling behind in these two key areas from their early years right through postsecondary. This is an area of policy that demands immediate policy attention. The economy of the future will need those skills.

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# As a province, we can no longer nibble at the edges of public policy. The poor results are too persistent and the future is too important.

Finally, the Task Force takes a look at innovation. This word has become among the most misunderstood, yet overused, in policy circles. This Report goes back to basics in explaining what true innovation is and what Ontario could do to become more innovative. As a Task Force, we have tried to tackle this issue in myriad ways. While we have made some progress and some of our recommendations have been followed, I hope that the next generation of thinkers and leaders can push this issue further and achieve greater success. My ultimate hope on this issue is that Ontario becomes the first major jurisdiction in the world to ensure that every secondary school graduate has received formal education in innovation.

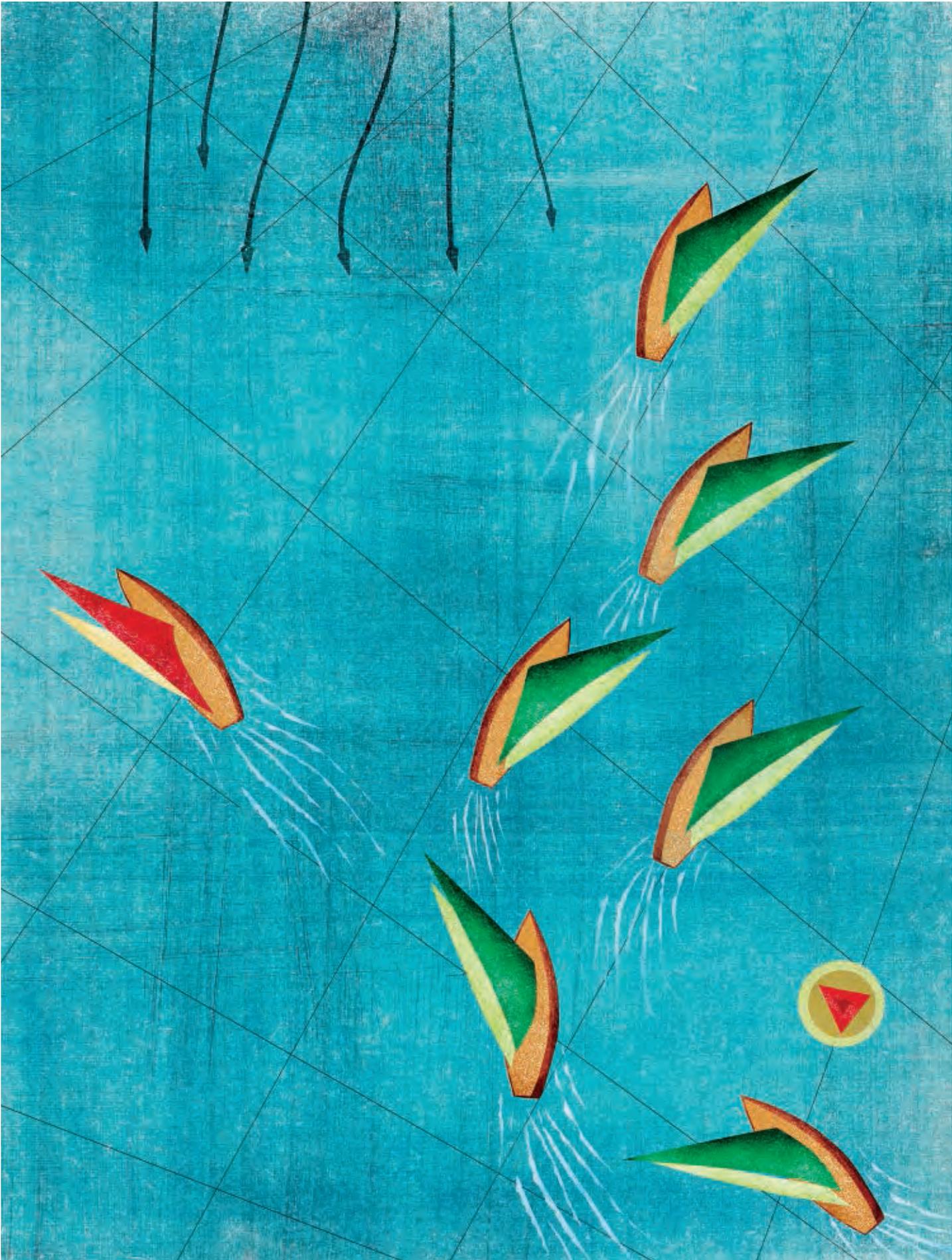
I would be remiss if I did not thank the countless men and women who have worked with me over the years at the Task Force's research arm, the Institute for Competitiveness & Prosperity. Their work has given me the confidence to push for policy change. I would also like to thank the three Executive Directors that the Institute has had during my tenure, Chris Riddle, Jim Milway, and Jamison Steeve. Their professionalism, energy, and leadership have helped us achieve a sustained run of success. Finally, I would like to thank my fellow Task Force members for their years of valuable public service. I think we have made a valuable contribution to public life over our time together.

The Task Force gratefully acknowledges the research support from the Institute for Competitiveness & Prosperity and the funding support from the Ministry of Economic Development, Employment and Infrastructure. We look forward to sharing and discussing our work and findings with all Ontarians. We welcome your comments and suggestions.



**Roger L. Martin, Chairman**

Task Force on Competitiveness, Productivity and Economic Progress



# Finding its own way: Ontario needs to take a new tack

A diverse economy, strong cluster mix, and educated populace have propelled Ontario to be one of the most prosperous regions in the world. But for the past two decades, comparisons of Ontario's economy to peer regions have shown that the province is falling behind rapidly. To catch up, Ontario needs novel policies and bold actions from government and business leaders to improve productivity and find new economic strength.

**F**OR THIRTEEN YEARS, the Task Force has tracked Ontario's economic progress compared to various peer jurisdictions in North America and abroad. Each year, similar problems have emerged. Ontario's prosperity, measured by GDP per capita, is significantly lower than that of most comparable US states and middling, at best, when compared to peer regions in Europe, Japan, and Australia. Low productivity has consistently been the main driver of this gap, and the Task Force has found several underlying issues that have contributed to this: low business expenditure on research and development (R&D), lack of business growth, and low productivity in traded clusters.

Regrettably, this year is no exception. Ontario's prosperity gap persists, and the province is falling further behind its North American and international peers in economic strength. In 2013, the prosperity gap, measured as the difference in GDP per capita between Ontario and the median of its North American peers, was \$11,180, an increase of \$180 per capita from 2012. Last year, Ontario fell to fourteenth out of the sixteen North American peers. This year, Ontario fell behind the state of Florida, placing fifteenth, ahead of only Québec.

# The Task Force has highlighted Ontario's key economic shortcomings

**T**HE TASK FORCE has proposed a number of recommendations over the years to help Ontario curb its poor economic performance. Many of them have been adopted: Ontario now has a competitive corporate tax structure, thanks to the adoption of the harmonized sales tax (HST) and a marginal effective corporate tax rate that is now at the OECD average. The province has also eliminated the Labour Sponsored Investment Fund tax credit and accelerated the capital cost allowance for new business investments. Ontario has also worked to improve human capital by increasing education spending, reducing the number of high school dropouts, and invested in programs to help highly skilled immigrants find jobs for which they are qualified.

There is much more work to be done on all of these fronts, but the key challenge remains: what does Ontario need to succeed in the modern global economy? Similarly, what are some of the main factors that have contributed to the prosperity gap over the past two decades? To answer these questions, the Task Force identified some of the common issues that have run through many of its reports, including lack of growth of small businesses, education under performance, and lagging innovation. All of these affect

productivity and desperately need to improve in Ontario.

Above all, Ontario needs to “tack away” from the policies and programs of other jurisdictions. Copying the actions of others will not be enough to revitalize the province's economy to lead in the coming years. The only way a laggard can overtake stronger economies is by being different. It is our hope that economic leaders, in both the private and public sectors, draw on the findings and recommendations in this Annual Report to chart a completely different course that gets Ontario to the finish line from a different angle, but ahead of our competition.

The Task Force examined a potential contributor to the prosperity gap that had never been analyzed previously in its Annual Reports, which could help Ontario find a new course: changes in industrial composition. It is well documented that today's economy is dominated by services and technology-oriented industries and that the manufacturing base that drove Ontario's prosperity for so many years is in severe decline. The Task Force took a closer look at industry trends using data on employment, wages, exports, and clusters. The aim was to show how Ontario's industry mix and shifts in industry composition differed from those of the US peers and how

these could have influenced the prosperity gap over time.

The results show overwhelmingly that the 1990s were a difficult time for the province. Many crucial industries lost a significant share of total employment relative to the US peers and are only now recovering. On various indicators, that decade was a tipping point for Ontario. Wages, the proportion of large firms, and business innovation all began to stagnate or decline significantly in Ontario relative to the US peers beginning in the late 1990s. Similarly, Ontario's performance in math and education – key subjects for the jobs projected to be in highest demand – suffered in the 2000s.

This year, the Task Force's Annual Report highlights four fundamental issues that have contributed to or could be contributing to Ontario's subpar economic performance: shifts in industrial composition; under performance in core education; lagging business growth; and inadequate innovation. Many of these topics have been examined in past reports, but here the Task Force has distilled the analysis into the most important findings for policymakers. It then presents recommendations for Ontario's leaders in both the public and private sector to “tack away” from its competition and race towards prosperity.

# Lagging productivity remains the biggest challenge for Ontario

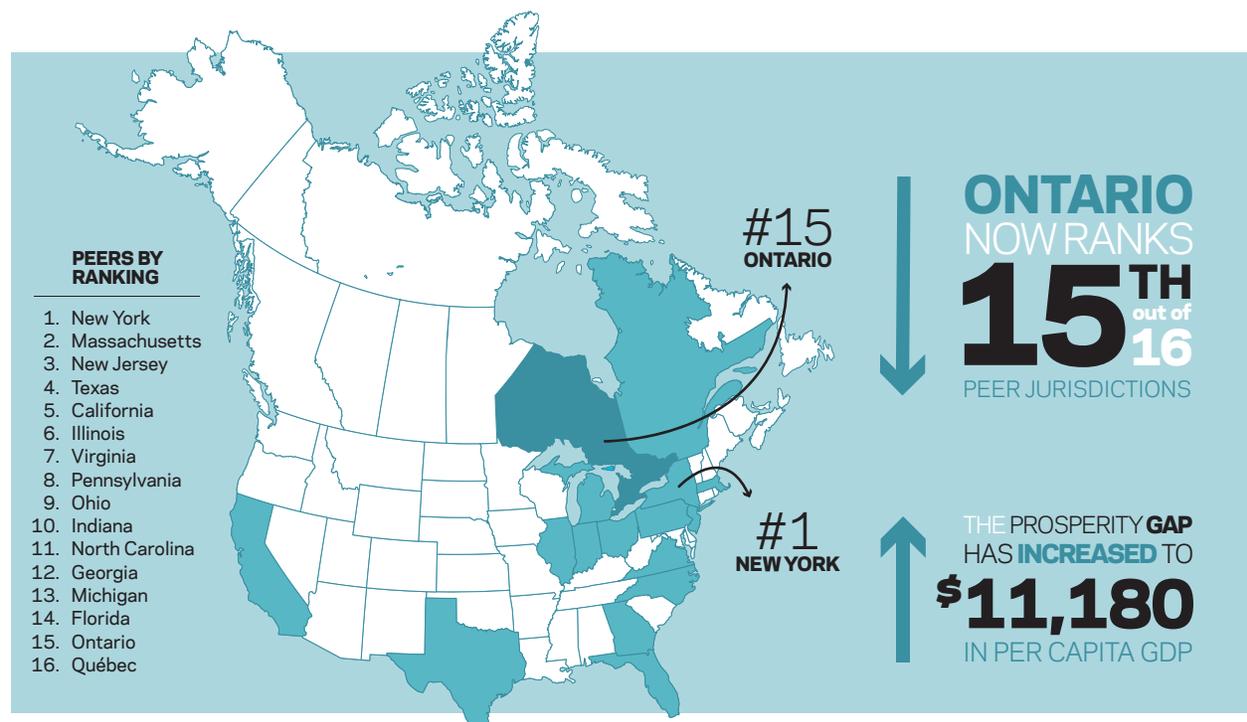
**T**HE TASK FORCE measures four components of prosperity to parse the factors contributing to prosperity:

- **profile** - the percentage of people of working age (15-64)
- **utilization** - the percentage of those who are of working age and are working
- **intensity** - the time employees spend on the job
- **productivity** - their economic output per hour worked.

Encouragingly, as in past years, Ontario has an advantage in workforce profile and utilization, meaning the province has a greater share of the population that is able to work and currently working.

However, this advantage is greatly negated by the productivity gap between Ontario and its peers. Nearly \$13,000 is lost in GDP per capita because of the lower output per hour worked in the province. This gap has been stubbornly high throughout the Task Force's research.

The Task Force has found, though, that this trend dates back to the 1990s. During this decade, Ontario's US peers saw a dramatic increase in workforce participation, which caused GDP per capita to increase significantly. At the same time, Ontario saw its productivity increase much faster than that of the US peers. However, this advantage did not offset the large increase in output in the US peers, causing the prosperity gap to grow irrevocably. Since the early 2000s, the prosperity gap has leveled off, albeit it a disconcertingly high level.





## A SHIFT IN MAJOR INDUSTRIES SLOWED ECONOMIC PROGRESS

The Task Force dug deeper into broad sectors of the economy to understand what really separated Ontario from its US peers and how these differences might have affected the prosperity gap.

The manufacturing job losses experienced in Ontario were sharper and more dramatic than those in the US peers. Furthermore, the proportion of jobs in the highly sought after advanced manufacturing sector was lower, and dependence on a single industry (auto) was higher, than advisable. The result is that decision makers are left to decide

whether they should continue to build on a single strength, or to invest in new areas in the hope of growing another sector of the economy.

As well, Ontario's much vaunted construction boom is not adding the value it should. Lagging investment in basic infrastructure in the 1990s led to low productivity in the 2000s. The cranes people now see around the province are of little comfort, as they are not necessarily building infrastructure that will enhance the province's future productivity.

The Task Force's research also demonstrates that, compared with US peers, Ontario's wages were lower and exports dropped while maintaining a heavy reliance on a single industry. Ontario's clusters were also less effective, as indicated by lower wages, particularly in high value added clusters. These factors helped determine a strong set of recommendations and inspired the focus on three areas: education, business scale, and innovation.

## EDUCATION POLICIES SHOULD PREPARE ONTARIO STUDENTS FOR FUTURE LABOUR MARKET NEEDS

The shifts in Ontario's industry composition that occurred over the past decade moved employment in the province away from manufacturing and toward professional and technical services, health care, and administrative support industries. These industries require continuous innovation and specialized workers' skills and competencies. These trends are expected to continue, and a proper understanding of fields such as math and basic science will

prove crucial. One of the goals of a quality education system must be to help students become productive members of society.

Sadly, Ontario's students are not being adequately prepared for the future. Students' math and science scores on international tests are well below those of our peers, and Ontario students' performance in science and math has deteriorated in the last

decade. But it is not just the kids. Ontario teachers' knowledge of math and science is significantly behind that of our peers as well. The Task Force recommends that Ontario's education system match the projected changes in the labour market, with particular focus on how the province teaches math and science to its students.



## SMALL BUSINESSES SHOULD BE ENCOURAGED TO GROW

Firm growth is important to a well-functioning economy. Larger firms are better managed, pay higher wages, and generate more export value than their small business counterparts. Yet, consistently, US businesses achieve greater scale, and in more high value added industries than Ontario businesses. Ontario businesses are,

in fact, encouraged to “stay small” through tax policy. And then, even Ontario’s larger companies are less competitive than those found in peer jurisdictions, as indicated by lower market value.

The Task Force recommends a re-examination of what we value in our businesses. Forming, growing,

and sustaining large, global businesses are essential for building stronger clusters and increasing productivity in the province. Public policy should work to remove barriers to growth experienced by Ontario businesses and encourage firms to scale up rather than stay small.

## ONTARIO MUST ENCOURAGE INNOVATION TO COMPETE IN THE MODERN GLOBAL ECONOMY

Innovation plays a vital role in Ontario’s prosperity. High levels of innovation are associated with the development of new technology and production methods and thus are critical to boosting the region’s competitiveness. Ontario has historically lagged its peers on many key measures of innovation, such as research and development expenditure, patent output, and commercialization of inventions.

Through an in-depth analysis of Ontario’s and Canada’s innovation policies, the Task Force found that it is not the amount that is spent on innovation that is problematic, but rather the incentives for innovation. Emphasis on indirect forms of support and the patchwork of many different support programs fail to generate major change. Ontario needs to provide more direct forms of support, particularly for large businesses.

To encourage innovation, the Task Force identified three major areas of action. The first is to raise business expenditure on research and development. The second is to introduce policies that encourage the commercial development of innovations and lend greater protection to intellectual property. The third is to broaden understanding of innovation and place a bet on the next generation of leaders by incorporating innovation into Ontario’s education curriculum.

As the prosperity gap widens and Ontario drops in North American and international rankings, the Task Force calls for a new approach, different from that of our competition. This Report will help economic leaders see the root causes of the problems Ontario faces today, and offer a way forward to a brighter, more prosperous tomorrow.



# The prosperity gap persisted in 2013

Since its First Annual Report in 2002, the Task Force has compared Ontario's prosperity to that of select regions, both internationally and within North America. The Task Force has advocated for policies that would improve the province's prosperity relative to its peers. Many policy recommendations have yet to be implemented, a fact that may be contributing to the province's poor economic performance.

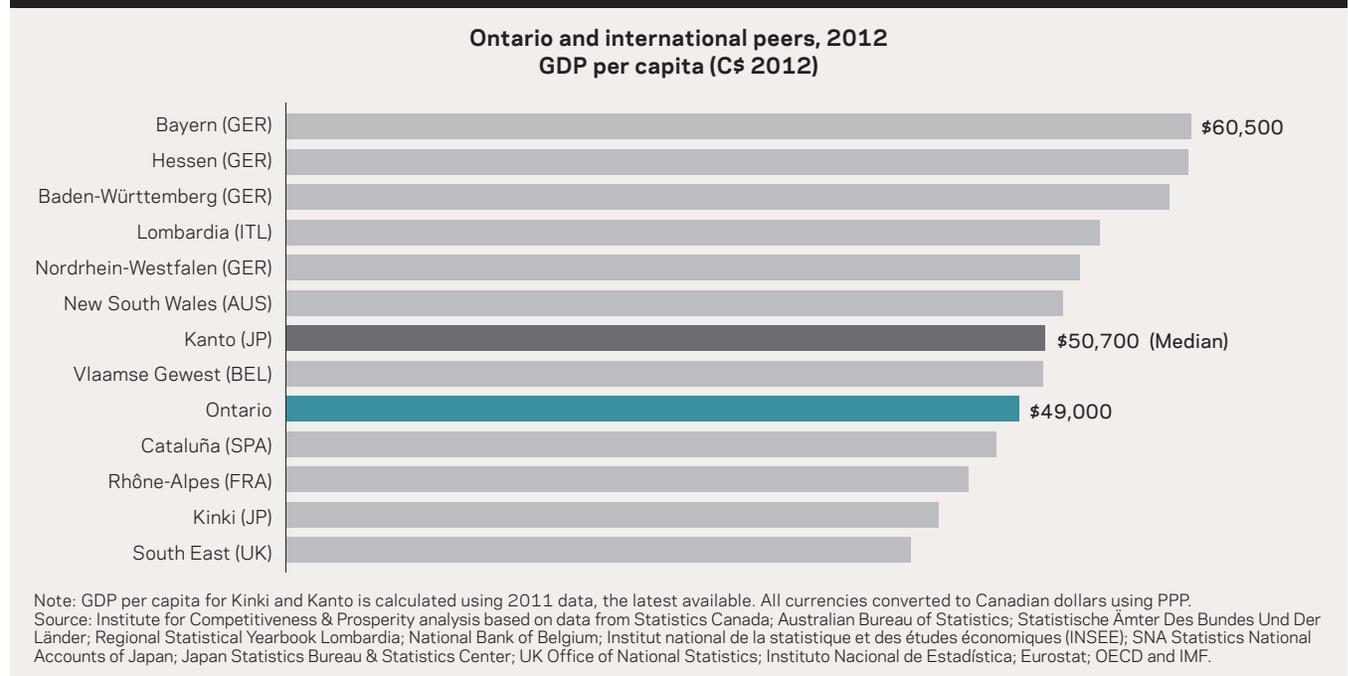
## Economic performance in Ontario continues to lag international and North American peers

**PROSPERITY**, defined as Gross Domestic Product (GDP) per capita, measures the average value of the goods and services produced by a region, for each member of the population. Ontario's prosperity has typically been above that of many international peers but below that of many North American peers.<sup>1</sup> However, this year's Annual Report shows that Ontario's prosperity has fallen relative to its international peers and is now below the median.<sup>2</sup> The most recent data show that in 2012, Ontario's GDP per capita was \$1,700 less than that of Kanto, Japan, the median international peer, and was \$11,500 less than that of Bayern, Germany, the leading international peer (Exhibit 1). The decline in Ontario's prosperity relative to its international peers has been increasing since the Task Force started comparing Ontario to leading global regions in 2005; in 2005 Ontario was only \$2,300 behind the then leading international peer, Bayern, Germany.<sup>3</sup>

Similarly, GDP per capita in Ontario has also been in decline relative to that of its North American peers. Last year the Task Force lamented Ontario's poor performance and the fact that it had fallen behind the state of Michigan. This year, Ontario has performed even worse. Ontario ranks fifteenth out of the sixteen North American peers, and its GDP per capita is now lower than Florida's, which it was ahead of in 2012 (Exhibit 2).

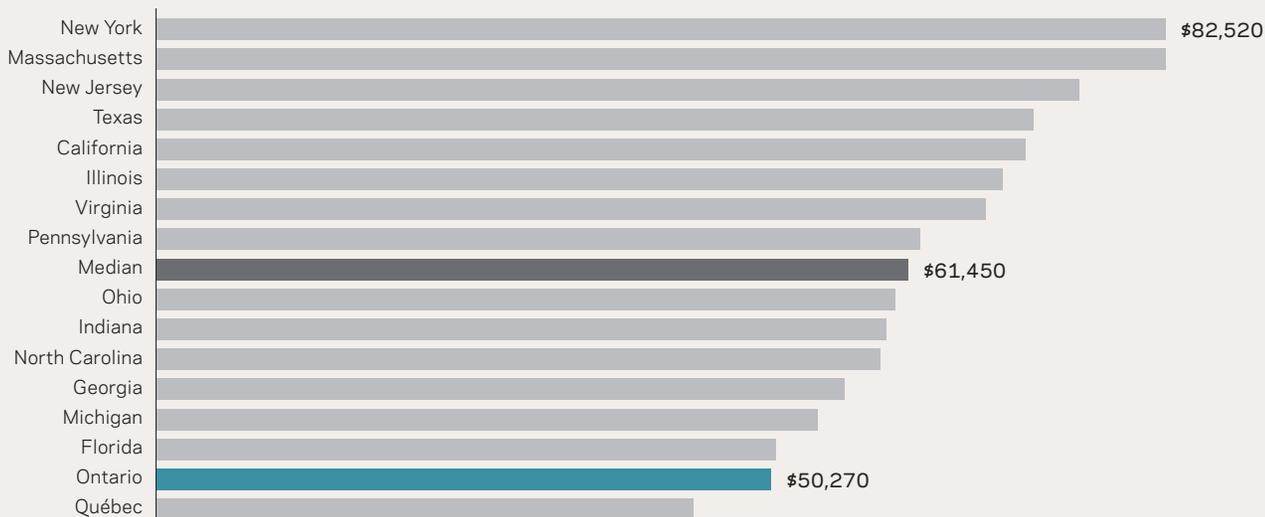
- 1 The North American peers are the sixteen largest states and provinces in North America that have a population greater than or equal to half of Ontario's, with economies that most closely resemble Ontario's.
- 2 Ontario ranked sixth, above the median, relative to its international peers in 2011.
- 3 Measured in C\$ 2012.

Exhibit 1 Ontario's economy ranked below the international peer median



## Exhibit 2 Ontario's GDP per capita is only above Québec's

Ontario and North American peers, 2013  
GDP per capita (C\$ 2013)



Note: US GDP numbers converted to Canadian dollars using 2013 PPP.

Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, Ontario Ministry of Finance, and US Bureau of Economic Analysis.

### Low productivity is the main drag on Ontario's prosperity

The prosperity gap is the difference in GDP per capita between Ontario and the median of its North American peers. In 2013, the prosperity gap was \$11,180 (Exhibit 3), an increase of \$180 from 2012.

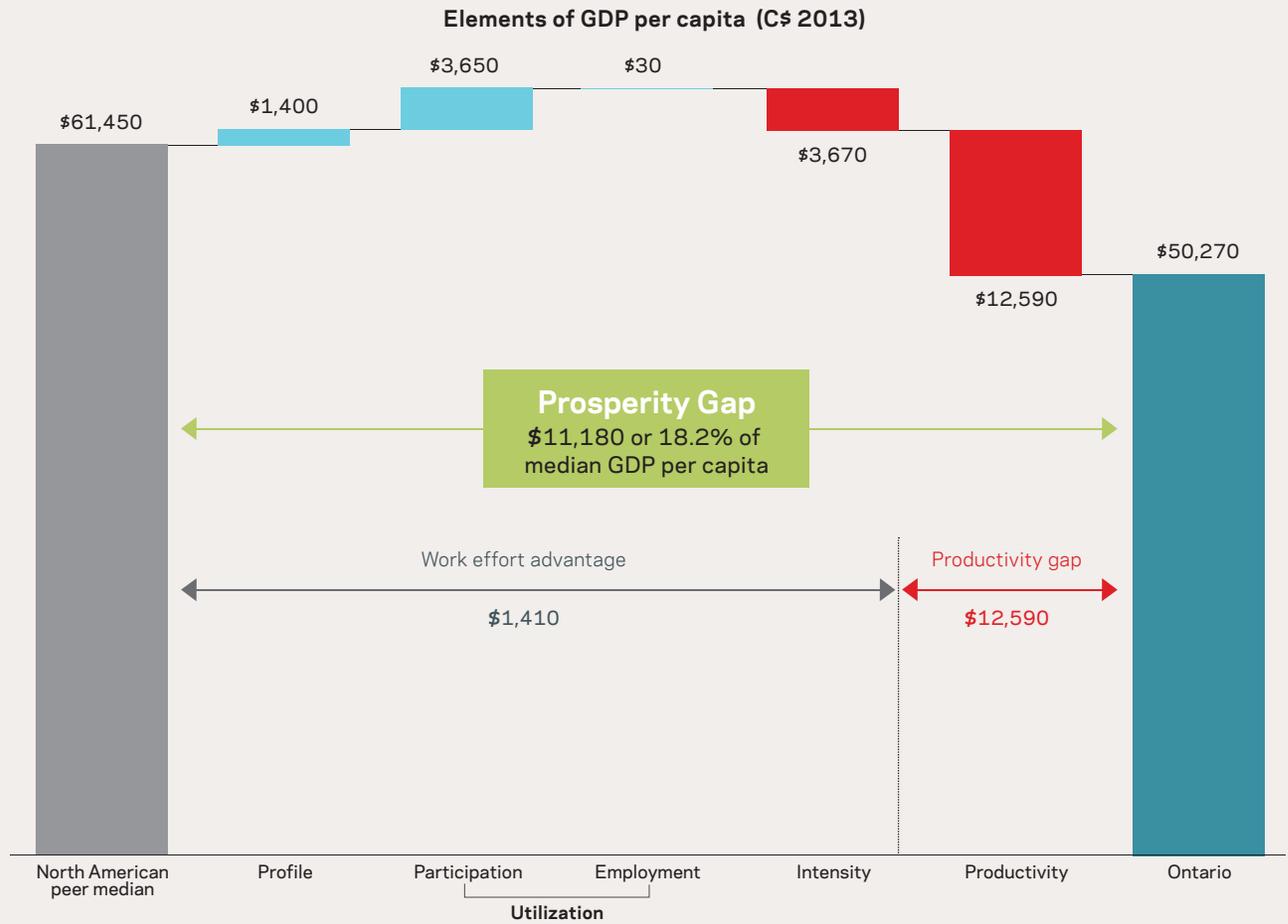
The Task Force measures four components of prosperity to parse the factors that contribute to the prosperity gap: profile, utilization, intensity, and productivity. Ontario's economy performed well relative to its North American peers' in the first two components: profile and utilization, because a larger proportion of its population was in the workforce compared to the North American peer median. Yet it performed very poorly in the second two components: intensity and productivity. The overwhelming majority of the prosperity gap comes from the difference in Ontario's productivity relative to its North American peers. The gap in productivity in 2013 was \$12,590; that is, given the same number of

hours worked, the average person in the North American peer median produced \$12,590 more goods and services in a year than a counterpart in Ontario.

While Ontario's prosperity significantly lags the North American peer median today, it has not always been this way. In 1990, the prosperity gap was only \$2,700, which was \$8,500 less than in 2013. In 1998, however, the prosperity gap peaked even higher than in 2013, at \$13,200 (Exhibit 4). The gap has typically been associated with the relatively lower level of productivity in Ontario.

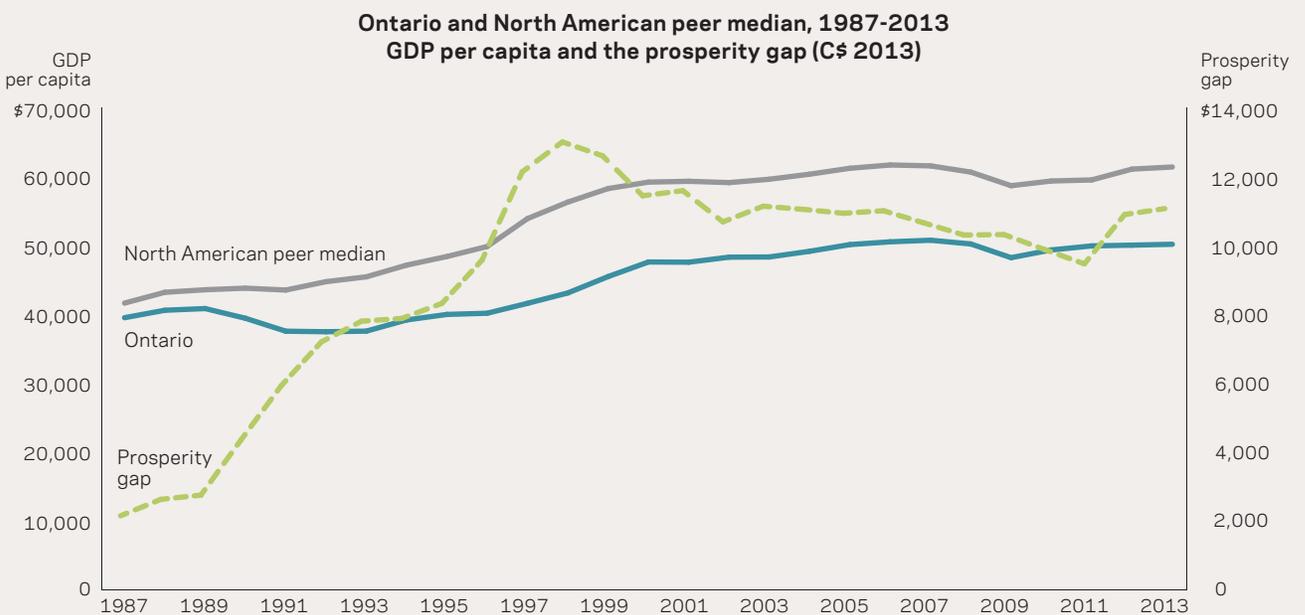
This broad description of Ontario's lagging prosperity, however, may be obscuring other important factors or nuances that have contributed to the prosperity gap. Also, it is difficult to attain an accurate measure of productivity, and there are likely other factors that affect Ontario's productivity. In this Report, the Task Force takes a deeper dive to explain the reasons behind the prosperity gap between Ontario and its North American peers.

### Exhibit 3 Ontario's productivity gap persists



Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada; Ontario Ministry of Finance; Banque de données des statistiques officielles sur le Québec; US Department of Commerce, Bureau of Economic Analysis; US Bureau of Labor Statistics; and US Census Bureau.

### Exhibit 4 The prosperity gap increased substantially during the 1990s



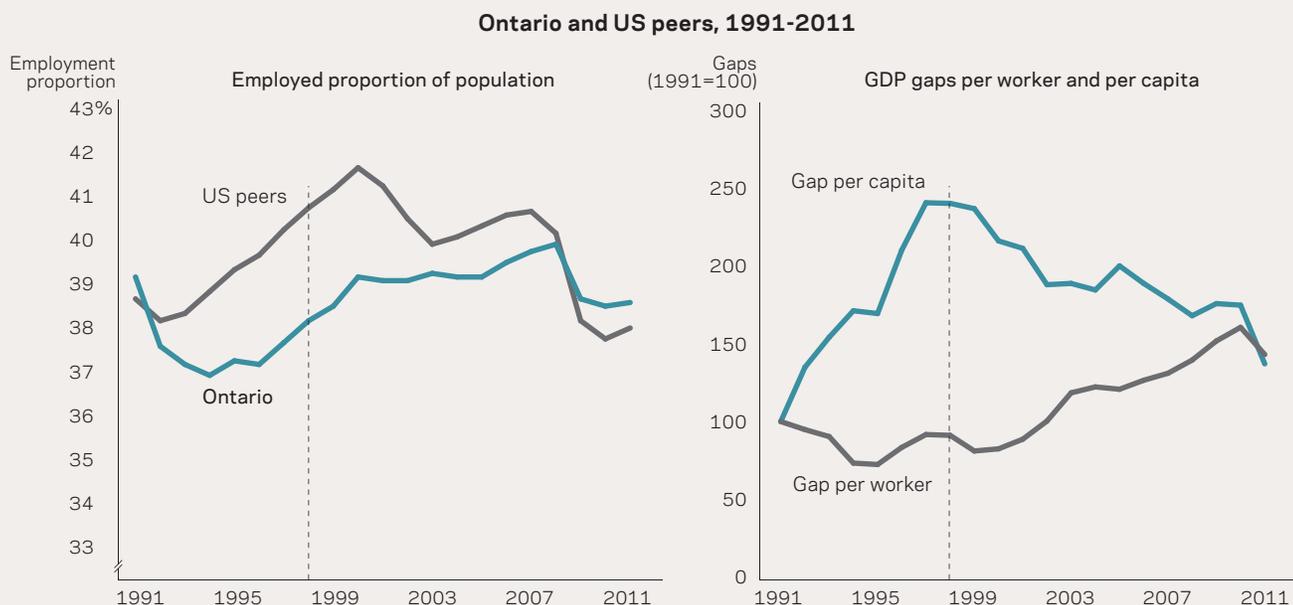
Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada and the US Bureau of Economic Analysis.

## The prosperity gap differs in distinct periods

The sources of the prosperity gap can be considered over two time periods: 1991 to 1998, and 1999 to 2013. Two main factors underlie the change in the prosperity gap: changing workforce participation and changing levels of productivity. In the first period, workforce participation increased substantially in the US peers relative to Ontario. That is, given constant population levels, proportionately more workers were employed in the US peers than in Ontario. This contributed to an increase in the difference in GDP per capita. Meanwhile, in the same period, productivity in Ontario actually grew faster than in the US peers, though it never surpassed the US peers' median. Yet the decrease in the productivity gap was unable to offset the effects of the increase in the workforce participation rate in the US peer states, leading to growth in the prosperity gap from 1991 to 1998 (Exhibit 5).

In the subsequent period, from 1999 to 2013, the two trends reversed, with Ontario gaining workers relative to its total population and the US peers losing them. But the data also reveal a decrease in the growth of Ontario's productivity for this period. These two counteracting forces caused the rising prosperity gap to taper off and remain at a fairly constant (but still high) level from 1998 onward. The fact that the prosperity gap persisted at such high levels, despite the decrease in the proportion of workers to population in the US peers relative to Ontario, shows that Ontario's productivity decreased substantially compared to the US peers after 1998.

Exhibit 5 Employment differences explain part of the gap in the 1990s, but not in later years



Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada and the US Bureau of Labor Statistics.

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**To explain the prosperity gap and prescribe effective policy recommendations, the Task Force examined what it believes to be some of the most important factors underlying the gap. These factors are all associated with Ontario's level of productivity and include: industry composition, the quality of the education system, business scale, and innovation. While there is no simple remedy to close the prosperity gap, the province should take purposeful steps to improve its competitiveness. In this Thirteenth Annual Report, the Task Force highlights what it believes to be the most important measures needed to boost economic strength and areas that will heavily influence Ontario's future prosperity.**



# Industry shifts drove the evolution of Ontario's economy

The last two decades witnessed sweeping transformations in Ontario's and its US peers' industrial landscape. Manufacturing experienced a large decline in Ontario, most prominently after 2002, while professional and technical services, as well as information technology industries, enjoyed large increases in their proportion of total employment. These changes in industry composition are a result of international macroeconomic conditions, as well as shifts in human capital and physical infrastructure.

**THE TASK FORCE** gathered data on four major indicators: employment, wages, exports, and clusters. These four indicators cover important aspects of a region's economy. First, workers are the major input to production and form the human capital that constitutes a region's core capabilities and skills. In turn, the shifts of workers from one industry to another determine the competitive advantages that the region will develop relative to those of its peers. Second, wages are the closest approximation to value added available at a detailed, industry level. Wages are also crucial for understanding improvements in productivity and standard of living of workers in a region. Third, exports

gauge a region's ability to compete abroad and show its competitive position relative to its peers. Lastly, clusters help understand how connected certain industries are in a region, and how those connections can improve overall economic activity through spillover effects.<sup>4</sup>

### Employment shares by industry are deceptively similar in Ontario and the US peers

Broad sectors, such as manufacturing, construction, and transportation, are commonly used for comparing economies over time. These broad comparisons, however, can hide important differences within these

sectors and their economic impact can be overlooked. In fact, the industry employment compositions of Ontario and the US peer states at an aggregated level do not show large differences (Exhibit 6). This could prompt a casual observer to conclude that these regions' differences in total output, as well as the prosperity gap, are not a result of differences in industry composition. For example, for the seventeen sectors shown below, the average difference (in absolute terms) is only 1.1 percent.

<sup>4</sup> The analysis in this chapter considers only the private sectors and health and education industries of Ontario and the US peer states. Public administration was excluded from the analysis. Québec was excluded from the analysis because of data limitations.

## Exhibit 6 Sector composition is similar in Ontario and US peers

### Ontario and US peer states, 2013 Sector composition based on employment

|  | Percentage of total employment |          |                             |
|--|--------------------------------|----------|-----------------------------|
|  | Ontario                        | US peers | Percentage point difference |
| Retail trade   | 13.0%                          | 12.0%    | 1.0                         |
| Manufacturing  | 12.4                           | 9.2      | 3.2                         |
| Health care and social assistance  | 11.9                           | 15.3     | -3.4                        |
| Educational services   | 8.5                            | 9.6      | -1.1                        |
| Accommodation and food services  | 7.9                            | 9.6      | -1.7                        |
| Finance and insurance, real estate and rental and leasing                | 7.7                            | 6.3      | 1.4                         |
| Administrative and support and waste management and remediation services | 6.4                            | 8.6      | -2.2                        |
| Professional, scientific, and technical services                         | 6.4                            | 7.1      | -0.7                        |
| Wholesale trade  | 6.0                            | 4.8      | 1.2                         |
| Construction   | 5.6                            | 4.6      | 1.0                         |
| Transportation and warehousing   | 4.8                            | 4.0      | 0.8                         |
| Other services (except public administration)                            | 3.7                            | 3.2      | 0.5                         |
| Information  | 2.6                            | 2.4      | 0.2                         |
| Arts, entertainment, and recreation                                      | 1.7                            | 1.9      | -0.2                        |
| Utilities  | 0.9                            | 0.5      | 0.4                         |
| Mining, quarrying, and oil and gas extraction                            | 0.4                            | 0.5      | -0.1                        |
| Agriculture, forestry, fishing and hunting                               | 0.1                            | 0.4      | -0.3                        |

Note: Data are at the 2-digit NAICS level. Agriculture, forestry, fishing and hunting excludes farming, and administrative and support and waste management and remediation services (NAICS 56) includes management of companies and enterprises (NAICS 55).  
Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, *Survey of Employment, Payroll, and Hours*, and US Bureau of Labour Statistics, *Quarterly Census of Employment and Wages*.

The Task Force dug deeper into the broad sectors to understand what really separated Ontario from its US peers and how these differences might have affected the prosperity gap from 1991 to 2013. To assess the fundamental differences between Ontario's economy and the economies of US peer states, the Task Force analyzed detailed industry data covering a total of 242 industries.<sup>5</sup>

### Ontario industries that lost employment affected the prosperity gap more than those that gained

Changes in industries' share of employment occurred simultaneously in Ontario and the US peers and likely resulted from changes in international economic conditions. The changes in Ontario must therefore be considered relative to the changes in the US peers, rather than independently. Some industries increased their shares of total employment in both Ontario and the US peers, while other industries showed opposite trends in the regions.

Ontario and the US peers went through markedly different changes in employment composition in the period between 1991 and 1998. Ontario did not necessarily shift its workforce toward industries with lower value added products and services; instead, it lost, or failed to grow, important support industries that contribute to productivity improvements.

After 1998, these trends reversed to some extent. That is, supporting industries grew at a faster pace in Ontario than in the US peer states from 1998 to 2013. Sectors such as construction and transportation increased their share of employment significantly in the period. Nevertheless, there is a lag in the effect these industries have on productivity and prosperity. That

means, even though these industries grew after 1998 in Ontario, improvements to productivity may not be measurable until later periods.

### Changes in employment in infrastructure industries affected Ontario's prosperity

Half of the industries in the construction sector and the vast majority of the transportation and warehousing industries experienced decreases in their share of total employment in Ontario from 1991 to 1998. The same industries in the US peers, however, saw an increase in their shares of total employment during that period. The other half of the construction sector industries saw decreases in the share of employment in both Ontario and the US peers, but the decrease was larger in Ontario.

Core industries of the construction sector grew by 4.4 percent on average in the US peer states, while in Ontario these industries shrank by 19.6 percent on average, between 1991 and 1998 (Exhibit 7). Although the share of employment in some of the industries declined slightly in the US peers in the period, construction industries were at least more stable in the US peers' economies than in Ontario. The differences in nonresidential construction and utility system construction are particularly important. These industries, especially the latter, represent basic infrastructure investments from businesses and public services that support business activities.

This is particularly important because scholars and analysts have proposed that information technology (IT) investments were the drivers of US productivity growth after 1995. Yet they also acknowledge the importance of basic, physical infrastructure for IT to yield its full returns. Therefore, lower growth in supporting infrastructure in Ontario

may be responsible for smaller returns to IT investment, causing the well-studied gap in IT investment.<sup>6</sup>

Some of the differences in employment share can certainly be traced back to large public expenditure cuts in Ontario that started in 1989 and lasted until the beginning of the 2000s. Not coincidentally, the employment shares in Ontario started to increase in the beginning of the 2000s, the period when the expenditure cuts were phased out.

The lagged effects caused by changes in the construction sector between 1991 and 1998, however, helped shape the differences in productivity from 1998 to 2013. That is, physical infrastructure projects do not necessarily yield returns in the period in which they are undertaken, but their effects appear in subsequent years or decades. Coupled with their possible effect on high-tech capital, the cuts in basic infrastructure spending may have had a large impact on productivity in the years from 1999 to 2013.

5 Data are at the 4-digit NAICS level, which corresponds to a total of 304 industries. However, consistent data for the indicators selected were available only from 1991 to 2013 for 242 industries. Nevertheless, these 242 industries account for 95 to 97 percent of employment in the US peers and Ontario.

6 See, for example, Erik Brynjolfsson and Shinkyu Yang, "Information technology and productivity: a review of the literature," *Advances in computers*, 43, 1996, pp. 179-214; Task Force on Competitiveness, Productivity and Economic Progress, Twelfth Annual Report, *Course correction: Charting a new road map for Ontario*, November 2013.

Exhibit 7 Ontario core construction industries' employment share increased after 1998

Ontario and US peers, 1991-2013  
Construction industries share of total employment



Note: Building contractors include foundation, structure, and building exterior contractors; building equipment contractors; building finishing contractors; and other specialty trade contractors.  
Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, *Survey of Employment, Payroll, and Hours* and US Bureau of Labour Statistics, *Quarterly Census of Employment and Wages*.

The transportation and warehousing sector represents another set of industries classified as basic infrastructure, and the trends in this sector mimic those in construction. Out of the 18 industries in the transportation and warehousing sector, 10 had either negative or lower growth in shares of employment in Ontario than in the US peers in the period between 1991 and 1998 (Exhibit 8). In the case of urban transit systems, there was a large decrease in the share of employment from 1991 to 1998.<sup>7</sup> This matches changes found in the construction sector, and could also be a result of lower investments in public infrastructure. Similar to the construction sector, transportation industries also have lagged effects on productivity; investments in urban transit lines, for

example, will likely affect productivity in subsequent years and decades, rather than immediately.

Among the transportation industries, the freight ones are particularly important, since these industries encompass services closely related to exports. Employment share in freight transportation industries decreased in Ontario relative to the peers from 1991 to 1998. Whether the decrease in employment share in these industries is due to low economic activity and exports, or whether the low economic activity can be explained by the absence of freight industries, is unknown. In any case, the period from 1991 to 1998 shows a decline in some of these supporting industries, with a reversal from 1998 to 2011.

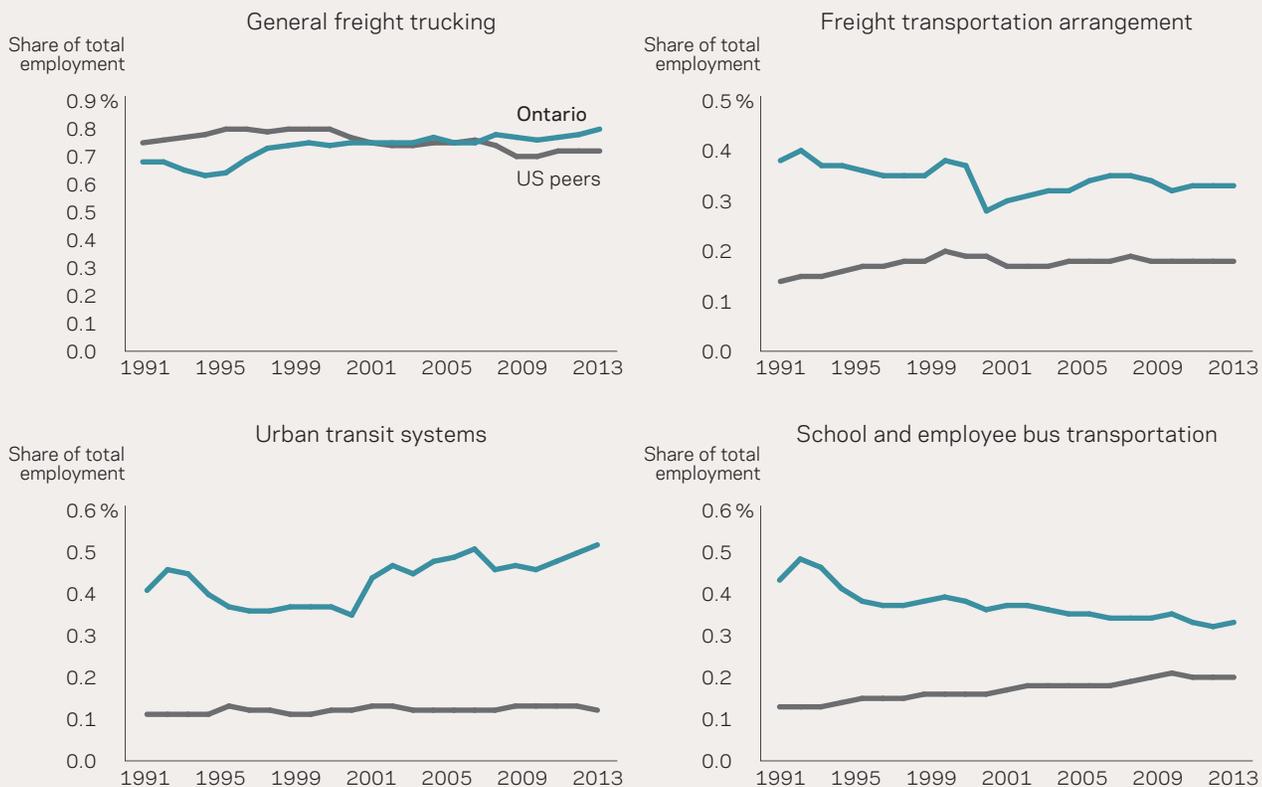
Ontario showed lower employment growth in business support industries than US peers

Most of the business administration support industries saw their share of total employment grow faster in the US peers than in Ontario, especially in the period between 1991 and 1998. These industries are also, in most cases, considerably larger in the peers. On average, between 1991 and 2013, the business administration support industries accounted for 5.6 and 7.5 percent of total employment

<sup>7</sup> It is worth noting the difference in relative size of the industries in Ontario and the peers, which may be due to labour market conditions, such as higher unionization levels in Ontario, or simply more efficient management and adoption of automated systems. It is clear that Ontario's transportation industries rely more on labour than their counterparts in the peer states.

Exhibit 8 Ontario's transportation industries recovered after the 1990s

**Ontario and US peers, 1991-2013**  
**Transportation and warehousing industries share of total employment**



Note: These industries do not represent the entire transportation and warehousing sector. But together they represent between 30 and 40 percent of the sectors' employment.  
Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, *Survey of Employment, Payroll, and Hours* and US Bureau of Labour Statistics, *Quarterly Census of Employment and Wages*.

in Ontario and the US peers, respectively. Out of these industries, three are particularly important: employment services; management of companies and enterprises; and business support services (Exhibit 9).

The employment services industry includes services such as human resource management, labour leasing, and recruitment and placement services. With the important changes that were happening in the North American economies from 1991 to 1998, these services might have played a crucial role in improving labour matching mechanisms in the economy during this period. The industry's share of employment grew in Ontario from 1991 to 1998, but the higher growth and size of these industries in the US peers may have

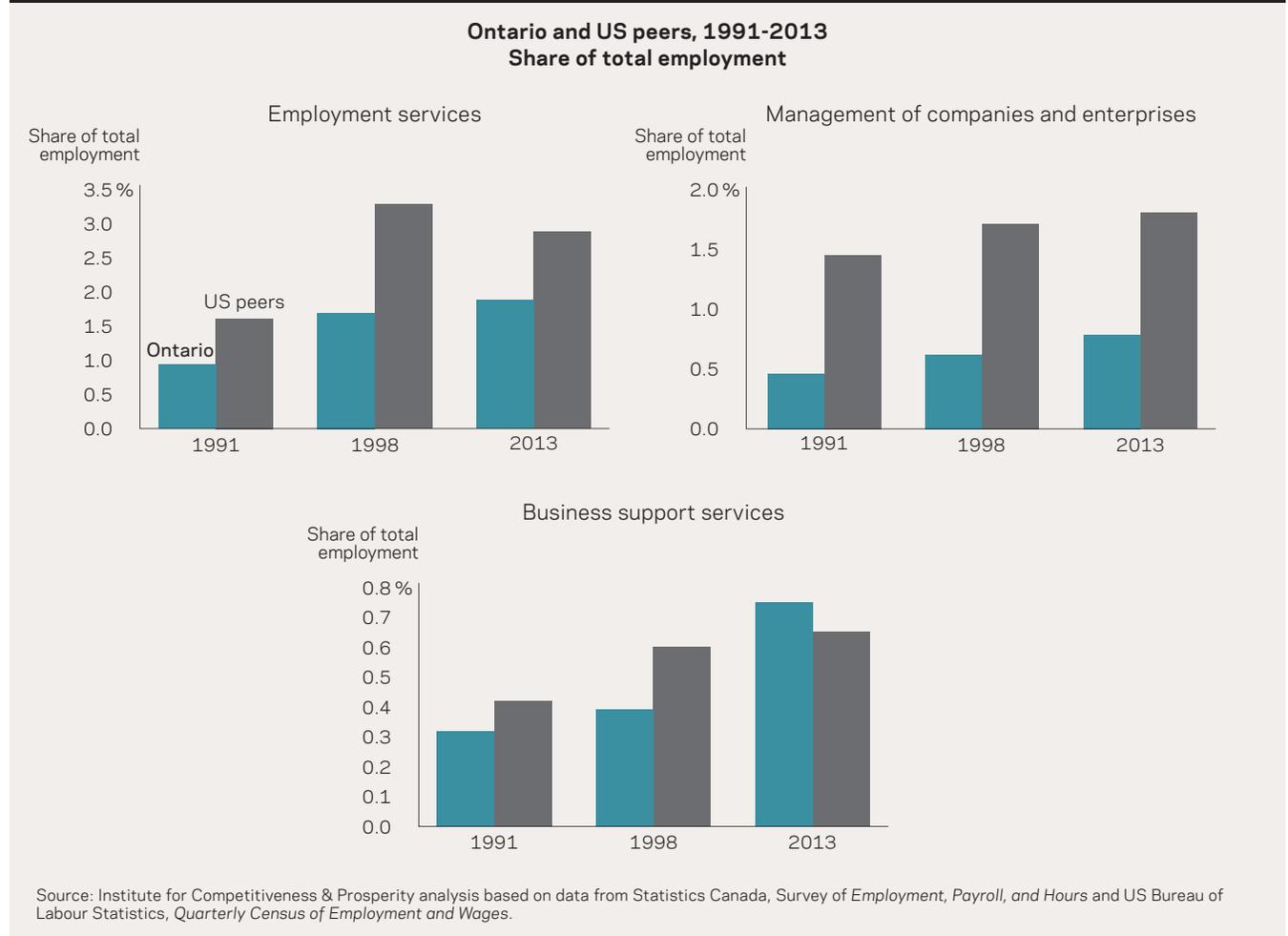
contributed greatly to the peers' economic development.

Management of companies and enterprises is particularly important, because it encompasses different types of holding companies, as well as corporate offices. Perhaps the most important aspect of this industry is that it contains centralized administrative offices, head offices, and other regional and managing offices. Because of that, this industry is a good gauge of Ontario's global business competitiveness relative to its US peer states. Not only is this industry smaller in Ontario compared to the US peers, as expected, but it also grew more slowly than in the peers in the period from 1991 to 1998. Nevertheless, Ontario saw improvements in this industry in the

period after 2000, but lost strength again after 2009.

The last industry, business support services, represents a more heterogeneous group of sub-industries and services. Ranging from document preparation services to collection agencies, this industry includes services that medium and large firms tend to outsource. From 1991 to 1998, this industry's composition of employment grew faster in the US peers than in Ontario. After 1998, the opposite is true: Ontario experienced much higher growth than the US peers. But, cross-referencing employment data and establishment counts (which are at an even more detailed level) shows distinct trends in Ontario and the US peers. In Ontario, most of the growth came from the sub-industries "other

**Exhibit 9 Growth in crucial business support was lower in Ontario than US peers, 1991-1998**



business support services” and “telephone call centres.” In contrast, for the US peers, the growth in business support services was more spread among all sub-industries. Therefore, despite the higher growth in Ontario, the diversified environment for business support in the US peers was perhaps more advantageous for productivity growth.

Because Ontario did not shift toward basic, physical infrastructure industries earlier, the province experienced slower productivity growth compared to the US peers. Given that this trend has reversed, it is expected that Ontario’s labour productivity will improve in future years. Moreover, Ontario did not grow its business supporting industries as fast as the US peers did in earlier years. These industries, just as the basic infrastructure ones, show signs of improvement in the period after 1998, which will also help close the productivity gap in the future.

### Manufacturing employment share decreased more abruptly in Ontario than in the US peers

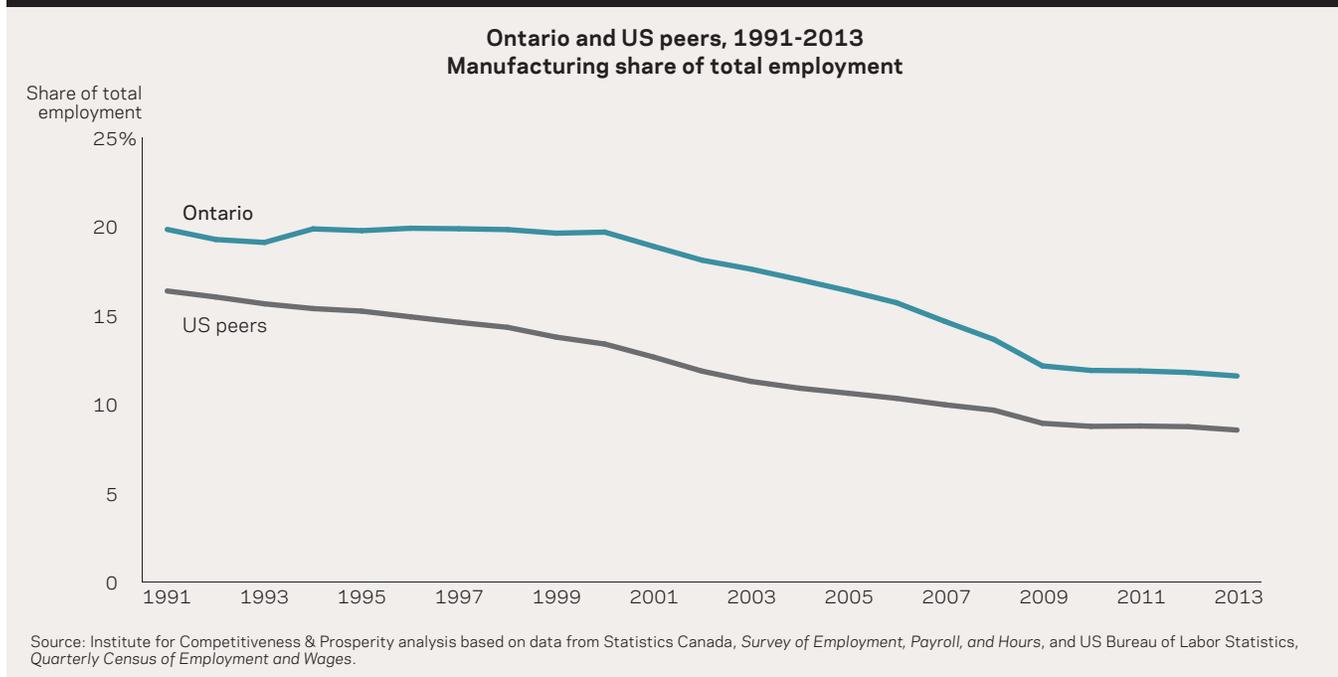
Between 1991 and 2013, the manufacturing sectors in both Ontario and the US peers declined substantially when measured by their shares of total employment. In the US peers, the sector experienced a gradual decline from 1991 to 2013, whereas in Ontario, the sector declined later and more dramatically. Ontario’s manufacturing share of total employment hovered around 20 percent prior to 2001, but thereafter decreased to 12 percent in 2013 (Exhibit 10). In contrast, the US peer states’ manufacturing share of total employment decreased steadily from 16 percent in 1991 to 9 percent in 2013.

The Task Force examined the manufacturing sector by separating advanced manufacturing industries from the rest of the sector. Industries with the highest share of employees classified as scientists, technicians, engineers, or mathematicians (STEM) were categorized as advanced.<sup>8</sup>

The share of total employment in advanced manufacturing industries declined from 1991 to 2013, but not to the same extent as the manufacturing sector as a whole, in both Ontario and the US peer states. This is evidenced by a gradual rise in the share of manufacturing employment

8 The top 22 industries were chosen as the cut-off point for classifying industries as “advanced” because the data showed a considerable drop to the next industry in the proportion of employment within STEM occupations.

Exhibit 10 Employment share in manufacturing declined more gradually in the US peers than in Ontario



in advanced manufacturing (Exhibit 11). However, within the manufacturing sector, the US peer states have consistently had a higher proportion of employees in advanced manufacturing industries. Since 1991, the US peer states had on average 42 percent of its manufacturing employment in advanced manufacturing industries, whereas Ontario had on average only 35 percent over the same period.

Advanced manufacturing in North America has garnered much attention in public policy circles, and for good reason. The increase in efficient and cheap labour in the emerging economies and the rise of global value chains have led corporations to move their non-specialized, labour-intensive manufacturing processes out of North America. Similarly, it is well documented that increased competition from Chinese firms decreased the jobs and survival rates

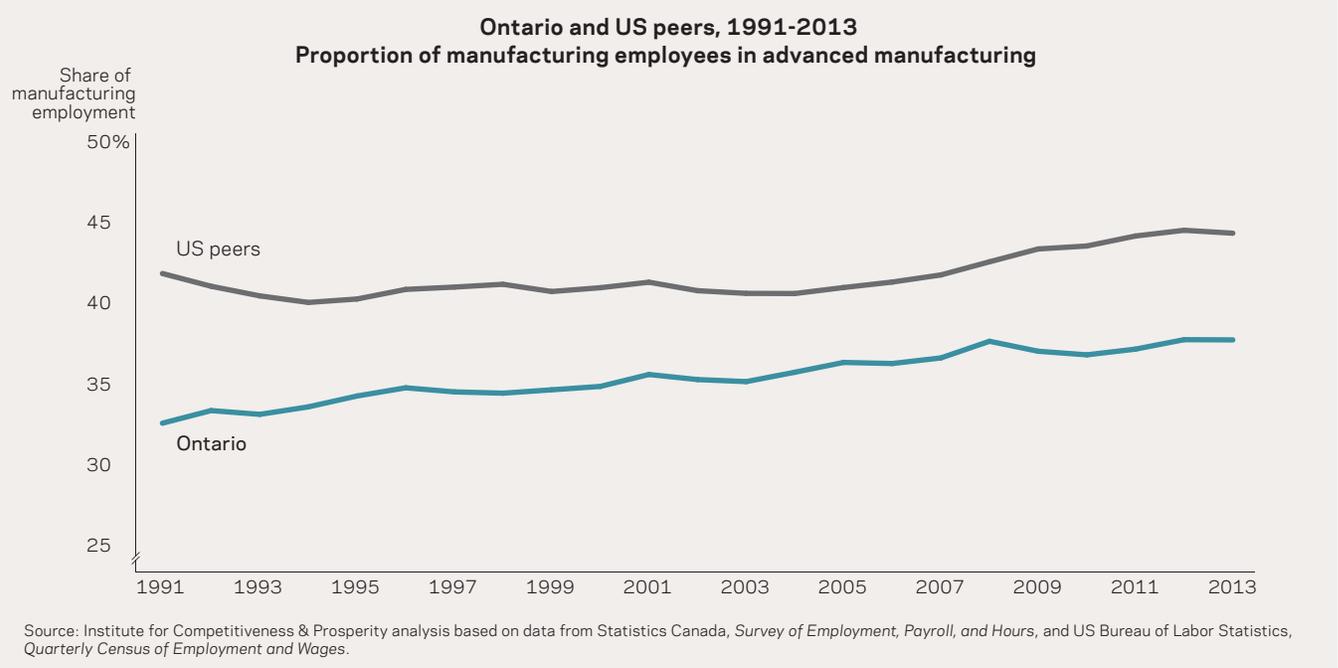
of manufacturing firms in developed countries such as Canada and the US during the 1990s and 2000s.<sup>9</sup> Advanced manufacturing industries in North America, however, have been less susceptible to this phenomenon. These industries are technologically intensive, and require highly skilled workers and proportionally larger capital investments.

It has been shown that both employment and output growth were much slower in low wage and less advanced manufacturing industries during the 1990s and 2000s.<sup>10</sup> This implies that if North America wants to maintain a strong manufacturing sector, it must continue to develop its industries that are technologically intensive. Yet the relatively smaller size of Ontario's advanced manufacturing sector is a concern, as it implies that Ontario may not be in as strong a position as its US peers to maintain a robust manufacturing sector.

The industry composition of advanced manufacturing itself differs substantially between Ontario and the US peers. The motor vehicle parts manufacturing industry constitutes a much larger proportion of Ontario's advanced

- 9 See, for example, Daron Acemoglu et al. "Import competition and the great US employment sag of the 2000s," National Bureau of Economic Research Working Paper 20395, August 2014; David Autor, David Dorn, and Gordon Hanson, "The China syndrome: Local labor market effects of import competition in the United States," *American Economic Review*, 2013, Vol. 103, No. 6, pp. 2121-2168.
- 10 See, for example, Andrew Bernard, Bradford Jensen, Peter Schott, "Survival of the best fit: Competition from low wage countries and the (uneven) growth of US manufacturing plants," National Bureau of Economic Research Working Paper 9170, September 2002; Nicholas Bloom, Mirko Draca, and John Van Reenen, "Trade induced technical change? The impact of Chinese imports on innovation, IT, and productivity," National Bureau of Economic Research Working Paper 16717, January 2011.

Exhibit 11 The US peers' manufacturing sector is more advanced than Ontario's



manufacturing industries than it does in the US peer states (Exhibit 12).

The high proportion of motor vehicle parts manufacturing in Ontario has both negative and positive aspects. The large proportion of manufacturing employees in this industry enables high degrees of specialization to take place and provides the potential for the industry to be very productive, and thus competitive. However, the high concentration of manufacturing employment in this industry also imposes risk to Ontario's prosperity. If the motor vehicle parts manufacturing industry were to become less competitive relative to other regions,

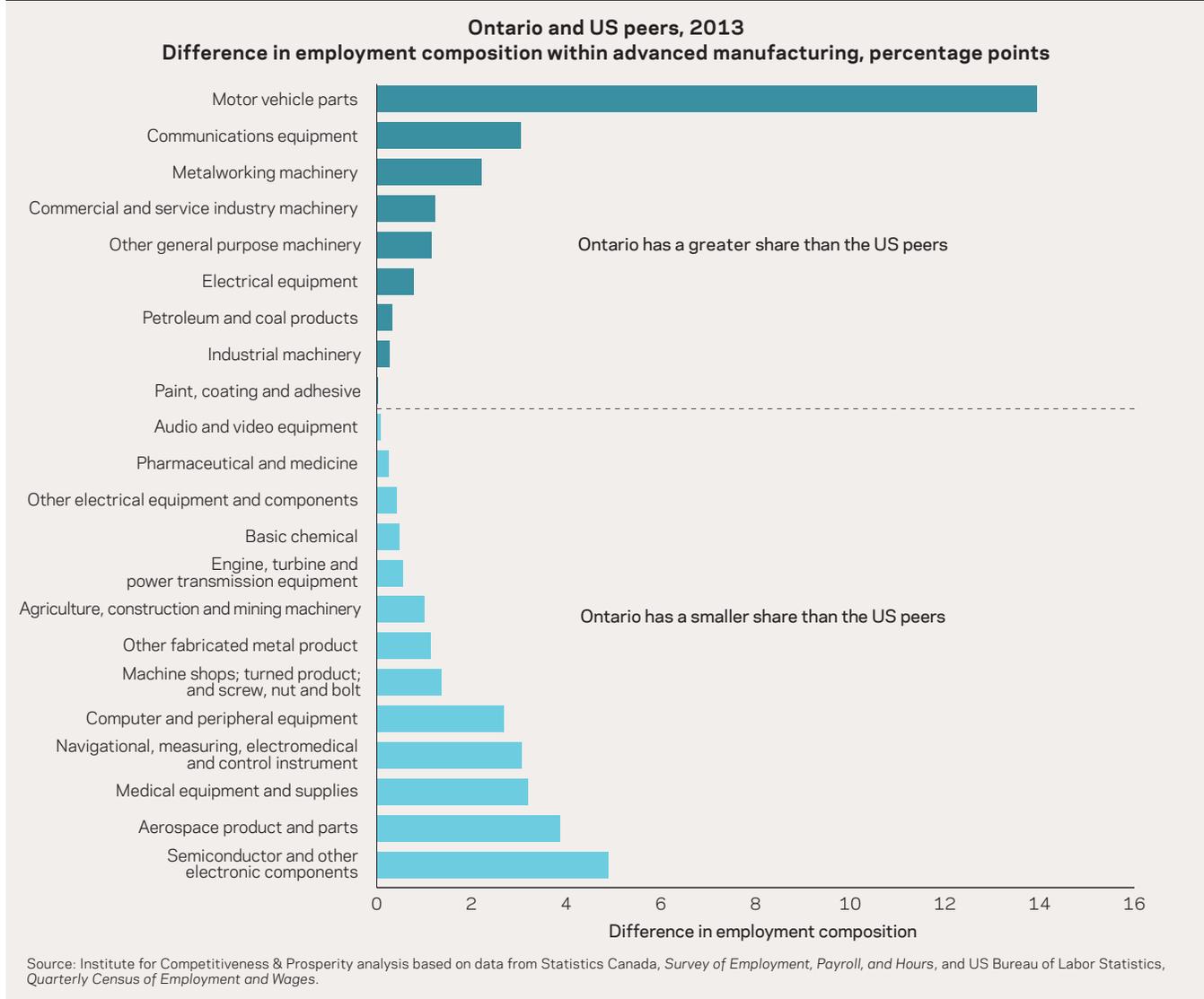
then employment in the manufacturing sector would decline substantially.

The Task Force encourages the Ontario government to be wary of the risk associated with the motor vehicle parts manufacturing industry, especially since the industry has had much government support. In 2004, the Ontario Automotive Innovation Fund was introduced to support large-scale capital investments within the industry. The federal Automotive Innovation Fund has also been providing support for firms to invest in innovative, greener, and more fuel efficient cars since 2008. The Task Force affirms that the automotive

industries should strive to remain competitive in the long run even in the absence of substantial government support. For example, if firms do not sense the need to invest in productivity enhancing capital or R&D because of government support, then the government may be harming the industry in the long run. A full and deep analysis of the industry should occur.

Manufacturing is still an important part of Ontario's economy, and Ontario should expand its share of advanced industries to take advantage of its skilled workforce and available capital.

**Exhibit 12 Motor vehicle parts industry accounts for much of Ontario's advanced manufacturing**



## The wage gap between Ontario and its US peers varies by industry

The Task Force considers wages a good proxy for value added, as they are a quantifiable indicator of productivity.<sup>11</sup> A company can pay a productive worker more than a less productive one. Wages account for roughly half of total GDP, and, more importantly, growth in GDP tightly follows growth in wages. Analyses of wages at the industry level can determine whether Ontario moved into or away from more productive industries, as well as how the productivity levels of industries themselves

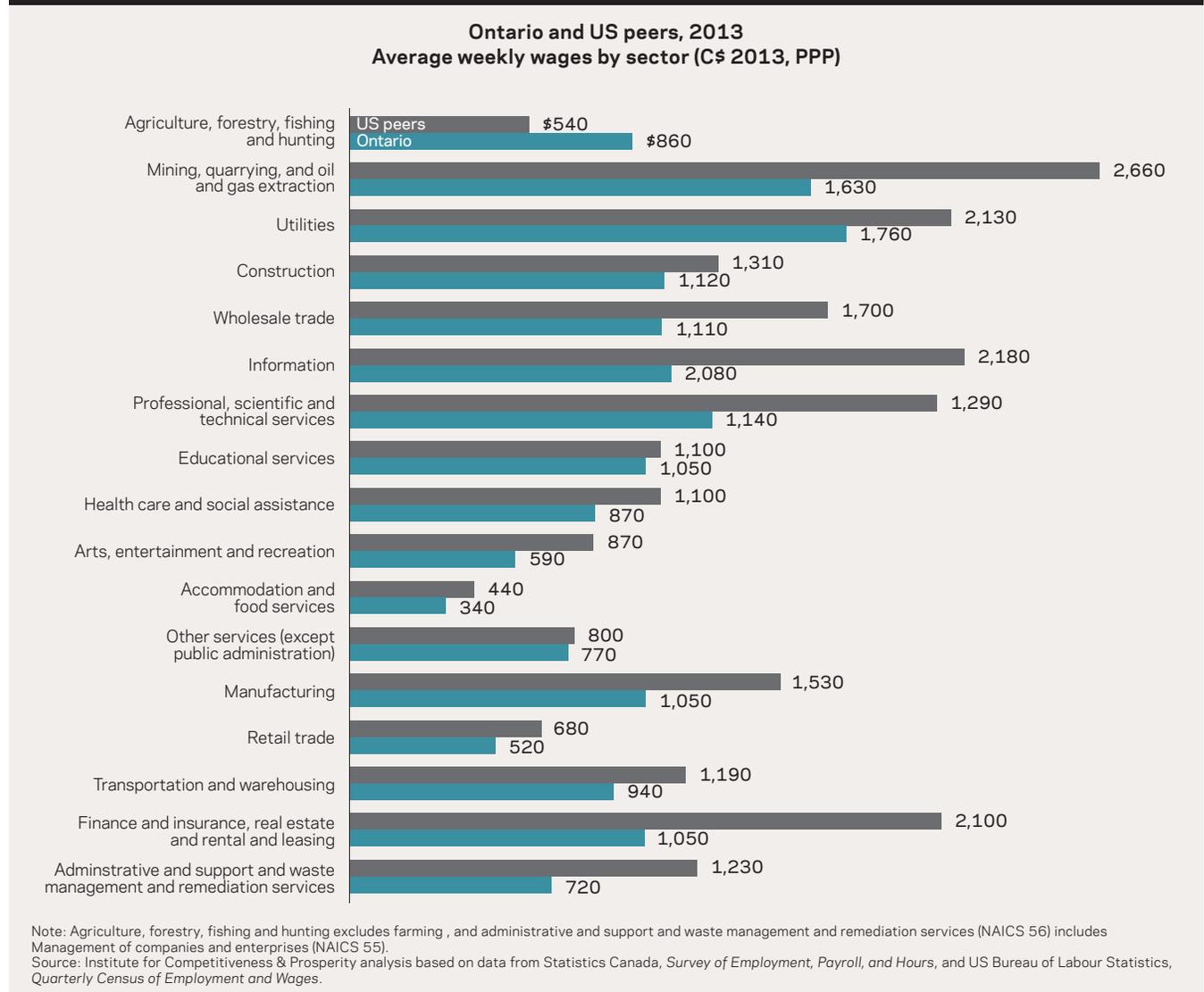
changed over time. Both of these factors help determine how changes in productivity affected the prosperity gap between Ontario and its peer states.

The Task Force's analysis of wages shows that, at the sector level, Ontario and the US peers have large wage gaps. However, in contrast to the employment analysis, the wage analysis did not present meaningful trends or patterns at the detailed industry level, except for within the manufacturing sector. The wages for advanced manufacturing industries grew much faster in the US peer states than in Ontario.

Ontario has had a long-standing gap in wages relative to the US peers. Although the aggregated data do not show considerable differences in employment, they do point to large differences in wages across nearly all sectors (Exhibit 13). The average gap in weekly wages was \$340 in 2013, with the average weekly wages being \$890 and \$1,230 for Ontario and the US peers, respectively. Alarming, the wage difference is larger for sectors that account for large shares

11 The Task Force recognizes that wages are not a perfect measure of productivity. Wage levels are the result of many economic forces and institutions, which can distort their theoretical, direct relationship to productivity. Nevertheless, given the data available at a detailed level, wages are the best proxy.

Exhibit 13 Wages across sectors are generally lower in Ontario than in US peers



of total employment, such as financial services, manufacturing, and professional and scientific services.<sup>12</sup> Moreover, in general, the higher the wage level, the greater the wage gap.

The wage gap between Ontario and the US peer states is long-standing. Looking at wage growth for the period between 1991 and 2013 reveals that for most aggregated sectors, the US wages grew faster than wages in Ontario. This finding is particularly true for the period between 1991 and 1998. During that time, only transportation and warehousing, administrative services, and agriculture sectors show a higher growth in wages in Ontario than in the US peers. Two important sectors present much higher wage growth in the US peers than in Ontario during the same period: educational services and construction. While wages in the educational services sector in Ontario shrank by one percent annually from 1991 to 1998, in the US peers, the wages in that sector grew at a rate of 1.1 percent annually. For the construction sector, wages remained stagnant between

1991 and 1998 in Ontario, but grew 1.2 percent annually in the US peers.

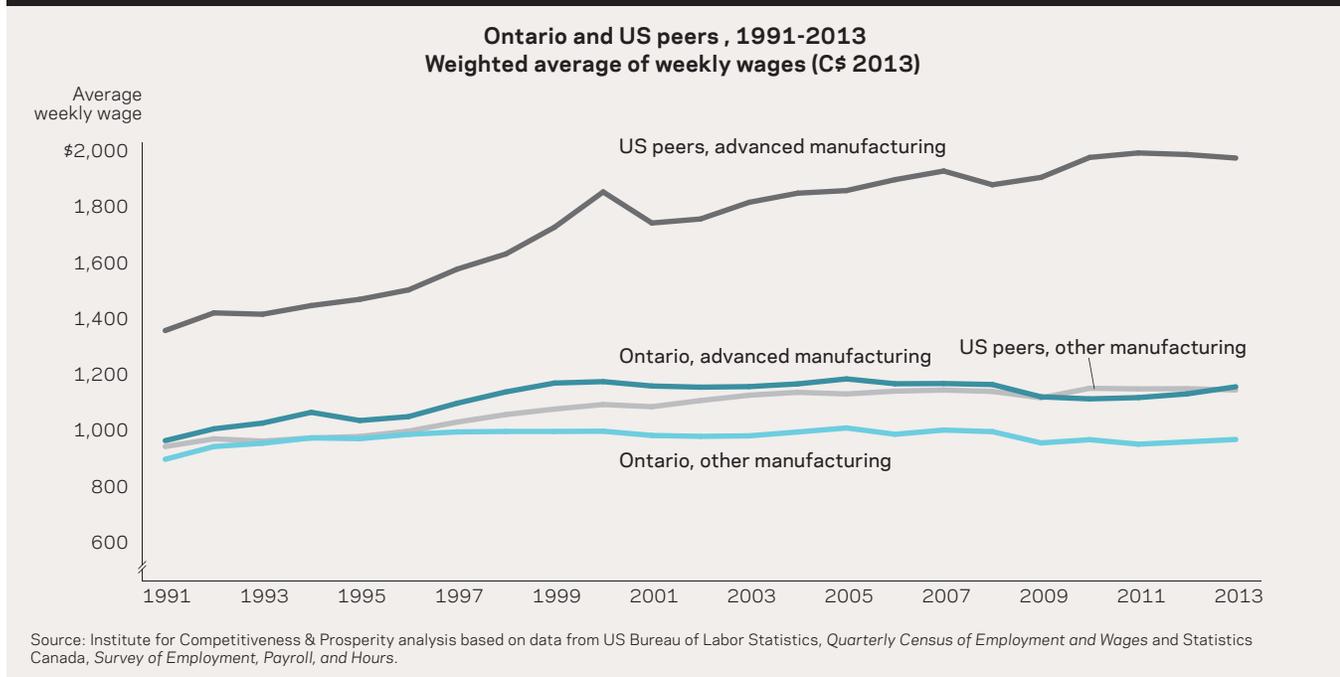
The period between 1998 and 2013 saw an improvement in wage growth in Ontario when compared to the US peers. For six out of seventeen sectors considered, wages grew faster in Ontario than in the US peers. Among these six sectors were educational services; health care and social assistance services; and finance, insurance, and real estate services, which together accounted for 28.1 percent of employment in 2013. In the latter sector, wages grew in Ontario by 6.4 percent annually from 1998 to 2013, while in the US peers wages grew 3.8 percent annually. In contrast to that, the Task Force found that for all other sectors including important sectors such as manufacturing and transportation and warehousing, Ontario experienced lower wage growth than the US peers. Ontario's manufacturing experienced a decrease in wages between 1998 and 2013 in the order of 0.1 percent annually, while in the US peers manufacturing wages grew 2.2 percent annually. In the transportation and warehousing

sector, Ontario experienced roughly the same decline as it did in the manufacturing sector, and the US peers saw a growth rate of 0.7 percent annually. These differences in wage growth in favour of the US peers helped shape the wage gap observed today.

**Manufacturing wages in Ontario trailed those of the US peers, especially in advanced manufacturing**  
The US peer states consistently had a higher average manufacturing wage than Ontario between 1991 and 2013.<sup>13</sup> Similarly, average wage growth in the US peer states' manufacturing sector was much higher than Ontario's between 1991 and 2013, with annual growth in manufacturing wages 0.8 percentage points higher in the US peers than in Ontario over this period.<sup>14</sup> Yet this

12 In this Report, wages are in constant 2013 Canadian dollars based on province or state-specific Consumer Price Indexes (CPI). In addition, wage levels for US peer states were converted into Canadian dollars using Purchasing Power Parity (PPP) indexes supplied by the OECD.  
13 The wages are averaged using weights according to relative employment size of each industry within the manufacturing sector.  
14 For this analysis, the geometric growth rates of Ontario and the US peers for the period 1991 and 2013 were used.

**Exhibit 14 Advanced manufacturing wages were much lower in Ontario than in US peers**



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difference in the average wage was not distributed evenly within the manufacturing sector. The average wage difference was far greater in the advanced manufacturing industries than in the other manufacturing industries (Exhibit 14).

Ontario's advanced manufacturing industries have seen very little growth in real wages since the early 1990s, relative to the US peers. Since 1991, Ontario's average weekly wage in advanced manufacturing industries has increased by 20 percent. This average wage increase pales in comparison to the US peers. From 1991 to 2013, the US peers' average weekly wage in advanced manufacturing industries increased by 45 percent. Moreover, in 2013 it was \$810 higher than Ontario's. The three largest wage increases in the US peers' advanced manufacturing industries occurred in computer and peripheral equipment manufacturing; audio and video equipment manufacturing; and semiconductor and other electronic component manufacturing. Each of these industries' average real wages grew by at least 85 percent from 1990 to 2013 in the US peers. Over the same period in Ontario, the same three industries' average wage increased by 61 percent, 5 percent, and 4 percent, respectively.

Between 1991 and 2013, the advanced manufacturing industries with the largest wage increases in Ontario were computer and peripheral equipment manufacturing; agriculture; construction, and mining machinery manufacturing; and pharmaceutical and medicine manufacturing. These industries' average wages increased by 61 percent, 46 percent, and 44 percent, respectively. In addition to slower growth, the overall difference between Ontario and the US peers' average wage in the advanced manufacturing industries was

substantial and contributed to the prosperity gap.

Not only have Ontario's advanced manufacturing industries become less productive relative to the US peers from 1991 to 2013, but within the advanced manufacturing category itself, employment also shifted toward less productive advanced manufacturing industries relative to the US peers. From 1991 to 1998, the composition of advanced manufacturing industries added very little to the average wage gap. Even though from 1999 to 2013 the composition of Ontario's advanced manufacturing category began to contribute more to the average wage gap, it explained only 10 percent, or \$80, of the gap by 2013. This means that although a greater share of the US peers' advanced manufacturing employees worked in industries that pay higher than average advanced manufacturing wages, this greater share is not what drives the wage gap. The real driver of the gap is the difference in productivity when the same industries are compared across the regions.

## Trends in Ontario's manufacturing exports match those of other economic indicators

The Task Force analyzed the change in the value of Ontario's manufacturing exports relative to the US peers between 2002 and 2013 in order to understand changes in Ontario's industry composition, relative to its US peers.<sup>15</sup> Between 2002 and 2013, the real dollar value of Ontario's manufacturing exports decreased substantially relative to those of the US peers. This finding is consistent with the wage analysis of the manufacturing sector. The value of exports in Ontario decreased in many of the manufacturing industries analyzed; the value of exports grew in only 21 out of 85 industries between 2002 and 2013.<sup>16</sup> Moreover, only exports in 16 manufacturing industries grew faster, or decreased more slowly, in Ontario relative to the US peers.

Many factors affect a region's export competitiveness outside of that region's direct control, namely, the value of the region's currency, the

macroeconomic conditions of its trading partners, and its geographical location. The Task Force therefore compared Ontario's export composition to that of its US peers to attempt to control for the effect of these macroeconomic factors on the region's exports.

The most notable changes in Ontario's export composition from 2002 to 2013 were in the motor vehicle manufacturing and the motor vehicle parts manufacturing industries. These two industries' share of total exports decreased substantially (Exhibit 15). The decline of exports for these industries was also reflected in the employment statistics; the share of total employment decreased by 42 percent in the motor vehicle parts manufacturing industry and by 35 percent in the motor vehicle manufacturing industry.

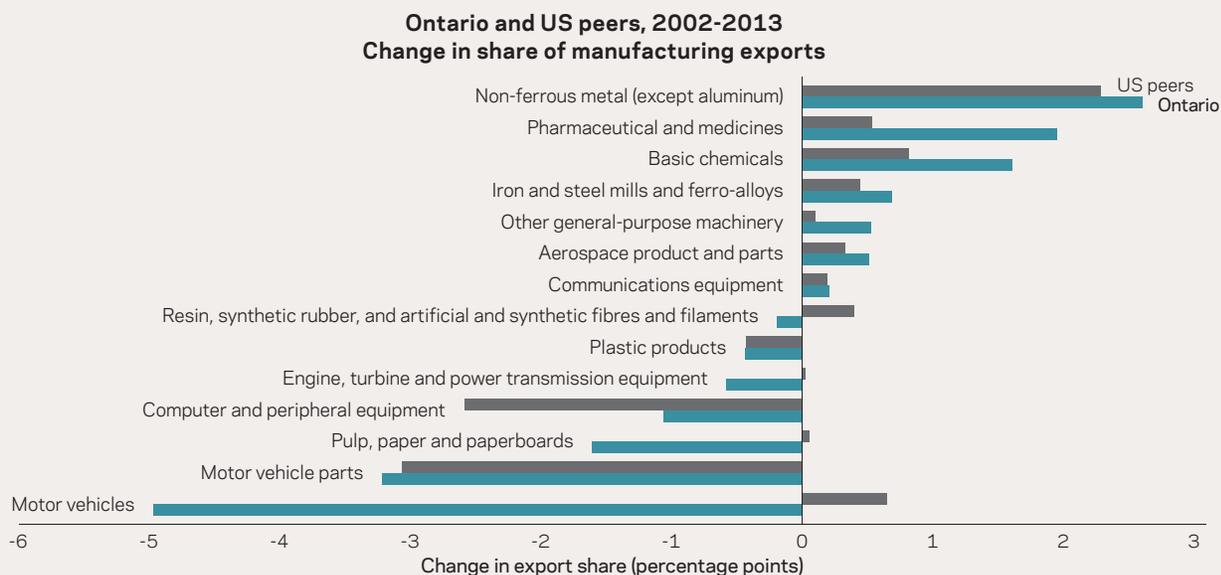
However, despite the declines in the value of their exports and their share of employment, the motor vehicle parts and the motor vehicle manufacturing industries still play a large role in Ontario's manufacturing sector.

Together they comprised 15 percent of manufacturing employment in 2013. Further declines in exports in these industries may still have large effects on Ontario's manufacturing sector. A more diversified manufacturing sector would mitigate the risk of a decline in a single industry's exports. To help prevent further drops in employment and promote long-term competitiveness within the manufacturing sector, the province should adopt more broad-based programs that support diversity within the sector.

15 Unfortunately, lack of comparable data between Ontario and its peers prevented analysis back to 1991. The analysis focused on manufacturing goods, as there are limited comparable data on other exports at the industry level. Examining exports helps document the relative value of industries rather than their sheer size.

16 The dollar value of goods is adjusted for price levels using export deflators for Ontario and the United States.

Exhibit 15 Ontario's export composition has shifted substantially since 2002



Note: Export shares are measured by their dollar values, adjusted to real terms using export deflators from Statistics Canada and Bureau of Economic Analysis, and are compared in Canadian dollars through adjustment with the OECD's Purchasing Power Parity estimates. Only industries with at least a 2 percent share of manufacturing exports in Ontario in either 2002 or 2013 were included in the exhibit.

Source: Institute for Competitiveness and Prosperity analysis based on data from Industry Canada and United States Census Bureau.

## Clusters are less productive in Ontario than in US peers

Different from industries or sectors, clusters comprise geographically proximate groups of interconnected companies, suppliers, service providers, and associated institutions in a particular field.<sup>17</sup> Examples of clusters are Financial Services in New York City and IT in Silicon Valley. Industries and clusters are interconnected. Clusters comprise businesses from different industries, and emerging or declining industries affect clusters. In turn, industries benefit from strong cluster environments, and new industries often emerge from clusters. Both clusters and industries are essential to propelling regional competitiveness.

In the Eleventh Annual Report, the Task Force concluded that Ontario has a beneficial cluster mix, which means Ontario has a greater share of highly productive industries within clusters than the US peers.<sup>18</sup> However, lagging cluster effectiveness, which is measured by the wage difference between US peers and Ontario in a

given cluster, is a significant part of Ontario's productivity gap.<sup>19</sup> Since Michael Porter's definition of clusters changed this year, the Task Force revisited the impact of both cluster mix and cluster effectiveness on Ontario's economy to better understand the province's cluster environment and performance. The Task Force calculated how much each factor contributed to the total wage gap.

The results show that Ontario has a more worrisome trend in traded clusters than in local clusters.<sup>20</sup> The average annual wage gap between US peers and Ontario for traded clusters steadily increased from \$13,900 per worker in 1991 to \$32,900 in 2013, in real terms. In contrast, the wage gap in local clusters peaked at \$12,400 in 2002 and has decreased since then, in real terms.

Cluster mix has had a limited impact on the wage gap, compared to cluster effectiveness. Noticeably, Ontario's local cluster mix has always been advantageous compared to that of its US peers. In the case of Ontario's traded cluster mix, the province used

to have an advantage over its US peers, but has lost it over time.

Ontario's cluster effectiveness has worsened compared to US peers since 1991 in both local and traded clusters. The wage gap attributed to cluster effectiveness is twice as big in traded clusters as that in local clusters, and is still growing (Exhibit 16).

Ontario has a better cluster mix in local clusters than in traded ones. As the low cluster effectiveness indicates, Ontario's clusters are much less productive than those of the US peers.

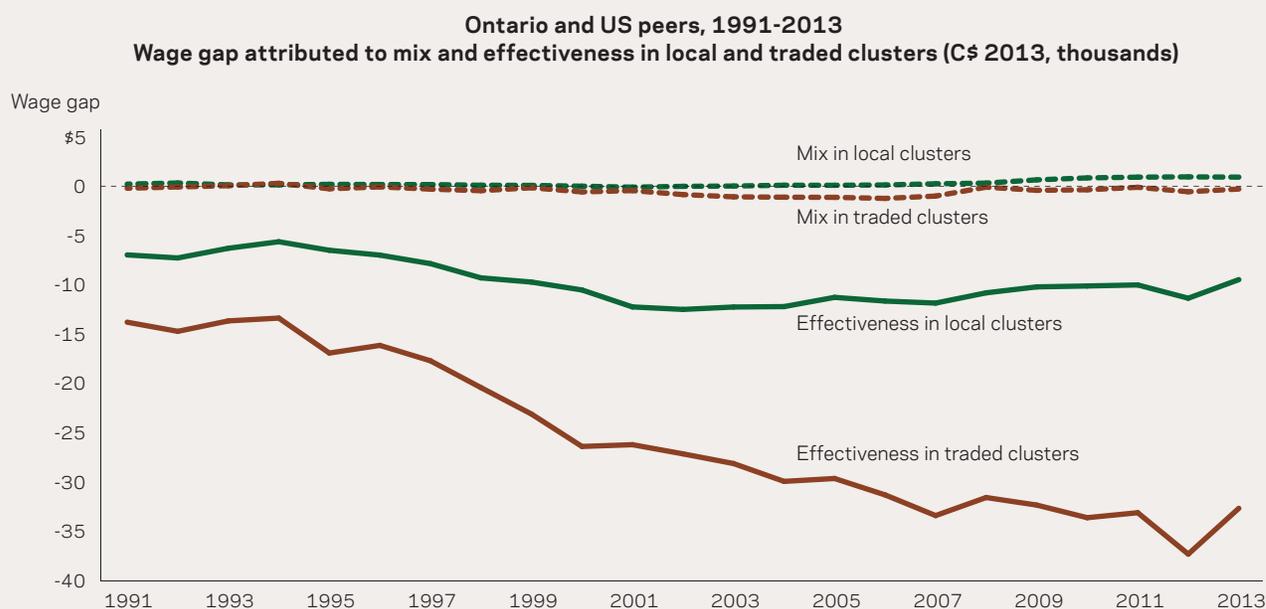
17 Michael Porter, "The economic performance of regions," *Regional Studies*, 2003, Vol. 37, No. 6-7, pp. 549-578.

18 It is important to note that the measure focuses on the mix of industries only. It calculates the productivity performance that could be expected in Ontario if each cluster were as productive as its US peer states. It does not measure the effectiveness of industries.

19 Task Force on Competitiveness, Productivity and Economic Progress, *Eleventh Annual Report, A push for growth: The time is now*, November 2012, pp. 23-25.

20 Local clusters are found everywhere and produce goods and services that are needed by the local population (e.g., retail trade). Traded clusters produce goods and services in a particular locale, and then distribute them across the nation or to other countries (e.g., Automotive, Medical Devices). These clusters are concentrated only in a handful of regions.

Exhibit 16 Ontario has an increasing gap in cluster effectiveness in traded clusters



Source: Institute for Competitiveness & Prosperity analysis based on data from Statistic Canada and US Bureau of Labor Statistics.

Productivity is especially low in traded clusters, which are the main drivers of prosperity. These clusters register higher wages, higher rates of innovation, and more influence on local wages.<sup>21</sup>

**The wage gap in high value added clusters is wider than that in low value-added ones**

Ontario trailed its US peers in wages within almost every cluster, except in Forestry and Livestock Processing. The largest wage gaps were found in Ontario's concentrated, strong, and high value added clusters, such as financial services, information technology and analytical instruments, communications equipment, and services.<sup>22</sup> Moreover, the wage growth in these clusters is even higher in the US peers than in Ontario, an alarming sign (Exhibit 17).

**Ontario needs cluster policies attuned to strong traded clusters rather than "desirable" clusters**

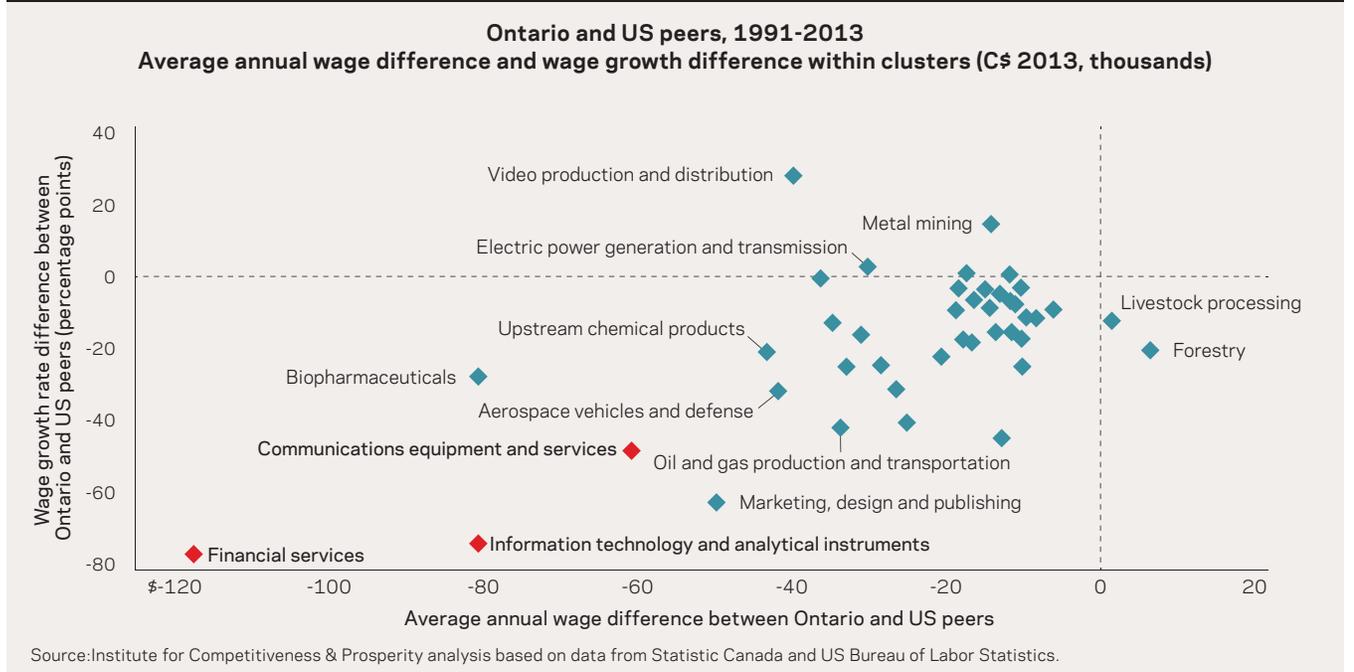
The underperformance of Ontario's strong traded clusters is a warning sign to Ontario's long-term prosperity, as traded clusters are one of the main driving forces of a region's economic progress.<sup>23</sup> The Ontario government has taken several policy actions since 2002 to support the wider economic environment in which clusters have been embedded, such as HST, corporate tax reductions, and investments in education and infrastructure over the last several years.

These policies supported cluster development, as they eased Ontario's business environment in general. However, some of them wrongly focused on creating jobs, rather than improving productivity. As well, they shifted the mix to desirable clusters, namely biotechnology and ICT, instead of targeting at strong and fast-growing clusters.<sup>24</sup> For example, ten out of thirteen Ontario cluster initiatives primarily invested in four clusters: biotechnology (biopharmaceutical and medical devices), ICT

(information technology and analytical instruments, and communications equipment and services), creative (video production and distribution cluster in the new Porter cluster definition), and mineral (metal mining) (Exhibit 18).<sup>25</sup> Yet, these initiatives have been proven to have limited effect to reach their goals. Ontario's ICT cluster had a 20 percent decline in employment between 2002 and 2013. It also trailed US peers in both wages and wages growth. Moreover, Ontario's overall traded clusters had a drop in employment of 1 percent, and their wage gap with the US peers continued to decline. Hence, Ontario needs to revisit its cluster strategy and shift the focus to strong traded clusters rather than desirable clusters.

21 Michael Porter, "The economic performance of regions," *Regional Studies*, 2003, Vol. 37, No. 6-7, pp. 549-578.  
 22 The analysis used Location Quotient (LQ) to quantify the concentration of employment in a particular industry cluster compared to the nation.  
 23 Michael Porter, "The economic performance of regions," *Regional Studies*, 2003, Vol. 37, No. 6-7, pp. 549-578.  
 24 *Ibid.*  
 25 Creative, biotechnology, ICT and mineral clusters are defined by the Ontario government.

**Exhibit 17 The wage gap between Ontario and US peers is wider in high value added clusters**



The Task Force has been studying and mapping out Ontario's strong and emerging clusters since 2001. Ontario has already achieved critical mass in employment and number of businesses in several clusters including Financial Services, and Distribution & Electronic Commerce in Toronto; Automotive, and Food Processing & Manufacturing in London; Information Technology, and Analytical Instruments in Ottawa;

and Textile Manufacturing, and Education & Knowledge Creation in Kingston.<sup>26</sup> These clusters already possess the resources that lead to regional competitiveness, such as a large base of trained employees, competitive and cooperative business supply chains, and specialized physical infrastructure. The Task Force emphasizes that cluster leaders, companies, institutions, and local

governments should work together to capture their potential. While government can provide a facilitating environment, clusters still cannot succeed in the absence of industry's leadership role to drive the process forward.

<sup>26</sup> Task Force on Competitiveness, Productivity and Economic Progress, Twelfth Annual Report, Course correction: Charting a new road map for Ontario, November 2013, p. 58.

Exhibit 18 Ontario has supported cluster development, 2002-2014

| Year | Program  | Target cluster               | Fund allocation and highlights  |
|------|--|------------------------------|---|
| 2002 | Biotechnology strategy                                       | Biotechnology cluster        | \$20 million for the Medical and Related Sciences Discovery District in Toronto<br>\$30 million for development of new strategies that will maximize investment and job creation  |
| 2002 | University of Waterloo research and technology park          | ICT cluster                  | \$13.4 million to build the University of Waterloo research and technology park to strengthen its position as a leader in the information technology and high technology fields   |
| 2003 | The interactive digital media small business fund (IDM Fund) | Creative cluster             | \$0.85 million to facilitate industry alliances, encourage innovation and improve human resources and training  |
| 2004 | The northern Ontario biotechnology initiative (NOBI)         | Biotechnology cluster        | \$0.15 million to explore new biotechnology opportunities in the agricultural, mining and remediation, forestry, and medical sectors  |
| 2004 | Northern prosperity plan                                     | Mineral cluster              | \$10 million Go North international marketing initiative to attract investment that promotes the cluster and supports the new Ontario mineral industry cluster council  |
| 2004 | Commercialization strategy                                   | All clusters                 | \$63 million to link public research institutions with companies that can move the research out of the lab and into the market. Universities, colleges, and hospitals will receive \$27 million to help identify promising research and make them investor-ready; institutions will receive \$36 million to establish pools of seed capital to commercialize the best ideas |
| 2006 | Entertainment and creative cluster partnership fund          | Creative cluster             | \$7.5 million over three years to promote the cluster's development as well as cooperation among industry leaders   |
| 2007 | Northern industrial cluster                                  | Adv. manufacturing           | \$1.6 million to shape a new northern industrial cluster by investing in a centre of expertise for welding technology in Kirkland Lake  |
| 2007 | Professional data center                                     | ICT cluster                  | \$1 million to develop the data centre in collaboration with Thunder Bay telephone and confederation college  |
| 2008 | nGen   | Creative cluster             | \$0.25 million to promote the Niagara region as an industry leader in interactive new media development by recruiting staff; researching and developing interactive media projects; providing creative, technical, and business support for media entrepreneurs, etc.   |
| 2009 | Ontario's enhanced film tax credits                          | Creative cluster             | \$165 million in tax credits to support growth and job creation in the Ontario film and television industry   |
| 2009 | Agri-technology commercialization centre                     | Agri-Tech cluster            | \$11 million joint government investment to assist producers, researchers, and entrepreneurs in agriculture find capital and take their products to market  |
| 2013 | Creating jobs plan   | Aerospace/ Manufacturing/ICT | Recent challenge for the agri-food industry to double its exports and create 120,000 jobs by 2020   |
| 2014 | The better business climate act, 2014                        | All clusters                 | Legislation to help create jobs and drive innovation by supporting the creation of cluster development plans. In consultation with business, academia, labour and non-profits, the government would identify cluster opportunities that focus on regional competitive strengths. The legislation would require cluster development plans to be reviewed within five years.  |

Source: news.ontario.ca

The Ontario government proposed the Better Business Climate Act in 2014, a legislative framework intended to act as a catalyst to encourage the development of long term, sustainable economic outcomes across the province. The Ontario government will strategically reassess its strengths and opportunities in the global marketplace, identifying its strongest clusters with comparative advantage in general factors of production, along with cooperative supporting industries for businesses to grow. The program would also work to induce rivalry and sophisticated customers for businesses to improve.

The Task Force applauds the new cluster strategy focus on improving innovation capacity and productivity as opposed to job growth. Plans aimed at job growth are ineffective at shrinking the productivity gap since Ontario's cluster mix contributed little to the wage gap. In the worst case, plans aimed at job growth alone will bring in more unnecessary low value added jobs to reach their goal, which will decrease the share of traded clusters in the region and slow the region's economic progress in the long run. The Task Force also encourages the government to keep incentivizing business growth, improving the culture of innovation, upgrading social and physical infrastructure, and attracting world class talent to the region.

The economies of Ontario and the US peer states are deceptively similar when examined at an aggregated level. Yet, with a more detailed view, differences emerge. Ontario has lost employment in crucial infrastructure and support industries during a time of economic transition. These losses might have led to negative productivity growth in subsequent years. In addition, while employment in the US and Ontario's manufacturing sectors has declined since the early 1990s, Ontario's manufacturing sector has not adapted as effectively as the US peers' to the new economic conditions facing North America.

In the case of wages, Ontario has been consistently behind its US peers. This wage advantage in favour of the peers becomes alarming for the advanced manufacturing industries and clusters. Moreover, it is not Ontario's mix, or industry composition, within the advanced manufacturing or clusters that determines the wage gap. Instead, it is the direct wage difference between the same industries or cluster in Ontario and the peers that accounts for most of our trailing wages.

**Ontario has plenty of room to improve productivity in its industries. Continued capital investments, innovation, and efficiency gains must be pursued by the private and public sectors. The province's economic characteristics have changed, and now it is time for business leaders and the government to take leadership in our economy.**

### Areas for Further Study

How can infrastructure spending be better directed to improvements in labour productivity?

Should fiscal incentives be more equitable within the manufacturing sector to reduce Ontario's dependence on motor vehicle parts manufacturing?

How can public policy be redesigned to target strong clusters' development rather than "desirable" clusters?





# Quality education will develop tomorrow's workforce

The Ontario government has invested heavily in expanding access to education for many socioeconomic and demographic groups in the past, and the Task Force has supported such endeavours. However, the educational system must ensure that students from a young age will receive quality education that will help them become capable and innovative potential workers. Ontario needs to take a new tack in education policy by emphasizing quantitative and technical skills among all students.

**THE SHIFTS IN ONTARIO'S** industry composition that occurred over the past decade moved the province away from manufacturing and toward sectors such as professional and technical services and health care services. These industries require continuous innovation and specialized workers' skills and competencies. These trends are expected to continue in the next decade. Proper understanding of fields such as mathe-

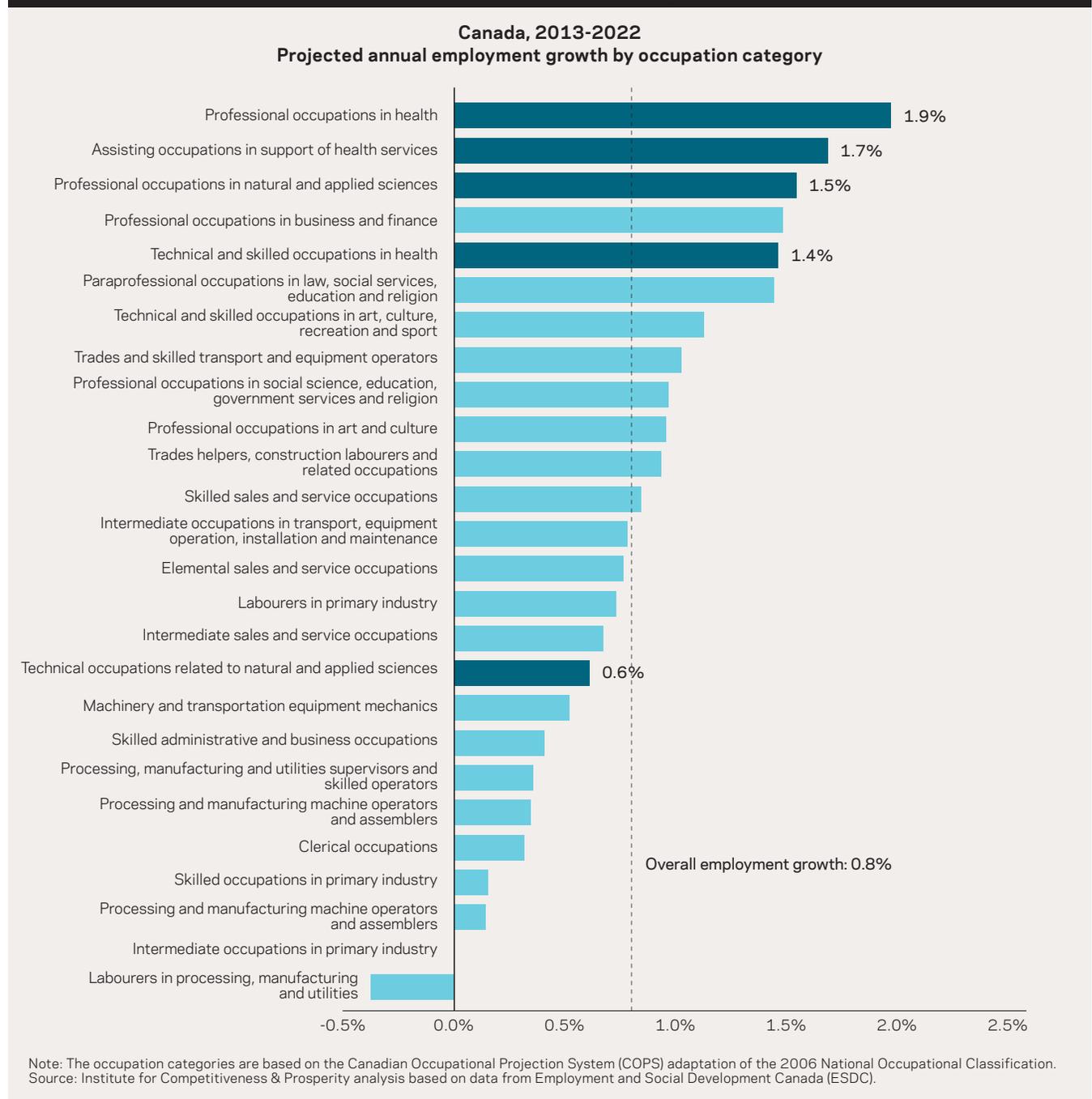
atics and basic science will prove crucial for the students of today to become the qualified workers of tomorrow.

**Employment in science based occupations is expected to increase in the next decade**

According to projections developed by Employment and Social Development Canada (ESDC), health and natural

and applied sciences occupations in Canada will experience the largest growth in employment between 2013 and 2022. While the average annual employment growth for the period is expected to be 0.8 percent, health and natural and applied science occupations are expected to grow between 1.4 and 1.9 percent annually (Exhibit 19). These projections are for the entire country, but given Ontario's

**Exhibit 19 Occupations requiring math and science are projected to grow significantly**



share of the Canadian economy, especially in employment, the trends found for Canada are largely a reflection of trends in Ontario.

Disaggregating the data into detailed occupational classifications shows that virtually all occupations belonging to health and natural sciences are projected to have positive growth. In addition, only 10 out of 59 occupations show employment growth rates that are below the projected average growth for the whole economy. On average, the growth rate of professional occupations is higher than the growth rate for technical and assisting occupations (1.7 percent for professional occupations, and 1.1 percent for technical occupations). Combined with the overall projected growth for health and natural science occupations, this finding helps explain why the ESDC projections also show an above average growth for occupations requiring university education between 2013 and 2022.

For managerial occupations, projected employment growth follows similar trends to those for non-managerial positions. For example, employment for managers in engineering, architecture, science, and information systems is expected to grow at an annual rate of 1.9 percent from 2013 to 2022. This rate is much higher than the average for non-managerial occupations (0.8 percent) and for overall managerial positions (0.7 percent).

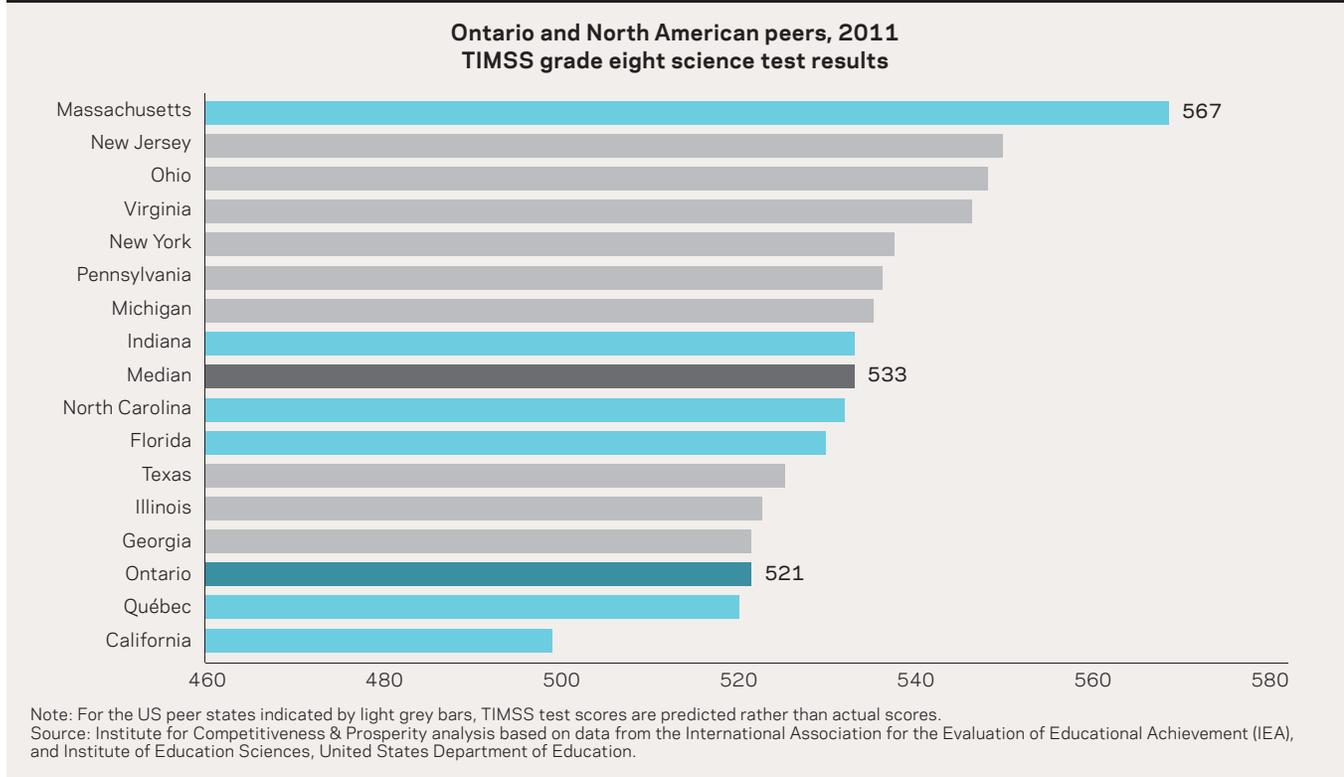
These projected trends are definitely favourable for Canada and Ontario. Occupations in health and natural science show high wages, which are a result of workers' specialized skills and high education levels. Having a higher proportion of the population in these occupations means higher average incomes. Moreover, these occupations are connected to high value added, innovative, and knowledge-based industries, which contribute to overall economic progress.

However, Ontario's education system is not completely aligned with these trends. Secondary students today are not improving in math and basic science, and they are significantly worse than their counterparts in the US peer states. This means today's students entering the job market in the next decade might not be at the highest level of competency for the tasks required by science- and math-based occupations. With North American peers surpassing Ontario in student performance in math and science, the province also loses the ability to adapt to employment trends and to continue to attract businesses, losing overall competitiveness.

### Ontario students' performance in science and math deteriorated in the last decade

Trends in International Mathematics and Science Study (TIMSS) is a worldwide research project, which takes place every four years and

**Exhibit 20 Ontario students rank lower than most North American peers in science**



provides data over time about students' ability to meet internationally agreed upon science and math curriculum standards. The tests are designed by the International Study Center at Boston College and the fifth cycle was administered in 2011 to a random selection of eighth graders in 45 countries. TIMSS science and math results show that Ontario students are lacking the necessary skills to match the occupations that will be available in the next decade.

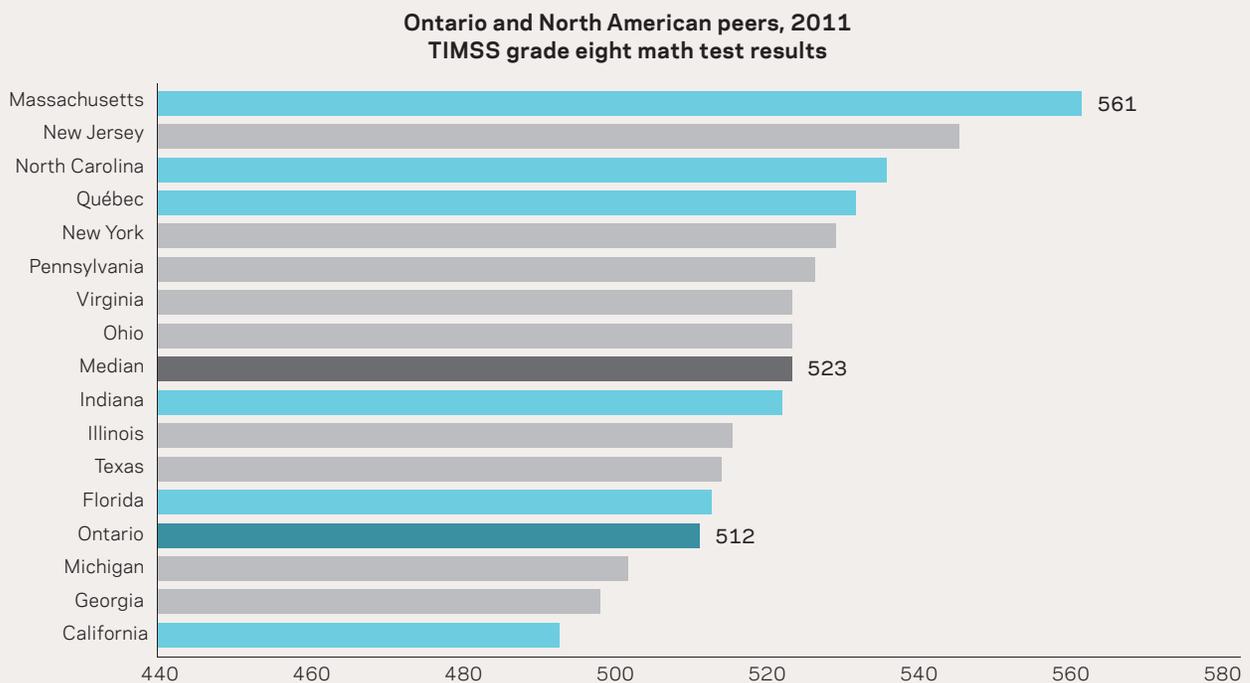
Ontario fared well on questions checking reasoning skills, which test students' ability to handle unfamiliar situations in complex contexts, but performed relatively poorly on questions testing knowledge and application. On average, Ontario students scored 521 points in science, which is 12 points below the median, with relative strength in biology and earth science, and weaker performance in chemistry. In the science category of the TIMSS, Ontario ranked well relative to many

international regions, but performed poorly when compared to its North American peers (Exhibit 20).<sup>27</sup> The score gap in science between Ontario and its leading North American peer, Massachusetts, was 46 points. Moreover, California was the only peer that Ontario outscored by a statistically significant margin.

It is also crucial to examine students' quantitative skills, which are necessary for many of the occupations projected to be in high demand. In 2011, the average achievement of eighth graders in math was 512, 11 points below the median, and while Ontario performed relatively better in data and chance, algebra appears to be an area of concern. Similar to the results in science, fewer students performed well in knowledge and application problems relative to reasoning problems. Ontario lags the leading North American peer by 49 points (Exhibit 21). Even though the results of math tests might be limited in scope, evidence so far raises

27 The TIMSS test was not administered in all US peer states. Only five out of the fourteen US peers participated in the test: California, Florida, Indiana, Massachusetts, and North Carolina. For the remaining nine states, the TIMSS results are predicted rather than actual scores. These predicted scores are from the U.S. National Center for Education Statistics (NCES) using their National Assessment of Education Progress (NAEP). Despite the similarities between TIMSS and NAEP, the predicted results should not be interpreted as actual scores. According to NCES NAEP-TIMSS linking study, there are differences in exclusion rates and test samples, but using three different statistical inference methods the test score predictions were similar. For more details, see National Center for Education Statistics, *U.S. States in a Global Context: Results from the 2011 NAEP-TIMSS Linking Study* (NCES 2013-460), Institute of Education Sciences, U.S. Department of Education, Washington, D.C., 2013.

**Exhibit 21 Ontario students underperform in math compared to North American peers**



Note: For the US peer states indicated by light grey bars, TIMSS test scores are predicted rather than actual scores. Source: Institute for Competitiveness & Prosperity analysis based on data from the International Association for the Evaluation of Educational Achievement (IEA), and Institute of Education Sciences, United States Department of Education.

doubts about the ability of the educational system to provide students with a comprehensive and high quality math curriculum at the secondary school level.

In addition to the average score achieved in each region, TIMSS also provides useful information about the distribution of scores. TIMSS categorizes students' results into four levels of achievement: advanced, high, intermediate, and low. The high percentage of students reaching the low level in Ontario and in most peer states indicates that many jurisdictions are able to educate almost all of their eighth grade students to a basic level of science and math achievement. The gap between Ontario and the peers increases at each benchmark. While Ontario is on par with its peers at the low level, and slightly below the median at the intermediate benchmark, the gap increases significantly at the high and advanced levels.

In Ontario, only 6 percent of eighth grade students reached the advanced level in science, versus a median of 13 percent and 24 percent in

Massachusetts. The gap was slightly smaller in math, with 4 percent of Ontarians reaching the advanced level, versus a median of 8 percent and 19 percent in the case of the top performer, Massachusetts. Clearly, the province has some room to improve, particularly with regards to students achieving advanced skills.

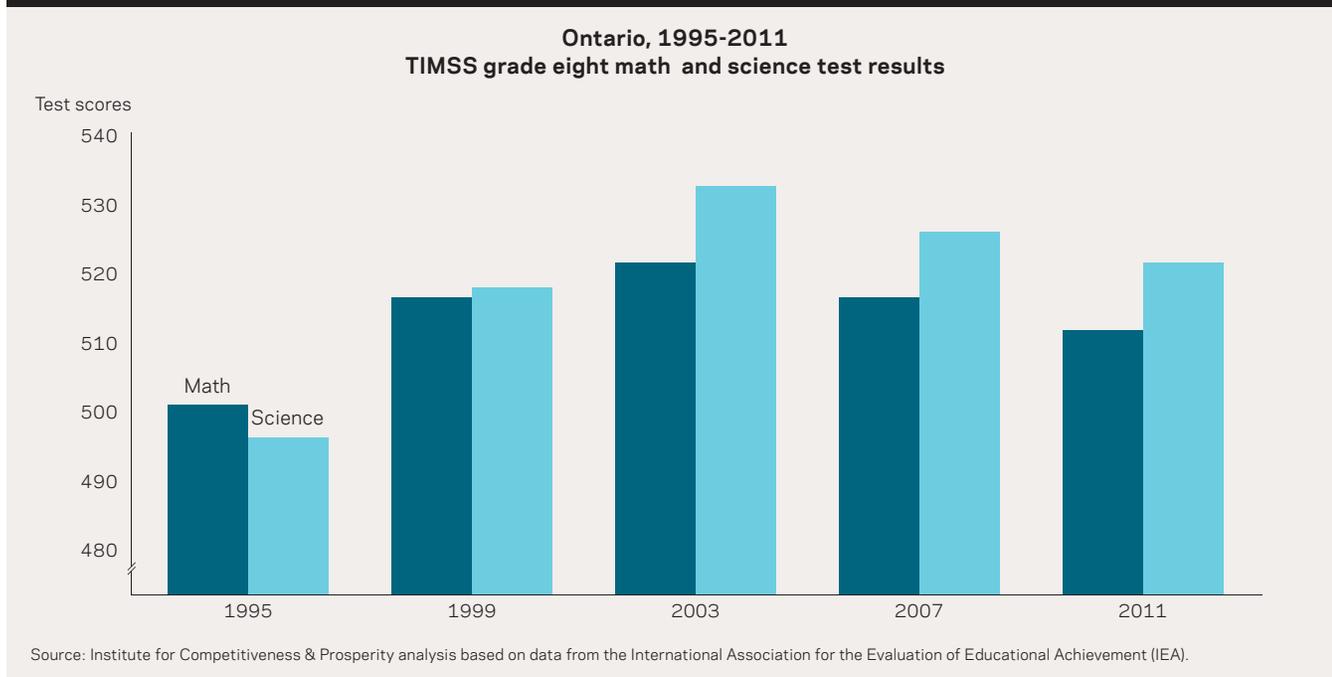
Particular attention should also be paid to Ontario's performance over time. Since the test was first administered in 1995, Ontario's average score has increased by 25 points in science, and by 11 points in math. Yet these numbers mask the decline in overall performance after 2003 (Exhibit 22). In the two most recent test cycles conducted by TIMSS, the average score in Ontario has declined steadily from the high levels reached in 2003; the science and math scores decreased by 11 and 9 points, respectively.

Findings from an additional test, PISA, which is conducted by the OECD, provide further evidence to support conclusions drawn from the TIMSS results. Both TIMSS and

PISA assess students' skills in math and science, yet each was designed to serve a different purpose. While TIMSS is a curriculum-based test evaluating the skills and knowledge taught in schools to students at the average ages of 13-14, PISA assesses whether 15 year old students can apply what they have learned in math and science to solve real-world problems.

PISA ranks Ontario students among the top in key subject areas, but there has been a noticeable decline over the years in both math and science performance. The average score in Ontario remains well above the OECD average in math, but since 2003, the performance of 15 year olds has declined from a high of 530 in 2003 to 514 in 2012. In science, Ontario students perform at the Canadian average, and well above the OECD average. The average score in science achievement among Ontario students increased from 2003 to 2009, but failed to improve in 2012 and remained at a similar level.

**Exhibit 22 Ontario's eighth graders' performance in math and science has deteriorated since 2003**



Examining both TIMSS and PISA results demonstrate that while our education system remains among the best in the world, there is strong evidence of weakening performance in the most recent decade. As the secondary education system plays a key role in providing students with a solid base upon which further skills and knowledge are built, students graduating from high school without strong basic skills may encounter difficulty in succeeding in the postsecondary education system and later in the labour market.

### Students' attitudes toward math and science are not the problem

Students' attitudes toward learning math and science are highly important, as a large volume of research shows that students with more positive attitudes achieve higher results.<sup>28</sup> According to TIMSS results, the percentage of students reported to like science in Ontario was at the median level, while in math, 26 percent of students reported to enjoy learning math, 9 percentage points above the median.<sup>29</sup> Furthermore, Ontario students place a high value on math and science and believe learning leads to better outcomes in the future. Ontario ranks in the middle of the pack in percentage of students who value science compared to peer states, and ranks second in terms of percentage of students who find math to be important and useful. In addition, Ontario ranked first in percentage of students who felt confident regarding their abilities to learn math. However, on average, Ontario students reported lower levels of self-confidence and felt less secure about their abilities in science than students in peer states.

Another important factor contributing to students' success in math is time spent in class learning these subjects.<sup>30</sup> Compared to six other North American peers, Ontario's

181 hours per year dedicated to teaching math in eighth grade ranked second to North Carolina, and was significantly above the median of 154 hours per week in 2011. Perhaps the explanation for Ontario's decreasing learning outcomes is not the quantity of instruction, but in the quality of instruction.

Math and science knowledge among teachers is significantly lower in Ontario than in its peers. While almost all of Ontario's teachers are equipped with at least a bachelor's degree, few of them specialize in either math or science. Only 19 percent of students were taught math by a teacher with a major in math, compared to a median of 65 percent. The vast majority of students in Ontario, 81 percent, were taught by teachers holding postsecondary degrees with a major in other subjects.<sup>31</sup> Similarly, in science, only 44 percent of students learned from a teacher who majored in science, while the median was 82 percent. More than half of eighth graders in Ontario learned science from a teacher who majored in a different subject.<sup>32</sup> Developing a quality curriculum depends upon the work of skilled teachers who have a deep understanding of the content they teach and understanding of how students learn. The fact that such high percentages of Ontario's teachers lack sound mathematical or scientific subject knowledge and teaching expertise is concerning.

## Ontario must reset its education priorities to address future labour market conditions

Although the province must be commended for increasing accessibility and reducing dropout rates, the government needs to shift its focus to quality education in specific areas. Math and science teaching for secondary students must be reviewed. A study by the Ontario Institute for Studies in Education (OISE) of the University of Toronto shows that most educators blame the poor performance of students on changes to the math and science curriculum that were introduced by the Bill 74 Education Accountability Act (2000).<sup>33</sup> According to the teachers, the changes made the curriculum too difficult for students, reducing their performance and understanding of the subjects. Certainly, the education system must demand high standards from students and remain updated given advancements in science and math. However, these objectives must be balanced with the students' ability to grasp and retain the curriculum contents. Coupled with the Task Force's findings regarding teacher

28 John Hattie, *Visible Learning: A Synthesis of over 800 Meta-Analyses relating to Achievement*, London: Routledge, 2009; Adele Eskeles Gottfried, George A. Marcoulides, Allen W. Gottfried, and Pamela H. Oliver, "Longitudinal pathways from math intrinsic motivation and achievement to math course accomplishments and educational attainment", *Journal of Research on Educational Effectiveness*, 2013, Vol. 6, pp. 68-92.

29 Ontario was compared to just six other North American peers, because data were unavailable.

30 Comparisons can be done only for math, because data are unavailable.

31 Ina VS Mullis, Michael O. Martin, Pierre Foy, and Alka Arora, *TIMSS 2011 International Results in Mathematics*, International Association for the Evaluation of Educational Achievement, Herengracht 487, Amsterdam, 1017 BT, The Netherlands, 2012.

32 Michael O. Martin, Ina VS Mullis, Pierre Foy, and Gabrielle M. Stanco, *TIMSS 2011 International Results in Science*, International Association for the Evaluation of Educational Achievement, Herengracht 487, Amsterdam, 1017 BT, The Netherlands, 2012.

33 Stephen E. Anderson, and Ben Jaafer Sonia, *Policy Trends in Ontario Education 1990-2003*, ICEC Working Paper #1, Ontario Institute for Studies in Education, 2006.

credentials, these claims about the secondary school system need to be addressed with future labour market conditions in mind.

Ontario's secondary education must take an overarching approach to teaching math and science. It is likely that in the future more occupations will require quantitative knowledge, not just those directly related to math and science. The deficiencies in secondary education for math and science may affect the future postsecondary system. Without the basic foundation, students might be discouraged to enrol in programs and courses that advance crucial quantitative methods. These courses and programs are not confined to the traditional engineering, computer science, and life sciences programs. Programs and courses in arts and humanities are increasingly applying methods from science-based disciplines. If Ontario aspires to widen its presence in knowledge-based and innovative industries, its education system must enhance the teaching of quantitative disciplines. This will help retain talented individuals in the province, as well as attract new businesses using a pool of well-qualified individuals.

**For the past two decades, the Ontario government has emphasized accessibility to the secondary and postsecondary systems. The efforts have yielded important results, placing Ontario among the best performing jurisdictions in the world in education attainment. Now the focus must shift. Employment projections point to greater demand and growth in occupations requiring specific science and math knowledge. Yet the performance of Ontario's secondary students has been declining. Without a qualified pool of workers with specialized knowledge, Ontario risks losing competitiveness in attracting knowledge-based, innovative, and high value added businesses. Realigning school curriculums to future labour market conditions is imperative to ensure productivity growth in the future.**

### Areas for Further Study

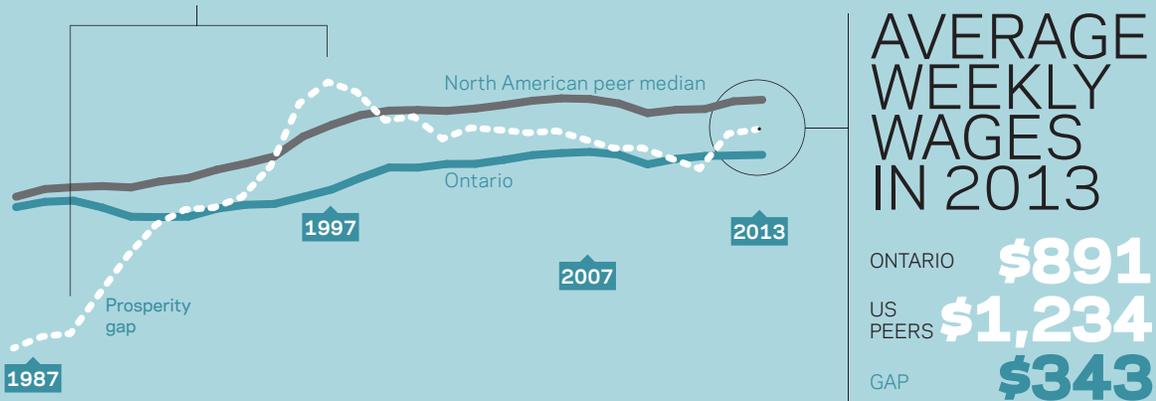
How should the secondary curriculum be designed to facilitate math and science learning?

Should the qualifications for secondary school teachers be reviewed to guarantee they have more postsecondary education in math and science?

How can the curriculum be reviewed so that all disciplines, not just math and science, help improve Ontario's student numeracy?

# ONTARIO'S PROSPERITY GAP: A SNAPSHOT

THE **PROSPERITY GAP** INCREASED SUBSTANTIALLY DURING THE 1990s



**6 / 17**

Since 1998, **only 6 out of 17 sectors** saw faster wage growth in Ontario than in the US peers

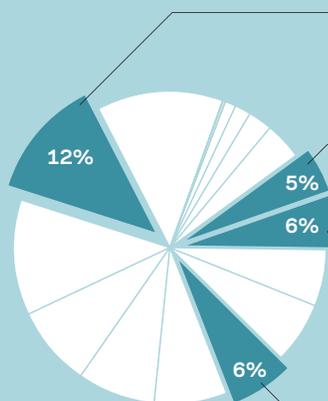
Between 2002 and 2013, the value of manufacturing exports declined by **29.8 percent** in Ontario, but grew **33.4 percent** in US peers

↓ **29.9%**  
↑ **33.4%**

## ONTARIO INDUSTRY PROFILE 2013



**HEALTH AND NATURAL AND APPLIED SCIENCES ARE PROJECTED TO HAVE THE LARGEST EMPLOYMENT GROWTH BETWEEN 2013 AND 2022, BUT ONTARIO'S TEST SCORES IN MATH AND SCIENCE ARE DECLINING**



### Manufacturing

Employment in advanced manufacturing  
Ontario: 35% of all mfg. employment  
US peers: 42% of all mfg. employment

### Transportation & warehousing

| Core transportation | GROWTH IN SHARE OF EMPLOYMENT |             |
|---------------------|-------------------------------|-------------|
|                     | 1991 - 1998                   | 1999 - 2013 |
| Ontario             | -2.8%                         | 5.0%        |
| US peers            | 11.2%                         | -4.0%       |

### Construction

| Core construction | GROWTH IN SHARE OF EMPLOYMENT |             |
|-------------------|-------------------------------|-------------|
|                   | 1991 - 1998                   | 1999 - 2013 |
| Ontario           | -18.9%                        | 38.8%       |
| US peers          | 6.5%                          | -13.3%      |

### Administrative & support services

Business support industries larger in US peers  
Ontario: 2.6% of total employment  
US peers: 4.8% of total employment



# Firm growth plays an important role in Ontario's prosperity

Firm growth - or scaling up - is a common goal shared among businesses and plays an important role in the province's competitiveness. Forming, growing, and sustaining large, global businesses are essential activities for building strong clusters and achieving higher productivity. Public policy should work to remove barriers to growth experienced by Ontario businesses and encourage firms to scale up rather than stay small.

**BUSINESS GROWTH INDICATES** the general conditions of business environment and economic progress of a region. Ontario's total number of businesses grew 39 percent from 0.2 million establishments in 1991 to 0.3 million in 2012. As a whole, this implies that Ontario has a sound business environment, creating and bringing more businesses into the region over the past twenty-two years. However, Ontario grew more slowly than the US peers.

### **Business growth is slower in Ontario than in US peer states**

Ontario achieved an annual growth rate of only 2 percent in total establishment count, versus 6 percent in US peers. Significantly, 30 percent of Ontario's industries experienced a decline in the total number of businesses, while in the US peers 23 percent showed the same trend. Just as for employment, the majority of industries that declined in establishment count in Ontario and the peers belonged to the manufacturing sector. Manufacturing industries accounted for 80 percent of the loss in the number of businesses in the peer states and 50 percent in Ontario. This was expected because of the shift to offshoring in North America starting in the 1990s. Ontario's retail trade, and transportation and warehousing sectors also contributed to this loss, a phenomenon that did not occur in the US peers.

Businesses in local service industries and the computer systems design and related services industry sprang up more quickly than businesses in any other industry from 1991 to 2012. As a result of population growth in both Ontario and the US peers, health care services, residential construction services, and real estate agents services also experienced high growth in new establishments over the same period. Moreover, the

number of establishments in the telecommunication subsector increased faster in Ontario than in the US peers.

**The US peers scaled up in more high value added industries than Ontario** Firm growth is important to a well-functioning economy. Large firms pay higher wages for more educated workers, contribute more to GDP, account for most R&D spending, and generate the most export value proportionally than small firms.<sup>34</sup> Hence, it is worthwhile to examine whether industries in Ontario are scaling up – increasing the number of large firms and the share of large firms in the economy – or scaling down.<sup>35</sup>

Over the past two decades, the US peers have seen faster growth in the total number of businesses, which has resulted in a significant increase in the number of large firms both in absolute and relative terms. In 1991, Ontario had a total of 898 large establishments versus an average of 709 in the US peers. This equates to 86 large firms per million residents in Ontario versus 61 in the US peers. However, since then, Ontario has increasingly lost its scale advantage as the US peers have dramatically increased the number of large firms. By 2012, Ontario had 75 large firms per million inhabitants, while the US peers had 112 – almost double the level two decades earlier. This means that although the proportion of firms classified as large is similar in both Ontario and the US peers (around 0.3 percent in 2012), closer examination reveals that Ontario is scaling down while the US peers are scaling up.

Even though both Ontario and the peers scaled up in many industries, the US peers did so in more high value added industries. For example, both Ontario and the US peers had ten manufacturing industries that scaled up between 1991 and 2012. Among those manufacturing industries,

the US peers saw three advanced manufacturing industries scale up. In contrast, Ontario saw none. This explains why the US peers had a higher proportion of manufacturing that is classified as advanced than Ontario does. Large firms tend to have a relative innovation advantage in industries that are capital-intensive and concentrated, which is the case for the manufacturing sector.<sup>36</sup> Therefore, innovation would be less likely to occur in Ontario than in US peers in this sector, which is concerning.

### **SMEs in Ontario are reluctant to innovate**

The most unfortunate side effect of Ontario's scale problem is the negative impact on business innovation. Business innovation varies depending on the environment in which the business operates. Businesses operating in globally competitive industries are more likely to innovate, as they need to adapt more readily to market demand to remain profitable. This makes them more likely to introduce new products and operational methods to increase productivity and gain market share. This aspect of innovation is what drives prosperity and overall economic strength through productivity improvements.

34 Institute for Competitiveness & Prosperity, Working Paper 15, *Small business, entrepreneurship, and innovation*, February 2012, pp. 17-28.

35 As a result of a lack of available data, the Task Force used establishment count to infer the number of firms in both Ontario and the US peers. Industry Canada defines firms with 1-4 employees as micro, firms with 5-99 employees as small, firms with 100-499 employees as medium, and firms with over 500 employees as large sized firms.

36 Zoltan J. Acs and David B. Audretsch, "Innovation, Market Structure, and Firm Size," *The Review of Economics and Statistics*, November 1987, p. 567.

Four main types of business innovations are defined by the OECD's *Oslo Manual* for collecting and interpreting innovation data. *Product innovations* involve the introduction of a new or significantly improved good or service. *Process innovations* improve how products are produced and/or delivered in order to reduce cost or increase convenience. These two types are the most common and recognized. *Organizational innovations* comprise the introduction of new or improved human capital management methods. *Market innovations* can include entering a new market or introducing a new marketing strategy or concept.<sup>37</sup> This classification is used by Statistics Canada to compare innovation levels between industries and between business establishment sizes.

The most common type of innovation for all businesses is product innovation (Exhibit 23). Nearly half of all businesses and 30.2 percent of SMEs introduced a product innovation between 2009 and 2012 in Ontario. Organizational innovations are the

second most common type for all enterprises, followed by process and marketing innovations. For SMEs, the second most common type of innovation is marketing, with the others roughly equal.

What is most noteworthy, though, is that SMEs are much less likely to introduce any type of innovation than the average for all businesses in Ontario. This could be due to several factors. Smaller businesses may only operate in local markets and therefore face less competitive pressure. Smaller businesses may also lack the capital and cash flow to spend on R&D or be too risk averse to introduce disruptive innovations to their organization.<sup>38</sup>

Many aspects of innovation are highly scale-sensitive. Because of the relatively fixed costs of R&D investment and marketing or branding, large firms benefit significantly from economies of scale and being able to sell a greater volume of their product or service. Scale reduces the unit cost of innovation by a wide margin, enticing large firms to innovate significantly more than SMEs.

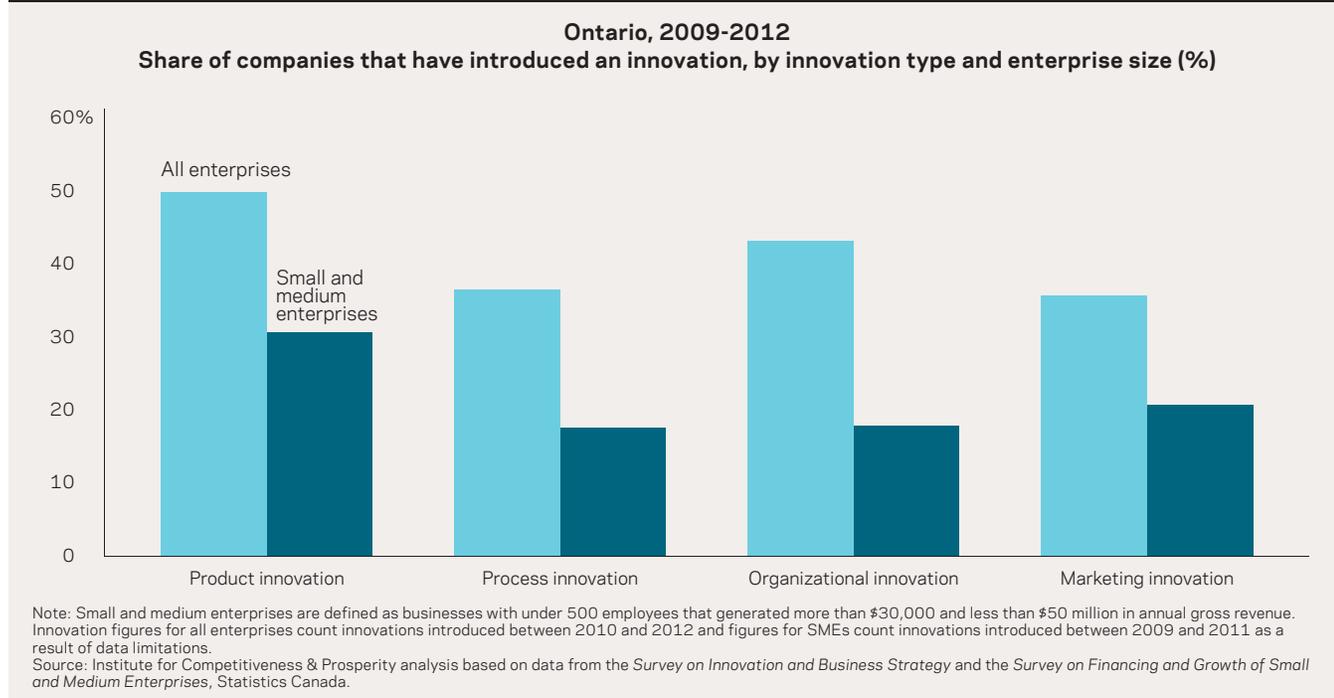
Business attitudes play a major role as well. According to Statistics Canada's *Survey on Financing and Growth of Small and Medium Enterprises*, the most common reason Ontario SMEs indicated for not introducing an innovation is that their "business doesn't need to innovate/innovation is not part of the business plan." Almost 40 percent of businesses indicated this. Approximately 30 percent also indicated the "market doesn't require new products/processes" as their reason for not introducing an innovation. Conversely, only 4.4 percent indicated "lack of funds to carry out innovation projects" as their reason for not innovating.

This indicates that SMEs face different market conditions than large businesses and have different capacities for innovation. While growing businesses into large firms

37 OECD and Eurostat, *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, Third Edition, 2005.

38 Institute for Competitiveness & Prosperity, *Small business, entrepreneurship, and innovation*, Working Paper 15, February 2012.

Exhibit 23 Small and medium enterprises are less likely to innovate



is not guaranteed to result in higher levels of innovation overall, it is clear that large businesses contribute disproportionately to the introduction of new products and processes in the province. It is expected that SMEs will be more motivated to innovate – and grow – if they experience more market pressure.

### Canada's top performing companies are small in global markets

Global companies are critical to a regional economy as they tend to be leaders in innovation and the industries in which they operate. As the destination for headquarters of the majority of global Canadian companies, Ontario's prosperity is tightly associated with their performance.

Measured by market capitalization, which is a proxy for the market's expectation of a company's present and future worth, Canada had the highest number of global top 500 companies on a per capita basis between 2006 and 2013.<sup>39</sup> Currently, twenty Canadian companies rank among the top 500 list, a drop from the highest level of twenty-seven in 2008. However, these companies are at the smaller end of the list; Canada's largest company now ranks 72nd out of the 500. Canadian companies on this list are predominantly banks or in the oil, gas, and consumable fuels industry.

More disappointing, however, is that Canada has the lowest average market value per company among all the peer countries (Exhibit 24). This illustrates that Canada's giant companies on average are viewed as less valuable in global terms than international peers.

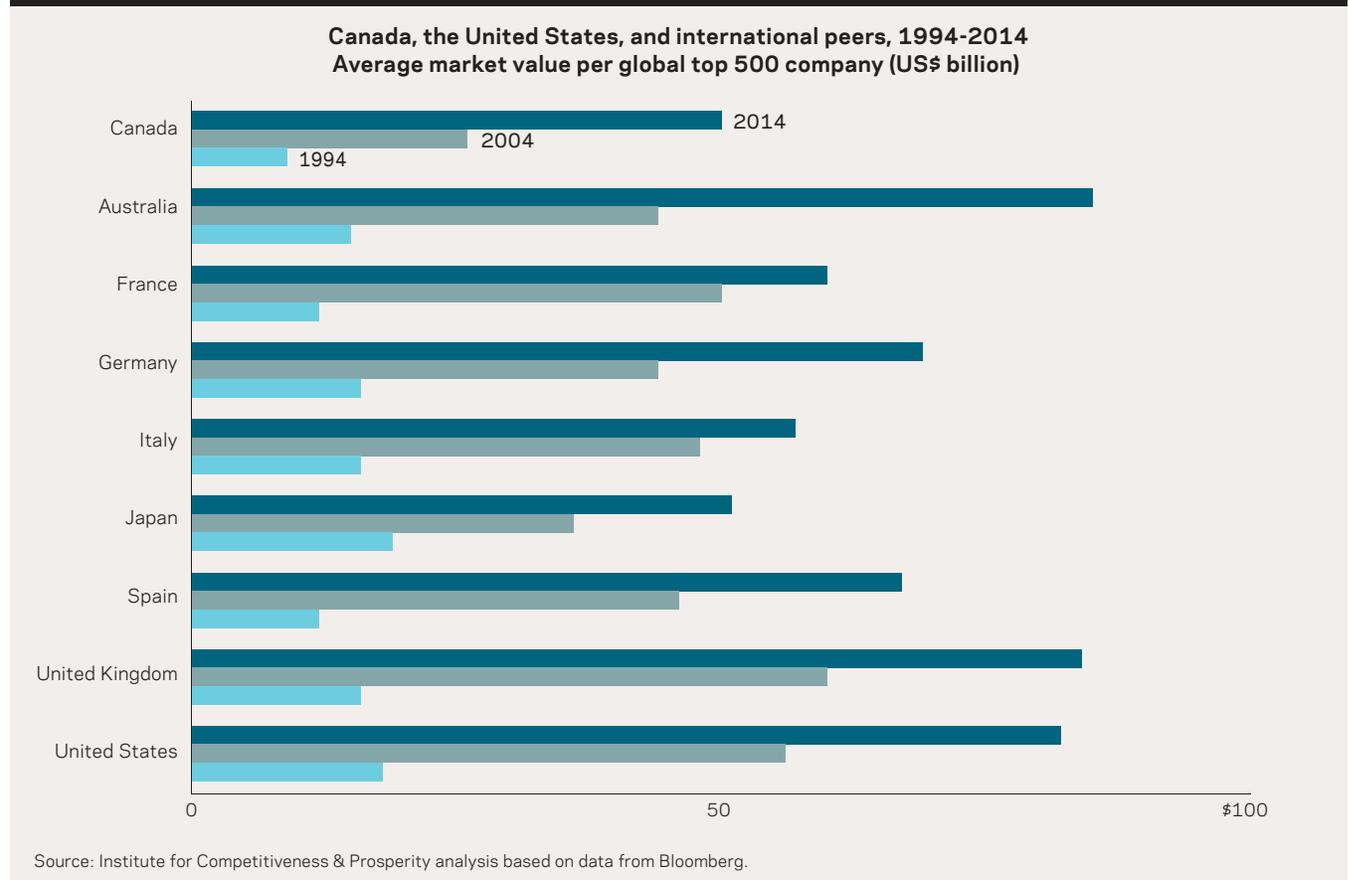
### Public policy should encourage firm growth

Ontario's competitiveness and prosperity depend on having a significant number of large and high-growth firms. Small firms are less likely to innovate and less likely to spend on R&D, despite the many tax incentives aimed at them to do so. Public policy must work to encourage firm growth.

The OECD's Entrepreneurship Indicators Programme (EIP) points to six factors that contribute to industry and firm growth. These include access to finance, creation and diffusion of knowledge, entrepreneurial capabilities, regulatory framework, market conditions, and entrepreneurial

<sup>39</sup> Market capitalization (or market cap) is the market value of a company's issued share capital. It is equal to the number of shares multiplied by the current price of those shares on the stock market.

Exhibit 24 Canada's global companies trail international peers in market value



culture. Although starting a business in Canada and Ontario is easier than in most countries, growing a business is harder.

The Doing Business Project from the World Bank Group looks at domestic, small- and medium-sized companies and measures the regulations applying to them throughout their life cycle. The project regularly provides measures of business regulations, as well as their enforcement across 189 countries and selected cities at the subnational and regional level. The World Bank reports that the ease of doing business has worsened in Canada relative to other countries in the past two years.<sup>40</sup> This is an undesirable trend for Canada, especially for Ontario where most businesses in Canada are headquartered. Among its ten indicators, Canada performed better than most countries in starting a business, resolving insolvency, getting credit, protecting minority investors, and paying taxes, but performed poorly in trading across borders, registering property, enforcing contracts, dealing with construction permits, and

getting electricity (Exhibit 25).<sup>41</sup> Once again, the report cautions that Canada has a good regulatory environment for starting businesses, but not for growing them. This is especially the case for businesses in goods-producing industries, whose expansion often requires getting electricity and dealing with construction permits.

#### Introduce smart policies to help firms grow

Ontario needs to adopt smart policies that stimulate business and firm growth, such as facilitating trade across borders, enforcing contracts, dealing with construction permits, and getting electricity, according to the World Bank report.<sup>42</sup> Such policies should focus on the following aspects:

- **Reduce the time to obtain necessary licences and permits when applying for construction permits.** It takes 249 days for a business to get licences, permits, and utility connections in Canada when building a warehouse, but only 149 days on average in OECD countries. The saved 100 days have

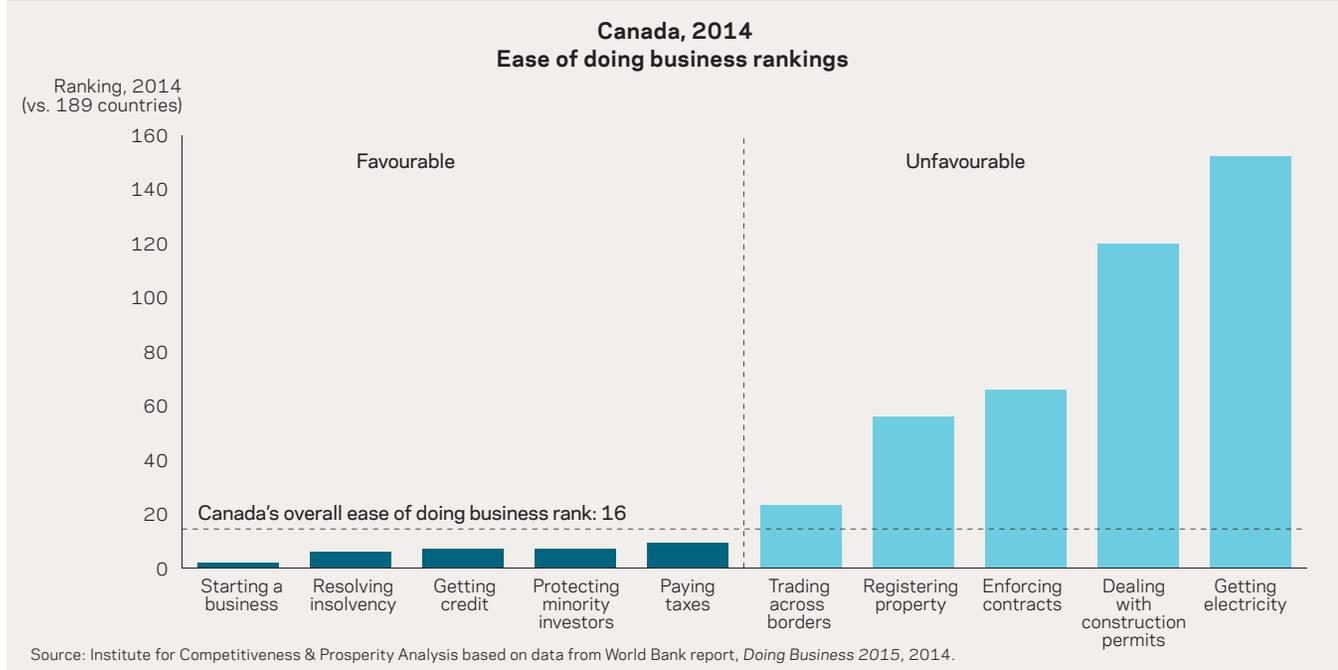
enormous economic value for a company's cash flow management and operations, especially for companies seeking to expand their production lines to export. The Task Force recommends policymakers, and municipal authorities in particular, revisit their procedures for approving site plans, in order to

40 World Bank Group, *Doing Business 2015: Going Beyond Efficiency*, October 2014.

41 Starting a business refers to measures on the time and cost to launch a new business. Resolving insolvency refers to the time and cost to resolve bankruptcies. Getting credit refers to measures on credit information sharing and the legal rights of borrowers and lenders. Protecting minority investors refers to three dimensions of investor protection: transparency of transactions, liability for self-dealing, shareholders' ability to sue officers and directors for misconduct. Paying taxes shows the tax that a medium-size company must pay or withhold in a given year, as well as measures of administrative burden in paying taxes. Trading across borders refers to the costs and procedures involved in importing and exporting a standardized shipment of goods. Registering property refers to the ease with which businesses can secure rights to property. Enforcing contracts refers to the ease or difficulty of enforcing commercial contracts. Dealing with construction permits refers to the procedures, time, and costs to build a warehouse, including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections. Getting electricity measures the requirements for a business to obtain a permanent electricity connection for a newly constructed warehouse.

42 World Bank Group, *Doing Business 2015: Going Beyond Efficiency*, October 2014.

Exhibit 25 Canada has a good regulatory environment for starting businesses, but not for growing them



propel business growth and generate more economic value for the region.

- **Reduce processing time and cost to get electricity.** It takes 142 days and 131.8 percent of per capita gross national income for a business owner to obtain a permanent electrical connection for a newly built warehouse in Ontario, versus only 77 days and 73.2 percent on average for businesses in OECD countries. Electricity is indispensable in production and the long waiting period and high costs of getting electricity are undoubtedly limiting firm growth. The Task Force strongly recommends that government and policymakers deregulate the process of getting electricity.
- **Reduce the cost of importing and exporting in Canada.** While Canada has built a good network of trading partners through free trade agreements, it has long neglected the cost of each shipment per container. According to the World Bank Report, even though it is easier to export and import in Canada than in most other countries, the average cost to import or export per container — including fees for documents preparation, customs clearance and technical control, ports and terminal handling, and inland transportation and handling — is around \$1,680 US dollars compared to an average of \$1,080 in OECD countries. The higher cost of exporting/importing lowers businesses' profits, discouraging them from exporting or expanding into international markets.

- **Reduce the time and cost to enforce commercial contracts.** In Canada, contract enforcement costs business owners around 570 days and 36 procedures to receive payment once a business dispute happens, versus 539 days and 31 procedures on average in OECD countries. The ability to enforce contracts within a shorter time frame with lower costs would enable businesses to minimize losses and reinvest or re-establish a new business.

In sum, The Task Force recommends that governments adopt smart policies and reduce the bureaucratic burden not only to start businesses, but also for companies to build their warehouses, expand production lines, and export. This will bring enormous economic value and prosperity to Ontario.

#### Encourage competition by opening industries up to trade

Fostering a competitive environment is crucial in order to narrow Ontario's prosperity gap. Successive panels have noted that the drive to innovate and enhance productivity is underpinned by high levels of foreign and domestic competition.<sup>43</sup> Without open markets, Ontario will likely continue to experience an innovation and productivity gap relative to its peers abroad.

Canada is laudably working to increase competition with the introduction of the Comprehensive Economic and Trade Agreement (CETA) with the European Union and continued interest in the Trans-Pacific Partnership. Canada has ratified free trade agreements with 11 countries (including, most recently, South Korea) and is currently in discussions with 60 others.<sup>44</sup> According to data from the *Survey of Innovation and Business Strategy*, the share of Ontario businesses that had a new competitor enter their enterprise's main market

increased from 27.4 percent in 2009 to 37.5 percent in 2012.

The Task Force recommends that policymakers continue to work to open Canadian markets to trade and competition. Policy efforts to spur competition are key to creating the environment in which innovation and productive improvements thrive. The Wilson Panel on Competition Policy observed that various foreign investment and takeover restrictions in Canada effectively protect certain industries, such as broadcasting, mining, and air travel.<sup>45</sup> Canada should work to reduce restrictions on foreign investment and takeovers to allow new market entrants and facilitate business growth. It should also continue to work with governments in emerging economies — a growing part of Ontario's trade — to establish free trade agreements. This will encourage firms to become more productive in order to compete with new market entrants and may also lead to innovation spillovers through the introduction of new technologies from foreign companies.<sup>46</sup>

#### Refocus Ontario's and Canada's tax policies to promote growth

The Task Force echoes its repeated recommendation that tax policy should encourage growth. The current small business tax credit discourages growth by creating a tax wall where businesses jump to a higher marginal effective tax rate when they grow. This could have

43 Thomas Jenkins *et al.*, *Innovation Canada: A Call to Action*, Review of Federal Support to Research and Development – Expert Panel Report, Government of Canada, p. 2-9, October 2011; Expert Panel on Business Innovation, *Innovation and Business Strategy: Why Canada Falls Short*, Council of Canadian Academies, p. 7, 2009.

44 Foreign Affairs, Trade and Development Canada, "Canada's Free Trade Agreements," <http://www.international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/fta-ale.aspx?lang=eng>.

45 Competition Policy Review Panel, *Compete to Win, Final Report*, Government of Canada, June 2008.

46 Richard Harris, *Canada's R&D Deficit – And How to Fix It: Removing the Roadblocks*, C.D. Howe Institute Commentary, No. 211, May 2005.

many negative behavioural effects, such as the breakup of firms with growth potential into smaller, less productive firms.<sup>47</sup> While encouraging firm growth is a complex task and it is unclear what policies can fully address this issue in Ontario, the small business tax credit has clear distortionary effects that are harmful to the province's growth.

The Task Force recommends that Ontario phase out the small business tax deduction to coincide with the general corporate tax rate. This would remove the greatest incentive for businesses to stay small and instead encourage growth. The savings over time should be put toward creating a new tax policy incentivizing growth. The Task Force proposes that for any tax year when a firm's taxable income exceeds its previous highest taxable income, the additional taxable income would be tax free. This would mean that in every year for every company, income growth would be tax free, creating a big incentive for growth. This would keep corporate tax revenue stable and predictable, while encouraging firms to grow their business each year.

Public policy should aim to remove all barriers to growth and competition. This includes opening our borders and eliminating tax incentives that encourage smallness. This has been a pressing recommendation in much of the Task Force's work, but seeing that firm growth is one of the greatest contributors to innovation and, in turn, productivity, this goal is all the more important.

**Stimulating firm growth has been a pervasive recommendation from the Task Force, as lack of firm growth is one of the main contributors to the prosperity gap. Despite Ontario's many economic strengths, it continues to have fewer large, high-growth corporations compared to its peers and a more challenging regulatory environment in which to grow businesses. Public policy must strive to remove barriers to growth created by flawed tax policies and unnecessary bureaucracy, so that businesses have the capacity to become innovative global players.**

### Areas for Further Study

What factors, other than regulatory issues, inhibit growth for Ontario SMEs?

How do Ontario's startups and entrepreneurs perform compared to the US peers?

What policies can ease the process of exporting for both SMEs and large firms in Ontario?

<sup>47</sup> Institute for Competitiveness & Prosperity, *Taxing for growth: A close look at tax policy in Ontario*, Working Paper 18, October 2013; Jack Mintz and Duanjie Chen, "Small Business Taxation: Revamping Incentives to Encourage Growth," *University of Calgary School of Public Policy Research Papers*, 2011, Vol. 4, Issue 7.





# Innovation is key to competing in the modern global economy

Innovation plays a vital role in every developed jurisdiction's prosperity, and Ontario is no exception. High levels of innovation are associated with the development of new technology and production methods and are critical to boosting the region's competitiveness. Ontario has historically lagged its peers on many key measures of innovation, such as research and development expenditure, patent output, and commercialization of inventions. Tackling this shortcoming has been a conundrum for business analysts and policymakers alike, but is nevertheless a priority if Ontario is to close the prosperity gap with its peers.

**INNOVATION IS NECESSARY** for economic progress. Lack of innovation has been a primary concern for the Task Force for the thirteen years it has been analyzing and reporting on the province's economy. Most of the Task Force's Annual Reports have ranked Ontario's innovation performance against that of its peers in terms of patent output and spending on research and development (R&D), particularly within the business sector. On most measures, Ontario has ranked below the North American peer median for some time. Ontario's low levels of innovation and poor commercialization record, particularly in its traded clusters, are among the main drivers of the prosperity gap with its North American peers.<sup>48</sup>

Successive rankings elsewhere also show Ontario and Canada behind their main peers, and far behind the United States, in innovation and business competitiveness.<sup>49</sup> Many reports analyzing Ontario's and Canada's so-called innovation gap emerged as a result of these rankings.<sup>50</sup> These works have centred on the assertion that, to compete in the modern global economy, businesses must find ways of continuously improving their operations and consumer offerings. This requires innovation – the generation and diffusion of new products, processes, or services that create economic or social value.<sup>51</sup> This is essential to maintaining a competitive advantage for any business and for an economy as a whole.

The Task Force has identified three major areas where action is needed to improve Ontario's innovation capacity. The first is to raise business expenditure on research and development – a call advanced in countless reports by the Task Force and others. The second is to introduce policies that encourage the commercial development of

innovations and protect intellectual property. The third is to broaden our understanding of innovation and incorporate this into Ontario's education curriculum.

By addressing these three areas, the Task Force has looked beyond select indicators to boost the province's lacklustre innovation scores and identified the inputs and contextual factors necessary to create a world-class centre for innovation. Many policies have strived to do this, but have proven expensive and ineffective. The Task Force's recommendations have the potential to redirect government funds more effectively and generate the influential innovations the Ontario economy needs to prosper in the twenty-first century.

### **Raise Ontario business investment in research and development**

R&D is a key component of innovation activity for a region. The development of new products, services, and production processes plays a critical part in boosting productivity and economic output. R&D spending has significant socioeconomic returns in the form of higher productivity and economic growth, as well as in domestic and international spillovers.<sup>52</sup>

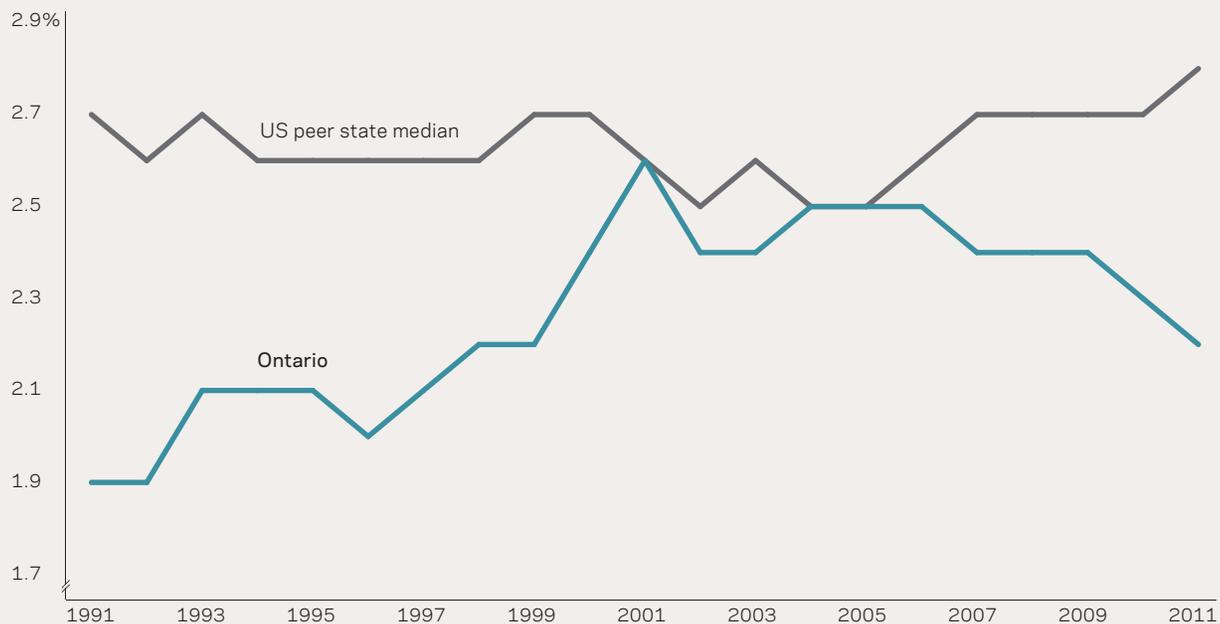
#### **Ontario businesses under invest in R&D**

Unfortunately, businesses in Ontario and Canada significantly lag their US peers in R&D expenditures.<sup>53</sup> This gap exists despite generous incentives from the federal and provincial governments for businesses to conduct R&D. Through initiatives such as the Scientific Research and Experimental Development (SR&ED) program, Canadian businesses can earn a refundable tax credit worth up to 35 percent of their R&D expenditures, along with additional

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- 48 Task Force on Competitiveness, Productivity and Economic Progress, Eleventh Annual Report, *A push for growth: The time is now*, November 2012.
- 49 Klaus Schwab, *The Global Competitiveness Report 2013-2014*, World Economic Forum, 2013.
- 50 See, for example, Don Drummond and Alistair Bentley, *The Productivity Puzzle: Why is the Canadian Record so Poor and What Can Be Done About It?* TD Economics, June 2010; Thomas Jenkins et al., *Innovation Canada: A Call to Action*, Review of Federal Support to Research and Development - Expert Panel Report, Government of Canada, October 2011; Jobs and Prosperity Council, *Advantage Ontario*, Government of Ontario, 2012.
- 51 Sorin Cohn and Bruce Good, *2012 Survey Findings: The State of Firm-Level Innovation in Canada*, The Conference Board of Canada, July 2013, p. 2.
- 52 David T. Coe and Elhanan Helpman, "International R&D Spillovers," *European Economic Review*, vol. 39, no. 5, 1995, pp 859-887; Leo Sveikauskas, *R&D and Productivity Growth: A Review of the Literature*, Working Paper 408, U.S. Bureau of Labor Statistics, September 2007.
- 53 Task Force on Competitiveness, Productivity and Economic Progress, Eleventh Annual Report, *A push for growth: The time is now*, November 2012.

**Exhibit 26 R&D spending has been lower in Ontario than US peers for most of the past two decades**

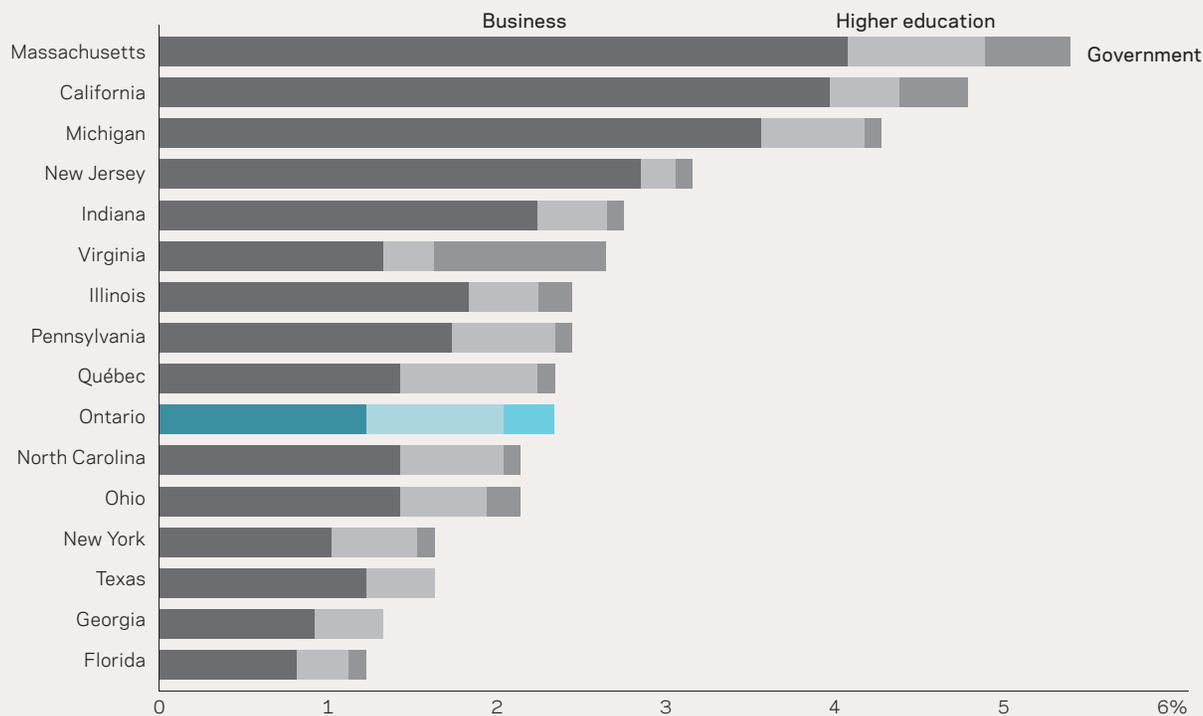
**Ontario and US peer state median, 1991-2011**  
**Total research and development (R&D) expenditure as a percentage of GDP (%)**



Note: Data for years 1992, 1994 and 1996 for the US were estimated because of data limitations.  
 Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, US Bureau of Economic Analysis and the Organisation for Economic Development and Cooperation (OECD).

**Exhibit 27 Ontario ranks tenth among North American peers in R&D expenditure**

**Ontario and North American peers, 2011**  
**Total research and development (R&D) expenditure as a proportion of GDP by performer (%)**



Note: R&D performed by private and non-profit organizations was excluded from the analysis as data were unavailable for select regions.  
 Source: Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada, US Bureau of Economic Analysis and the Organisation for Economic Development and Cooperation (OECD).

credits for hiring eligible R&D employees and matching credits from the provincial government in the case of Ontario. According to a report by the C.D. Howe Institute, Canada's effective subsidy rate (the proportion of the cost of R&D that is reduced by tax incentives) on R&D investments is approximately 30 percent – the third highest out of thirty-six countries ranked in the report and roughly three times that of the US rate.<sup>54</sup>

Ontario has not always underperformed in R&D. During the tech boom of the early 2000s when Ontario telecom companies like Nortel were at their peak, R&D expenditure caught up to that of the US peers after a period of much lower levels during the 1990s (Exhibit 26). Following the tech boom, Ontario's R&D spending briefly ebbed and then rose in the mid-2000s as Research in Motion (RIM) began to emerge. RIM (now Blackberry) continues to be the second largest corporate R&D spender in Canada, after Bombardier.<sup>55</sup> However, since the 2000s, Ontario's overall R&D expenditure has declined relative to the US peer median.

Currently, Ontario ranks tenth out of the sixteen North American peer jurisdictions in total R&D expenditure as a proportion of GDP (Exhibit 27). The top ranked regions are, unsurprisingly, Massachusetts and California, boosted by their high-tech sectors. Michigan also ranks in the top three R&D spenders and has a similar industry composition and GDP per capita to Ontario. It is also a natural centre for R&D as it is the headquarters of many major automotive manufacturers.

Ontario also performs below the median of R&D expenditure compared to its international peers, at just over 2 percent of GDP (Exhibit 28). Three of the German peer regions are in the top three, followed by the South East region of the United Kingdom and Rhône-Alpes in France. Although data were unavailable for Japan, Kinki and Kanto would likely rank above Ontario, given their high presence in manufacturing and high-tech industries.

### Ontario's higher education sector contributes disproportionately to R&D investment

R&D expenditure can be broken down by performer and funder, with business enterprises, government, and postsecondary institutions being the main players.<sup>56</sup> Performers of R&D are the businesses or institutions carrying out the research using their own labs and staff. Businesses generally constitute the majority of both funders and performers, although there are important variations and cross-partnerships across the North American peers.

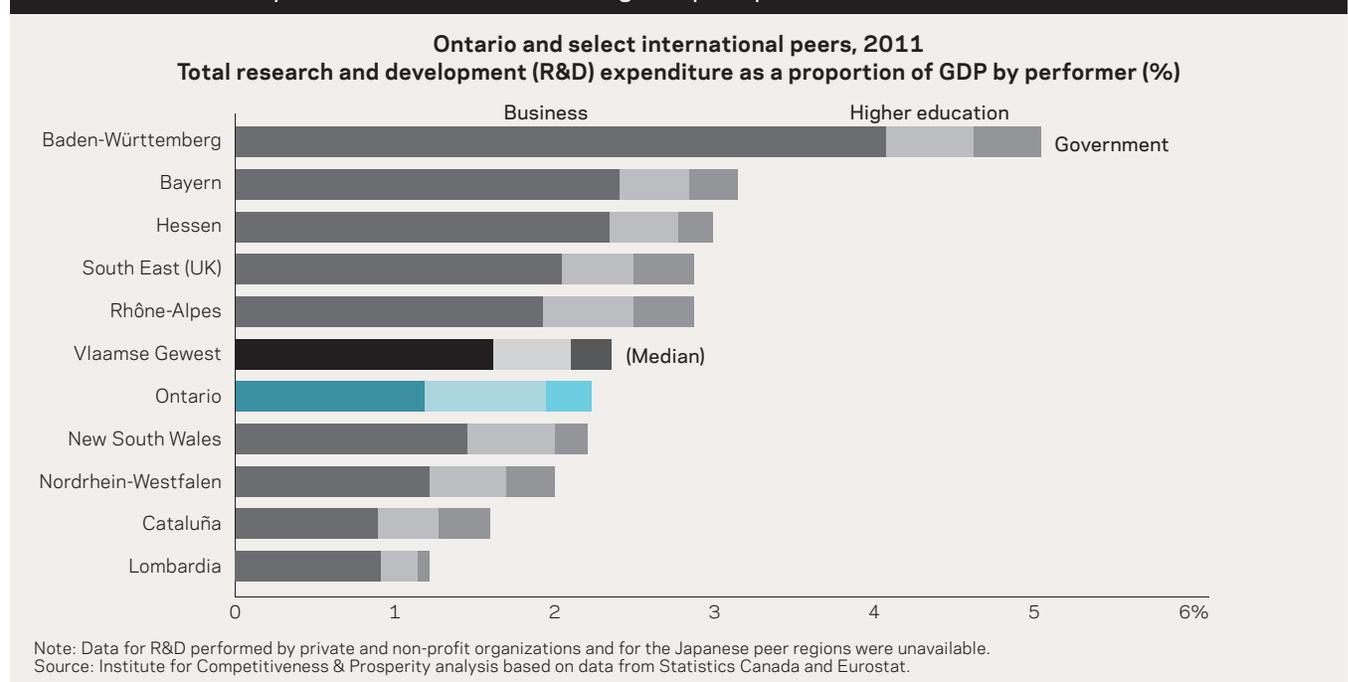
In both the North American and international peer regions, overall R&D expenditure consists mainly of R&D performed by businesses (known as BERD, or business expenditure on

<sup>54</sup> Mark Parsons, *Rewarding Innovation: Improving Federal Tax Support for Business R&D in Canada*, C.D. Howe Institute, September 2011.

<sup>55</sup> Research Infosource Inc., *Canada's Top 100 Corporate R&D Spenders*, 2013.

<sup>56</sup> R&D performed by private and non-profit institutions (consisting of voluntary associations, philanthropic foundations, and research institutes that are privately funded) was excluded from the analysis, as it accounted for a small share of total expenditure.

Exhibit 28 Ontario spends less on R&D than leading European peers



R&D). Roughly 75 percent of R&D is performed by business enterprises, with the exception of a few noteworthy cases. Nearly 40 percent of Virginia's R&D is conducted by government, as opposed to less than 10 percent for all of the other peer regions. This is due to the state's military activity. Ontario and Québec also share a different profile of R&D performers from the other peers, as they rely much more on R&D performed within the higher education sector. BERD constitutes only slightly more than half of the total R&D in these provinces.

There has been a noticeable shift in Ontario away from government-performed R&D toward higher education-performed R&D. In 1991, provincial and federal government-performed R&D accounted for 20.3 percent of total expenditure,

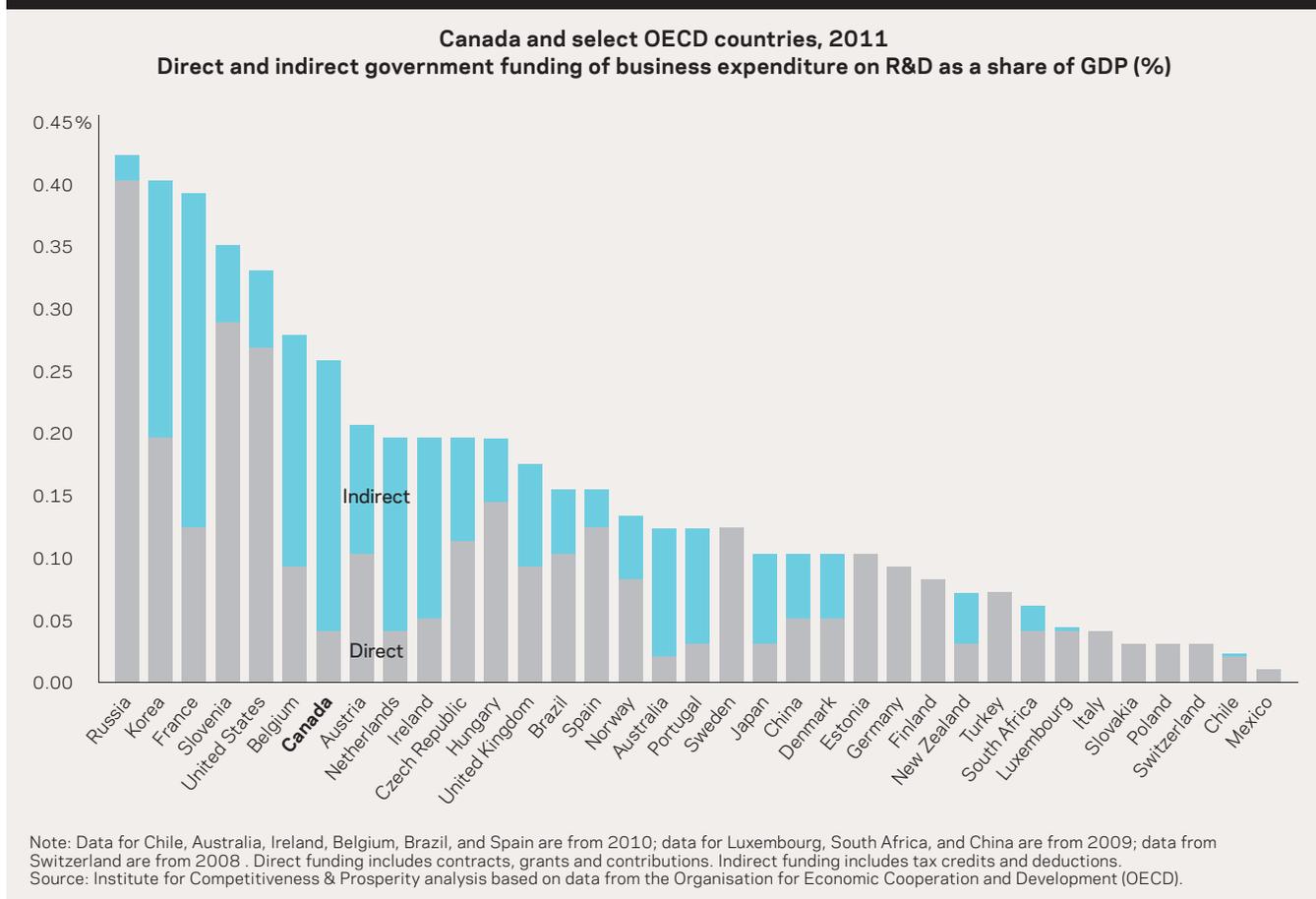
while higher education-performed R&D accounted for 22.7 percent of the total. By 2011, government-performed R&D accounted for only 13.2 percent of the total and higher education-performed R&D accounted for 34 percent of the total, with business-performed R&D declining slightly.

This shift is due to various factors. Government policy has increasingly favoured indirect support of private sector R&D in place of more direct forms of support such as contracts, grants, contributions, or fully public sector research activities. Canadian military spending, which has traditionally been a large focus of government-performed R&D, has also been nearly halved since 1991, according to data from the World Bank. There has also been a rise in policies geared toward linking higher education

with businesses in R&D partnerships to fill Ontario's gap in BERD, given their resources and connections with industry.

Every jurisdiction has a different model for both conducting and funding R&D, with some leaning heavily on government support and others favouring the private sector taking the lead. Ontario is a North American leader in university and college R&D but still lags in overall R&D spending, largely because, despite the incentives offered, businesses underinvest in R&D. Clearly, Ontario's model is not achieving best results. Addressing this gap requires a full re-evaluation of current policies aimed at incentivizing R&D – something many analysts have already done, but little influential action has yet been taken.

Exhibit 29 Canada relies most on indirect support for R&D among OECD countries



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### Rebalance indirect, generalized support for R&D and direct, targeted measures

Canadian governments provide an array of incentives for businesses to conduct R&D. It is estimated that the federal government spends more than \$6 billion annually on supporting business R&D (roughly half of which is performed in Ontario), through tax credits, grants, and other forms of direct support. Approximately half of this is through the SR&ED tax credit program.<sup>57</sup> The Ontario government also currently spends nearly \$450 million annually on tax credits for innovation and R&D support, in addition to millions of dollars' worth of grants and direct support to specific sectors, according to the most recent Ministry of Finance data.<sup>58</sup> Given that Ontario's BERD amounts to roughly \$7 billion, businesses clearly receive substantial government support to conduct R&D.

Governments in all OECD countries offer some financial incentives for businesses to conduct R&D, but Canada is somewhat unique in its reliance on indirect versus direct forms of support for R&D. While very limited data exist on indirect support for R&D – particularly at the subnational level – the OECD has conducted a periodic survey of indirect and direct support for business R&D. It found that not only does the federal government in Canada offer among the most generous support for BERD of the thirty-five countries surveyed, it has the heaviest reliance on tax credits to fund BERD, with 84 percent of support delivered through indirect support (Exhibit 29). This also does not include tax credit support provided by provincial governments, which is quite substantial in the case of Ontario. In contrast, support for BERD in high-performing countries, such as the United States, the United Kingdom, Germany, Norway, and Sweden, either comes mostly or completely from direct government funding.

There is considerable evidence to suggest that tax credits are less effective, at least on their own, than direct forms of R&D support. A 2009 study in Canada compared the performance of Canadian-based firms that received tax credits but no R&D grants with firms that received both tax credits and grants. The results showed that firms that received both credits and grants introduced more new products than their counterparts that only received tax credits. They also developed more world-first product innovations and were more successful in commercializing their innovations.<sup>59</sup>

This difference could be because tax credits encourage short-run profit seeking instead of profitable long-term investment. An older study argued that longer-term R&D, which generates a higher social return and greater spillover effects, is less favoured by tax policies, as the earnings need to be reaped in the current tax year to make the most use of the credit.<sup>60</sup> Direct forms of support are more conducive to higher risk, but more influential, innovations that require long-term commitments. A study by UK-based innovation think tank Nesta also showed that while tax credits seem to encourage firms to invest more in R&D than they would otherwise – indicating a positive return for governments – there is little evidence showing that R&D tax incentives raise productivity or other measures of firm performance. This suggests that tax credits stimulate R&D projects with a lower marginal rate of return and thus little economic impact.<sup>61</sup>

To address the gap in business R&D, the federal government created an expert panel to review policies supporting R&D. The Jenkins Panel's Report, released in 2011, revealed repeated calls for more direct versus indirect R&D support programs.<sup>62</sup> Indeed, many countries that make better use of grants and direct

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57 Thomas Jenkins et al., *Innovation Canada: A Call to Action, Review of Federal Support to Research and Development – Expert Panel Report*, Government of Canada, October 2011.

58 Ministry of Finance, *Public Accounts of Ontario 2012-2013: Ministry Statements and Schedules Volume 1*, Government of Ontario, 2013; Ministry of Finance, "Transparency in Taxation, 2013," *Economic Outlook and Fiscal Review 2013*, November 2013.

59 Charles Bérubé and Pierre Mohnen, "Are Firms That Received R&D Subsidies More Innovative?" *Canadian Journal of Economics*, 2009, vol. 42, No. 1, pp. 206-225.

60 P. David, B. Hall, and A. Toole, "Is Public R&D a Complement or Substitute for Private R&D? A Review of the Econometric Evidence," *Research Policy*, 2000, vol. 29, pp. 497-529.

61 Christian Köhler et al., *The Impact and Effectiveness of Fiscal Incentives for R&D*, Working Paper No. 12/01, January 2012.

62 Thomas Jenkins et al., *Innovation Canada: A Call to Action, Review of Federal Support to Research and Development – Expert Panel Report*, Government of Canada, October 2011.

subsidies have higher BERD levels than Ontario and Canada — chief among them the US. Canada and Ontario’s hands-off approach through indirect support is driven by a desire to avoid “picking winners” and to reduce the bureaucratic layer needed to validate funding requests. That is, by relying on tax credits to deliver the majority of R&D support, governments can avoid the administration requirements of dealing with businesses directly. However, a tremendous amount of administration is already in place to process SR&ED claims and toward staffing various government research arms.<sup>63</sup>

Many programs can be consolidated to achieve greater economies of scale, transparency, and access for businesses. The Panel recommended the creation of a national Industrial Research and Innovation Council (IRIC) to serve as the main funding and delivery agency for business R&D support “with a clear and sharply focussed mission to support business innovation.” The IRIC would provide “an integrated and responsive entity to foster business innovation and competitiveness.”<sup>64</sup> It would focus not just on delivering funding but also on maintaining a concierge service to provide businesses with information on programs available to them, as well as access to a talented pool of researchers and skilled personnel. Countries such as the United States, the United Kingdom, and Australia all benefit from having large, well-funded organizations similar to the IRIC to assist businesses in their innovation goals. The Task Force echoes this recommendation and calls for the centralization of both federal and Ontario-based innovation programs into the jointly funded IRIC and consolidation of overlapping programs.

The Task Force reiterates the Jenkins Panel recommendation to rebalance direct and tax credit R&D support by

reducing the refundable portion of the credit over time and redirecting the savings to the IRIC.<sup>65</sup>

#### Change the SR&ED program to help reorient R&D support toward direct funding mechanisms

The Task Force also recommends reducing the bias toward small businesses in SR&ED’s design. Under the SR&ED program, small Canadian-controlled private corporations (CCPCs) can earn a refundable tax credit of 35 percent on qualified expenditures, which include salaries, materials, and equipment, up to \$3 million. However, large corporations receive a much lower tax credit rate of 15 percent (which was reduced from 20 percent in 2012) that is non-refundable. This asymmetrical tax treatment discourages firm growth and disadvantages large companies and multinationals from the United States and elsewhere that generate the majority of business R&D in Canada.<sup>66</sup> According to the most recent data, SMEs account for less than half of Canada’s total BERD, versus more than a third for businesses with at least 1,999 employees.<sup>67</sup>

Tailoring policies that encourage R&D spending toward SMEs is warranted to some degree. Large businesses have greater risk tolerance and likely more access to capital to invest in R&D. Among firms that invest in R&D, SMEs devote a significantly larger proportion of their total revenue than large businesses do, indicating that scale gives companies a great advantage in being able to invest in R&D.<sup>68</sup> Likewise, the Conference Board of Canada has found that the biggest barriers SMEs face in becoming more innovative are lack of R&D funding/capital, lack of time, and lack of in-house expertise.<sup>69</sup>

Yet the difference in tax credit rates between large and small firms is greater in Canada than in any other

OECD country.<sup>70</sup> Moreover, other policies are currently in place to assist SMEs in carrying out R&D projects. The National Research Council’s Industrial Research Assistance Program (IRAP) specifically targets SMEs offering advisory services, networking, and funding. These services would be rolled into the proposed IRIC.

The Ontario government has also recently introduced an innovation and commercialization voucher that provides direct funding for SMEs to partner with research and postsecondary institutions in the province in conducting R&D and commercializing their innovations. The Task Force is highly optimistic about this program, as it provides SMEs with the opportunity to tap into well-established research and commercialization networks to get a head start on their innovations, drawing strength from the province’s relative advantage in R&D performed by higher education institutions. The Task Force believes expanding this program could benefit SMEs and boost overall business R&D expenditure far more than continuing to rely on tax credits.

The Task Force recommends phasing out the higher tax credit rate for SMEs and eventually harmonizing

63 Examples are the federal National Research Council (NRC), Natural Sciences and Engineering Research Council (NSERC), and the Ontario Centres for Excellence (OCE).

64 Thomas Jenkins et al., *Innovation Canada: A Call to Action, Review of Federal Support to Research and Development - Expert Panel Report*, Government of Canada, p. 5-10, October 2011.

65 *Ibid.*, p. E-10.

66 Mark Parsons, *Rewarding Innovation: Improving Federal Tax Support for Business R&D in Canada*, C.D. Howe Institute Commentary, No. 334, September 2011.

67 Statistics Canada, *Business enterprise intramural research and development expenditures, by performing company employment size*, CANSIM Table 358-0208.

68 Industry Canada, *Key Small Business Statistics*, July 2010.

69 Conference Board of Canada, *Innovation Catalysts and Accelerators: The Impact of Ontario Colleges’ Applied Research*, November 2010.

70 Department of Finance Canada, *Tax expenditures and evaluations*, 2009.

it with the overall rate to reduce the preferential treatment toward small businesses. This will provide savings that can be used toward more direct funding support that can benefit businesses of all sizes. Over time, the general rate too should be reduced to be in line with other OECD countries, with the average being roughly 15 percent according to C.D. Howe estimates.<sup>71</sup>

### Boost business innovation through targeted R&D programs

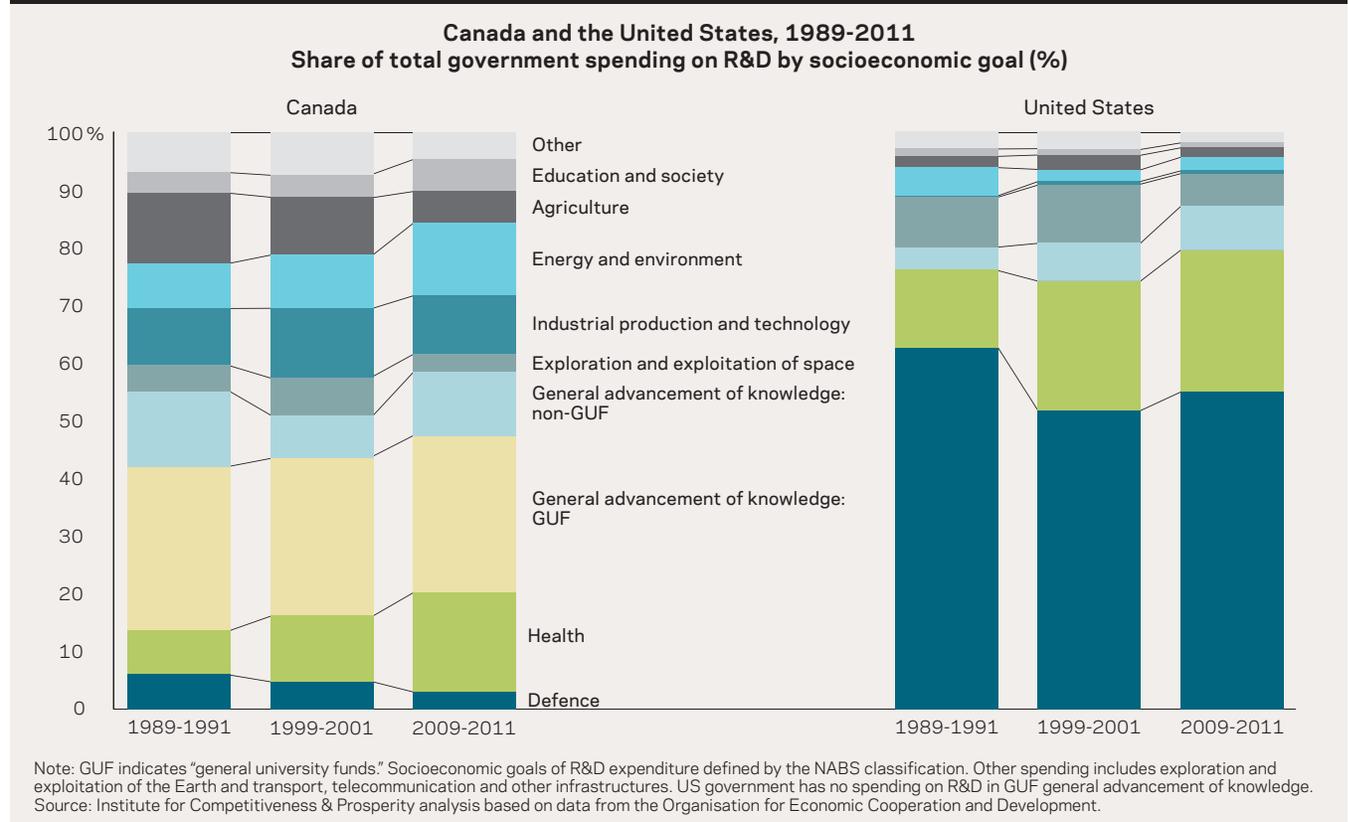
Another way Canada and Ontario might look to boost business innovation is through the use of targeted research programs. Much of the US innovation system is linked to large strategic initiatives directed at defence and security as well as health research.<sup>72</sup> The origins of many groundbreaking inventions, such as GPS, epipens, and microwave ovens, lie in US military research.<sup>73</sup> Israel, which has the highest ratio of BERD-to-GDP in the world, also benefits

from having many targeted supports aimed at military research.<sup>74</sup>

Forming the IRIC could aid in the creation of more targeted research initiatives, which can generate significant spillover effects through greater economies of scale and enhanced research capacity. Targeted government R&D investments have proven successful in regions such as China, Taiwan, and Singapore and in growing sectors in Ontario, such as IT and agri-food.<sup>75</sup> Canada is characteristically more generalist compared to its peers in the areas of research it supports (Exhibit 30). Defence spending accounts for the largest proportion of government spending on R&D in the peer countries, and was even larger during the Cold War era, while Canada's government spending toward R&D has mainly targeted general university funds (GUF) for research. Government support for health as well as energy and environment R&D has increased since

- 71 Mark Parsons, *Rewarding Innovation: Improving Federal Tax Support for Business R&D in Canada*, C.D. Howe Institute Commentary, No. 334, September 2011.
- 72 Richard Harris, *Canada's R&D Deficit – And How to Fix It: Removing the Roadblocks*, C.D. Howe Institute Commentary, No. 211, May 2005.
- 73 Allison Lex, "9 Things Invented For Military Use That You Now Encounter In Everyday Life," *Mental Floss*, 21 October 2012.
- 74 Dan Senor and Saul Singer, *Start-up Nation: The Story of Israel's Economic Miracle*, 2011.
- 75 Tijs Creutzberg, *Canada's Innovation Underperformance: Whose Policy Problem Is It?* Mowat Centre, October 2011.

Exhibit 30 R&D support is more generalized in Canada than the United States



the 1980s, but still accounts for a relatively small share of total direct government funding for R&D.

Establishing targeted programs for R&D, while more risky than the government's current approach, may help boost Canada's R&D performance. Research from the Mowat Centre recommends this be primarily undertaken by provincial governments to tailor programs to industries specific to their jurisdiction. This would mimic efforts already underway in sectors such as agri-food, life sciences, water technology, and green energy in Ontario.<sup>76</sup> The Task Force advises that this could be coordinated with the proposed IRIC to ensure programs are not duplicated. Canada is placing more emphasis on research in the health care and energy sectors to capitalize on these increasingly important economic areas. Ontario could consider expanding on these areas to improve its innovation capacity in these growing sectors.

## Encourage commercialization

R&D on its own is worth little to companies and the economy in general if the innovations are not commercialized. This is often the most difficult part of the innovation process and where Canadian companies are said to have the greatest gap compared to their US counterparts.<sup>77</sup>

The use of intellectual property is an essential counterpart to R&D as it ensures firms reap the benefits of their invention by either using it exclusively or profiting from its use by others. Various forms of intellectual property are used by firms to protect the commercial value of their inventions, including patents, licensing, trademarks, and copyrights. The Task Force analyzed Ontario firms' patent output and investment in intellectual property to see how they compare

with peers on commercialization and use of innovations.

### Ontario underperforms in patent output

Patents are the most often used metric for invention and, by extension, innovation. Patents signal the extent of innovative activity occurring within a region by counting the number of inventions attributed to an inventor within that region in a given year. Patents are a valuable form of intellectual property and allow innovation to thrive by giving inventors exclusive rights to use their invention, while also allowing the public to build on these inventions by viewing their specifications and expanding on and improving them.

Past Task Force analyses have used patents filed at the USPTO as the basis for comparing patent counts between Ontario and North American peers. Some analysts use triadic patents – or patents filed in the United States, Europe, and Japan – as the basis for international comparison, although data were unavailable at the subnational level. Here, comparisons are of patents filed under the Patent Co-operation Treaty (PCT) – which grants applicants simultaneous patent protection in 148 member countries around the world – for three reasons. First, the PCT is the only international patent database available and enables smooth cross-jurisdictional comparisons. Second, using this database reduces the bias potentially created as a result of a region's preference or access to a particular patent office. For example, the majority of Ontario SMEs (88.4 percent) only hold intellectual property in Canada, and there is roughly the same number of patents filed within Canada by Canadian businesses as there are in the United States, but several times more patents are filed in the United States than in Canada by American businesses.<sup>78</sup> This could distort regional comparisons depending on what patent office

is used for data collection. Third, patents filed under the PCT, similar to triadic patents, are more likely to reflect influential innovations, as companies are less likely to go to the trouble of patenting in more than one country if their innovation has little value abroad.

Using an international patent database reduces biases and highlights the most important patents for the various peers. PCT remains the most comprehensive and fair overall comparison and accounts for roughly a third of the total patent filings from Ontario.

Ontario's proportional patent count has more than tripled since the early 1990s (Exhibit 31). At this time, Ontario had proportionately about half as many patent filings as the US peer state weighted average; however, this gap has grown substantially over time. By 2010, Ontario had 1.8 patent applications per 10,000 workers, while the US peers had 3.4.

<sup>76</sup> *Ibid.*

<sup>77</sup> See, for example, Stephen Hurwitz, *Beyond R&D: Canada's Commercialization Challenge and How to Meet It*, Choate, Hall & Stewart LLP, October 2011; Jenkins et al., *Innovation Canada*.

<sup>78</sup> Survey of Financing and Growth of Small and Medium Enterprises, Statistics Canada; USPTO Patent reports; Canadian Intellectual Property Office, *Annual Report 2012-13*, 2013.

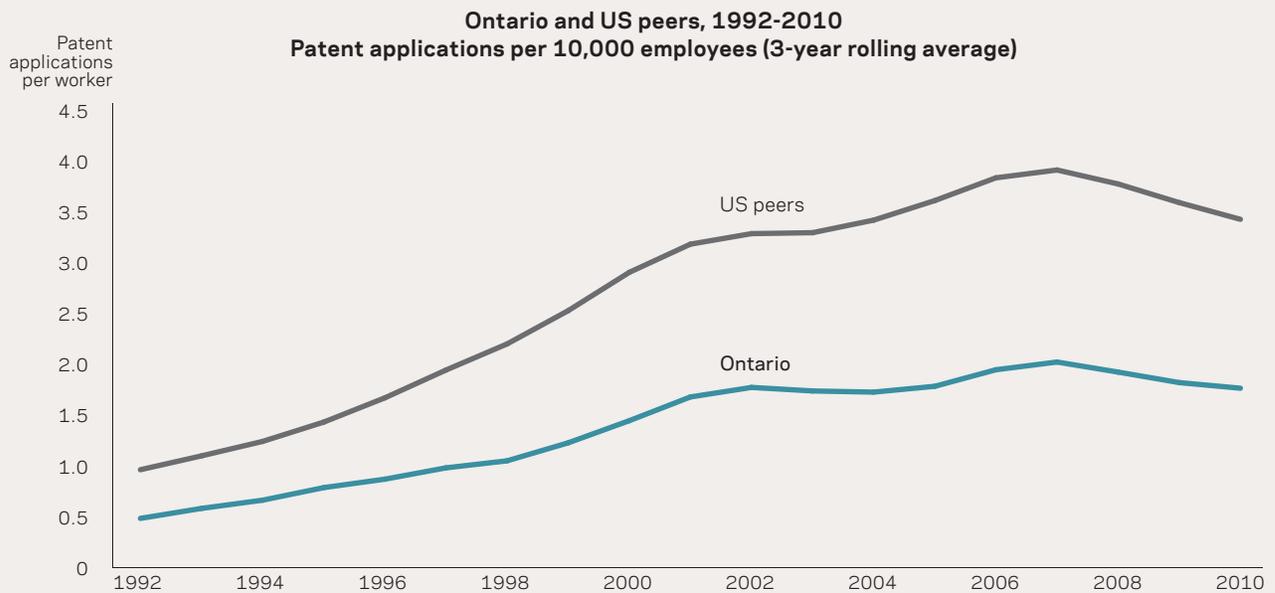
This is due to the stellar growth of California and Massachusetts high-tech sectors, which skew the average. These two states account for nearly half of all PCT applications from the US peers. On a per-employee basis, Ontario performs below the median of North American peers, but not by as large a magnitude (Exhibit 32).

Interestingly, Ontario performs even worse among international peers, generating the second lowest number of patent applications per employee (Exhibit 33). German and Japanese peers all rank above the median, with the top patenting international peer being Baden-Württemberg, followed closely by fellow German state

Bayern. This is unsurprising, given the prominence of advanced manufacturing in these regions.

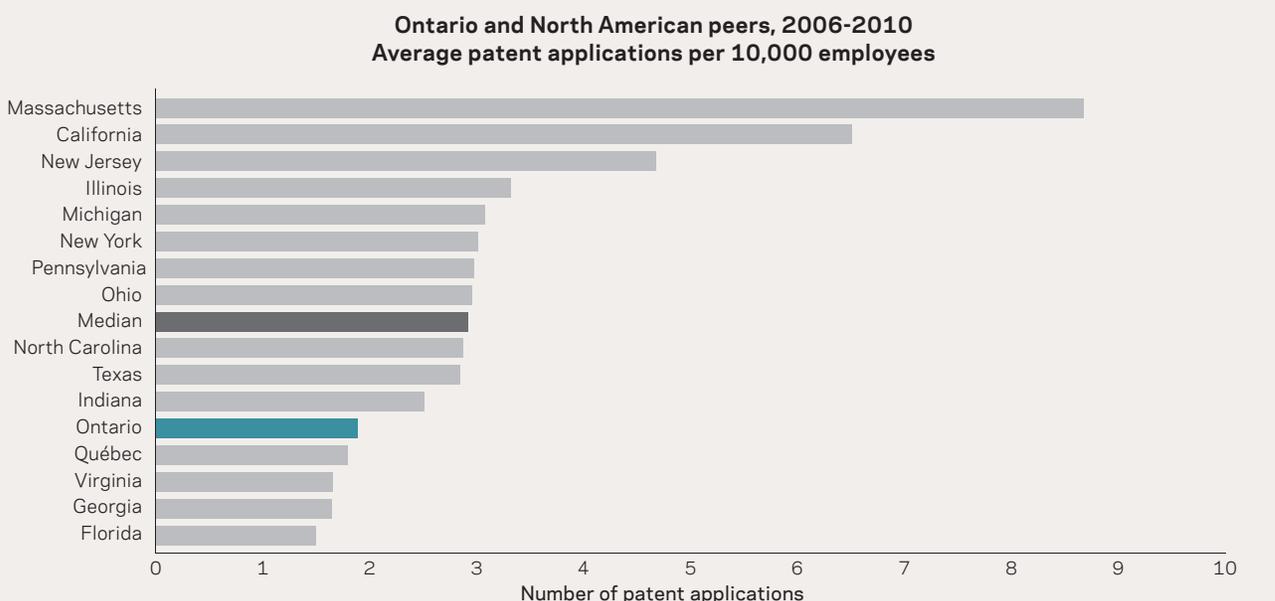
Ontario's relatively poor patent performance is cause for concern, as it could indicate that its inventions are not being translated into commercialized products. If businesses'

**Exhibit 31** Gap in patent applications persists between Ontario and US peers



Note: Regional patent counts represent patent application filed under the Patent Co-operation Treaty that are attributed to an inventor with an address in the region. Source: Institute for Competitiveness & Prosperity analysis based on data from the Organisation for Economic Co-operation and Development (OECD).

**Exhibit 32** Patent activity in Ontario is lower than North American peer median



Note: Regional patent counts represent patent application filed under the Patent Co-operation Treaty that are attributed to an inventor with an address in the region. Source: Institute for Competitiveness & Prosperity analysis based on data from the Organisation for Economic Co-operation and Development (OECD).

innovations were of greater value, a higher patent count would be expected, as they would be more likely to take steps to protect their intellectual property. Instead, Ontario exhibits a gap not only at the front end of innovation through relatively low business expenditure on R&D but an even larger gap in its patent output. This does not bode well for Ontario's competitiveness, as ensuring the protection of innovations is a key signal that companies intend on commercializing their technologies and products.

### Ontario invests less in intellectual property products than the United States

Investment in intellectual property products (IPPs) indicates firms' commercial innovative activity through means other than just patents.<sup>79</sup> Aside from 1994, there has been a gap in IPP investment between the United States and Ontario, which has been increasing over time (Exhibit 34).<sup>80</sup> In 1991, the difference in investment in IPPs between the US and Ontario was approximately

\$600 per worker, but by 2013 this figure had reached over \$1,300 per worker.

The difference in IPP investment has not, however, been constant across all sectors. The share of each sector's private investment in intellectual property products differs greatly between the United States and Ontario. Ontario lagged the United States in eight out of fourteen sectors in 2013. Moreover, the investment gap was significantly larger in the sectors that depend more on scientific research and technological advances, such as manufacturing and information technology (Exhibit 35). The information sector had by far the largest difference in IPP investment. In 1991, investment per worker in the US information sector was \$27,400 higher than that of Ontario and by 2013 the difference increased to \$52,800. This is due in part to the US having most of its total IPP investment concentrated within the information and manufacturing sectors (roughly 70 percent). In comparison, investment in Ontario is

more diversified: finance, insurance and real estate, educational services, information, and utilities together account for 70 percent of overall investment in IPPs.

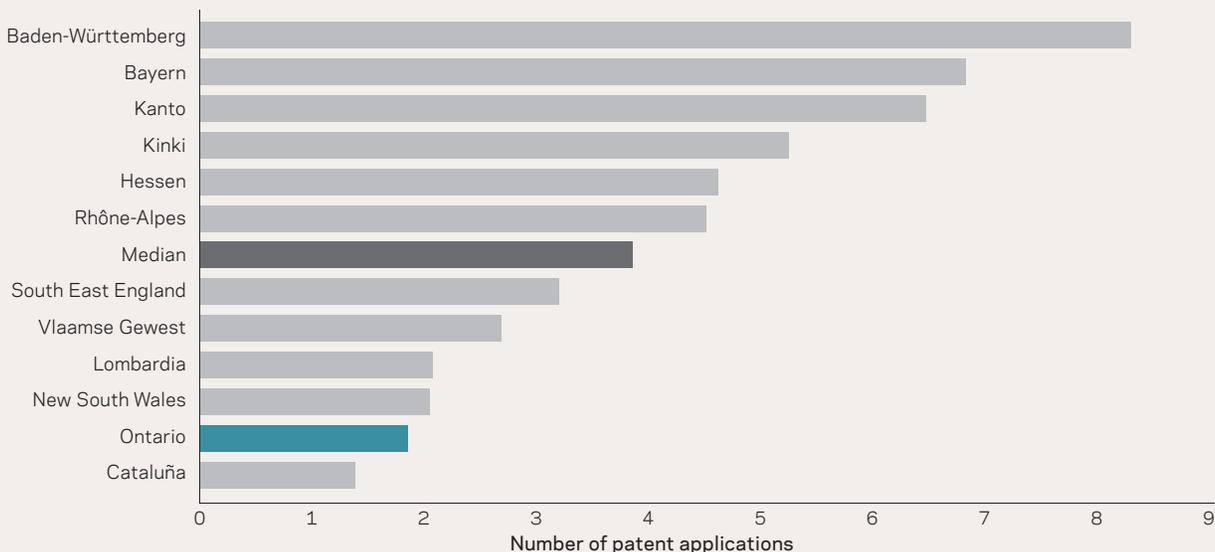
Ontario's IPP investment in manufacturing also substantially lags that of the United States. In 1991, the gap in manufacturing IPP investment between Ontario and the United States was \$7,200, but this increased to over \$21,000 by 2013. Moreover, the average annual growth in

<sup>79</sup> IPPs are defined as products of research and development that create marketable knowledge or knowledge which can be used in production. All expenditures on IPPs, such as patents and licensing, whether produced on one's own account or purchased, are included if they are expected to produce economic benefit for the owner. However, in the case of purchasing IPPs, only long-term investments in which the licensee assumes all the risks and rewards of ownership are included. The internationally recognized definition for IPPs is set out in the *System of National Accounts 2008*. The definition includes R&D, computer software and data bases, entertainment, literary or artistic originals and mineral exploration and evaluation. It must be noted that the Canadian System of National Accounts, due to a lack of data, does not capitalize data bases, entertainment, literary or artistic originals in its definition of IPPs, and these components are therefore excluded from the US data in the Task Force's comparison.

<sup>80</sup> For data comparability, analysis was done for selected sectors.

## Exhibit 33 Ontario generates fewer patents than international peers

Ontario and international peers, 2006-2010  
Average patent applications per 10,000 employees



Note: Regional patent counts represent patent application filed under the Patent Co-operation Treaty that are attributed to an inventor with an address in the region. Source: Institute for Competitiveness & Prosperity analysis based on data from the Organisation for Economic Co-operation and Development (OECD).

investment was higher in the United States throughout this period. This phenomenon may help explain the differences that the Task Force found in the manufacturing sector as a whole; the US peers' manufacturing sector had more employees in advanced manufacturing industries than Ontario from 1991 to 2013, and

the difference in IPP investment may indicate one reason why.

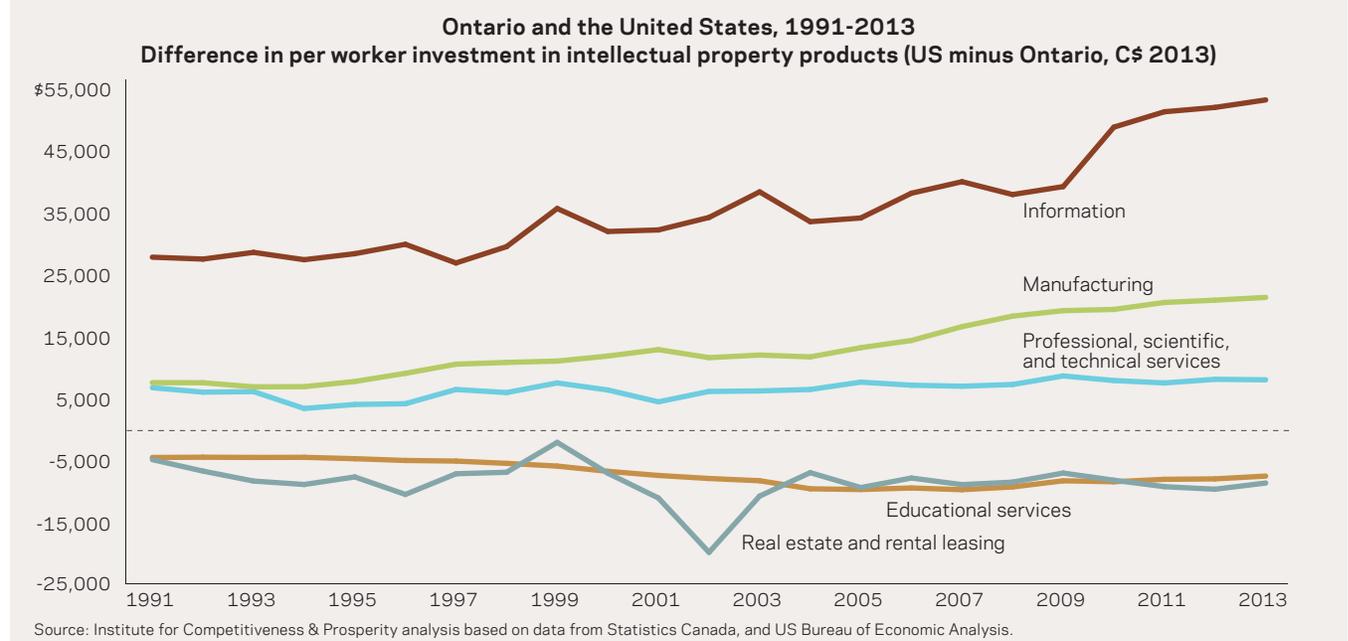
The gap in IPP investment between the two educational service sectors matches the results found in R&D spending. Between 1991 and 2013 there was a large shift in R&D spending away from government-

performed R&D and toward higher education-performed R&D in Ontario. The higher per person investment in IPPs in Ontario relative to the United States in the educational services sector further illustrates how important educational institutions are to Ontario's innovation landscape. Yet the advantage that Ontario shows in

**Exhibit 34 Business investment in intellectual property products is lower in Ontario than in the United States**



**Exhibit 35 Information and manufacturing sectors contributed the most to the investment gap in intellectual property products**



this sector is not enough to compensate for the poor performance in the manufacturing and information sectors. This should necessitate a full re-evaluation of the incentives provided for business spending on innovation products such as IPPs.

While measuring private investment in IPPs does not capture innovation to its fullest extent, it provides insight into the value that the two regions place on investment in intellectual property. The findings raise serious concerns about the lack of innovative activity in Ontario over the past two decades; Ontario's businesses invest far less in IPPs in several sectors when compared to the United States. In some sectors, the difference is minor, such as construction and accommodation and food services, but those sectors tend not to rely as much on scientific research. What is most concerning is the substantial gap in other more technologically advanced industries like information, manufacturing, and professional, scientific, and technical services.

#### Improve Canada's system of intellectual property protection

Ontario's poor performance on patenting and IPP investment could be attributed to Canada's haphazard system of patent protection. According to the Global Intellectual Property Center's (GIPC) International IP Index, Canada ranks significantly below other developed countries in patent, trademark, and copyright protection, as well as ratification of international treaties on IP protection. Its overall score of 17.4 puts it in eighth place out of the twenty-five countries ranked, and well behind innovative countries such as the United States (28.5), the United Kingdom (27.6), and France (27.2).<sup>81</sup> Canada scored particularly low on effective border measures for seizing counterfeit and pirated goods.

The U.S. Chamber of Commerce,

which compiles the GIPC Index, issued a scathing critique of Canada's IP system in response to this ranking, writing, "Canada is the largest trading partner for the United States ... and IP-industries account for 60% of U.S. exports. This makes it all the more bewildering to the business community at how substandard Canada's IP system is."<sup>82</sup> Furthermore, they claimed, "Over the past eight years, approximately twenty pharmaceutical patents have been revoked in Canada for what is called 'lack of utility or usefulness.' This trend, which is not happening elsewhere in the world, is due to Canadian courts requiring evidence that is wholly inappropriate for judicial review of patent approvals. ... Canada is the only place patents have been routinely challenged solely on utility grounds."<sup>83</sup>

The overturning of patents and the inability to appeal court decisions particularly disadvantages pharmaceutical companies looking to do business in Canada.<sup>84</sup> This is one of the major pushbacks the federal government has faced during negotiations on CETA. As the federal government appears to be finalizing the trade agreement, it is hoped that improvements have been made to meet the European Union's demands, namely to increase data protection, allow right of appeal, and add patent term restoration.<sup>85</sup> However, other efforts to improve IP protection should be put in place.

The Task Force advises the federal government to improve regulations on IP protection to ensure businesses are able to retain the commercial value of their innovations. The weak enforcement of counterfeit laws and arbitrary "patentability" requirements issued by the courts are concerning. Canada's neglect of the World Intellectual Property Organization Copyright Treaty is also an oversight and delegitimizes its patent protection system. The Task Force hopes that as

81 Global Intellectual Property Center, *Charting the Course: GIPC International IP Index, Second Edition*, U.S. Chamber of Commerce, January 2014.

82 Mark Elliott, *Statement of the U.S. Chamber of Commerce*, Statement to U.S. House Committee on Foreign Affairs Subcommittee on the Western Hemisphere, p. 5, January 15, 2014.

83 *Ibid.*, p. 6.

84 Canadian Chamber of Commerce, *Innovation for a Better Tomorrow: Closing Canada's Intellectual Property Gap in the Pharmaceutical Sector*, January 2011.

85 Joel Lexchin and Marc-André Gagnon, *CETA and Intellectual Property: The debate over pharmaceutical patents*, Canada-Europe Transatlantic Dialogue: Seeking Transnational Solutions to 21st Century Problems, October 2013.

Canada continues to pursue relations with the Trans-Pacific Partnership that it will address these flaws in its IP regulations so as to attract global businesses and strengthen its capacity for innovation.

#### Introduce a patent box regime

Another explanation for why Ontario firms may be unlikely to commercialize their innovations is the tax burden imposed on income received in exchange for royalties and licensing IP. Substantial research from the C.D. Howe Institute shows that Ontario's and Canada's tax systems strongly encourage R&D investment through the SR&ED program and other credits, but once these investments lead to commercial success in the forms of new products, services and processes, the income is taxed like any other form of investment. This includes patent, royalty, and licensing income, as well as other forms of IP.<sup>86</sup> The taxes on IP developed in Canada cause many companies to transfer IP abroad, where taxes on income received from patents and other forms of IP are lower and distinguished between other corporate income. While the majority of patents are transferred to the United States, an increasing number are being transferred to "island tax havens" and countries that have introduced lower taxes on IP income.<sup>87</sup> Canada, as the United States' largest trading partner, stands to benefit from this trend if it too designs tax incentives for IP income that are comparable with other nations.<sup>88</sup>

Ontario firms are unlikely to be motivated to conduct R&D and develop commercially viable innovations if they are taxed more heavily in Canada than elsewhere. Moreover, as much of Ontario's R&D is conducted by large multinational corporations that are highly mobile, they are likely to base their IP wherever the tax system is most favourable.

The Task Force reiterates its Twelfth Annual Report recommendation that Canada join other countries in introducing a patent box on its corporate tax form. Countries that have introduced patent boxes have received more patents and more patent income, largely thanks to the ease of transferring IP.<sup>89</sup> The patent box would enable income received from patents – including licensing income, sales of patented inventions and products, and patent infringement income – to be taxed at a lower rate than other corporate income. In the United Kingdom, the effective corporate tax rate on IP is 10 percent, versus its general corporate tax rate of 23 percent. This is roughly at the median of countries that have some form of patent box, including Belgium, France, the Netherlands, and Spain, and would be a suitable rate for Canada to start with.<sup>90</sup>

Ontario faces many challenges to commercialization that should be explored further, but there is no question that Canada should improve its tax treatment of innovation income to motivate the development and repatriation of IP. Reducing the tax burden on innovation investment income is a better use of public dollars to increase innovation than lowering the upfront costs through cumbersome tax credits. The Task Force affirms that introducing a patent box will act as a catalyst in transforming Ontario into a global centre for innovation.

#### Create an agency for protecting Ontario patents abroad

Ontario businesses could also benefit from enhanced support in defending their patents in the United States and other countries. Anecdotal evidence suggests that many companies' patents are overturned in other courts, which causes businesses to lose competitive advantage as their IP is infringed.

This risk is part and parcel of the risk that companies face as they enter new markets. Customers abroad can refuse delivery, file for bankruptcy, or neglect payment, leaving little recourse for Ontario firms to recover costs. Export Development Canada (EDC) offers credit insurance protecting companies against a variety of political and commercial risks that may arise in operating in foreign companies. Operated as a crown corporation, EDC allows Canadian businesses to cover their losses and provides advice on how to expand into new markets.

Ontario could set up a similar crown corporation that would support businesses in defending their patents abroad. The agency could provide legal support as well as advice on how to appeal court decisions. The agency could also offer insurance against patent infringement similar to EDC's credit insurance services. This would assist companies on protecting their IP abroad and expand the commercialization of inventions from Ontario. And as a self-financing organization, the initiative would pose little cost to the public purse. This would be a bold and novel step to bolster Ontario's innovation landscape.

86 Mark Parsons, *Rewarding Innovation: Improving Federal Tax Support for Business R&D in Canada*, C.D. Howe Institute Commentary, No. 334, September 2011.

87 Nick Pantaleo, Finn Poschmann, and Scott Wilkie, *Improving the Tax Treatment of Intellectual Property Income in Canada*, C.D. Howe Institute Commentary, No. 379, April 2013.

88 Antoine Desroches, *A Comparative Study of the Canadian and European Taxation of Intellectual Property Income: Has the Time Come for a Canadian Patent Box?* HEC Montréal, August 2012.

89 Rachel Griffith, Helen Miller, and Martin O'Connell, *Corporate Taxes and Intellectual Property: Simulating the Effect of Patent Boxes*, Institute for Fiscal Studies, Briefing Note 112, 2010.

90 Nick Pantaleo, Finn Poschmann, and Scott Wilkie, *Improving the Tax Treatment of Intellectual Property Income in Canada*, C.D. Howe Institute Commentary, No. 379, April 2013.

## Broaden understanding of innovation

The Task Force has focused on the most common measures of innovation, including R&D expenditure, patents, and other forms of intellectual property products. Most discussions of innovation and innovation policy centre on these important metrics and indeed they all serve crucial roles in boosting Ontario's productivity through the development of new technology, products, and processes.

Traditional measures of innovation, though, do not cover the full innovation landscape and tend to bias innovation policy toward certain industries and sectors. Measures such as patents and R&D are more relevant for industries that rely heavily on scientific research and technological advances, such as manufacturing, information and communications technology (ICT), and the sciences, and thus make jurisdictions with a high proportion of these industries appear to be more innovative.<sup>91</sup>

However, a growing body of research argues that innovation is not isolated to the traditional high-technology industries and the development of new technologies and products, but rather extends to all fields and includes innovations in services, processes, organizational design, and user experience.<sup>92</sup> R&D, patents, and startups are important components of innovation in an economy, but they do not capture the full innovation landscape. Many other forms of innovation can have a significant impact on a region's competitiveness, but are not necessarily reflected in these traditional indicators. A nuanced understanding of what constitutes innovation and the context in which it happens will help public policy achieve the ultimate goal of greater productivity and heightened prosperity.

### Innovation is not exclusively invention

A common perception likens innovation to invention; in other words, innovation is the invention of new products and ideas. This view extends from the school of thought promulgated by Austrian economist Joseph Schumpeter, who drew a link between economic growth and technological advances.<sup>93</sup>

Yet innovation is not exclusive to universities or particular industries and is mainly customer- rather than producer-driven.<sup>94</sup> It is the need to establish competitive advantage that drives innovation for a firm, rather than the desire to invent new ideas or products. Innovation may result from invention, but firms can be innovative without necessarily being inventive. Firms can also be innovative by simply adopting best practices and building on them, rather than generating wholly new ideas, products, and methods themselves.<sup>95</sup> Large productivity gains can result from adopting mobile technologies and other established digital innovations, for example.<sup>96</sup>

This definition of innovation has yet to catch on in many policy circles. Studies of innovation continue to turn to indicators like R&D spending and patents to show a region's innovation performance, rather than other softer measures of innovation.<sup>97</sup> Perhaps this is a measurement problem; very few reliable data exist on other innovation indicators, and quantifying other aspects of innovation is problematic. Without a clear definition, identifying true innovation is cumbersome and open to interpretation in self-reported surveys.

Statistics Canada has recently introduced the *Survey of Innovation and Business Strategy* in an attempt to enhance both the definition of innovation and corresponding data that are available in Canada. Surveying nearly 8,000 enterprises across the country, it

91 Organisation for Economic Cooperation and Development, *Measuring Innovation: A New Perspective*, March 2011.

92 See, for example, Larry Keeley et al., *Ten Types of Innovation: The Discipline of Building Breakthroughs*, Wiley, April 2013; Nesta UK, "Introduction to Innovation," <http://vimeo.com/82177621>.

93 Joseph A. Schumpeter, *Capitalism, Socialism and Democracy*. London: Routledge, 1942; Robert D. Atkinson and Merrilea Mayo, *Refueling the U.S. Innovation Economy: Fresh Approaches to Science, Technology, Engineering and Mathematics (STEM) Education*, The Information Technology and Innovation Foundation, 2010.

94 Paul Nightingale and Alex Coad, "The myth of the science park economy," *Demos Quarterly*, 24 April 2014; Roger Martin, "What is innovation, really?" *Globe and Mail*, 11 June 2010.

95 Don Drummond and Alistair Bentley, *The Productivity Puzzle: Why is the Canadian Record so Poor and What Can Be Done About It?* TD Economics, June 2010.

96 Sara Diamond and Vera Roberts, *Taking Ontario Mobile*, Ontario College of Art and Design University, October 2012.

97 See, for example, OECD data on innovation; The Expert Panel on the Socio-economic Impacts of Innovation Investments, *Innovation Impacts: Measurement and Assessment*, Council of Canadian Academies, 2013.

breaks down innovation into four types: product (good or service), process, organizational, and marketing. A firm is deemed innovative if it has introduced a new or significantly improved good or service, production process, organizational method, or marketing strategy within the last three years. In turn, it goes beyond R&D and patenting – which relate mainly to product and process innovations – and identifies firms that have introduced other improvements that have the ability to add value to their bottom line. This is a good step toward gaining a better understanding of the innovation landscape in Ontario, but many more data in this field are needed to form inter-industry and inter-regional comparisons over time.

The Task Force encourages policymakers to adopt a broader view of what constitutes innovation. Creating better innovation policies must start by recognizing the incremental and softer forms of innovation that are essential to productivity. The Task Force recommends three actions to address this.

#### Create better benchmarking data on innovation

Statistics Canada's *Survey of Innovation and Business Strategy* forms a good base of comprehensive data on innovation in Ontario, providing information on the types of innovation introduced by establishment size and industry, along with data on use of government innovation programs, advanced technology use, export activity, and competition. Yet this survey is simply too small to provide a great deal of reliable data. For many indicators, statistically significant data are only available at the national level.

The Task Force recommends that this survey be substantially expanded to provide a robust dataset on innovation metrics for Canada and the provinces. The sample size should

be increased to ensure results are reliable at the industry and establishment size level, and the survey should be conducted yearly similar to other important economic surveys. The data should also be made publicly available and broadcast to all Canadian businesses to raise awareness of any innovation shortcomings.

The data could also be more detailed to outline specific innovations introduced. Instead of grouping types of innovations into broad categories (new product innovations, for example, are only categorized by goods and services), the survey could ask for the specific technologies, products, and services that were introduced. This would provide much more useful benchmarking information for companies to examine the actions of their competitors.

The Task Force also recommends that Statistics Canada work with other statistical agencies in the United States and OECD to conduct similar surveys elsewhere. Without knowing what competitors abroad are doing, Ontario businesses' efforts may be insufficient to be competitive. Canadian businesses need information not only on their own markets but also on activities in other countries, particularly the United States, to gauge their competitive strength.

Undertaking such a survey would be immensely challenging, but having better data is crucial for policymakers and businesses to know whether the province is matching the efforts of its competitors. The Task Force has previously outlined research showing that better benchmarking data will have a significant impact on improving firms' investments in productivity enhancers.<sup>98</sup> If firms are made aware of what they need to do to compete, they are much more likely to innovate. Moreover, if innovation is to be recognized as a key component of the government's economic policy and

strategy, there should be better data available.

Canada already has a basis for what sound benchmarking data would look like. It simply needs to build on these efforts. The Frascati Manual, upon which Statistics Canada's *Survey of Innovation* is based, provides an internationally recognized template for classifying and quantifying innovations. Using its methodology will enable a robust and internationally comparable survey. The *Survey of Innovation and Business Strategy* should be expanded and refined to provide reliable innovation data beyond R&D spending and intellectual property investment. With these data, companies and policymakers will have the tools they need to identify innovation gaps and determine what is needed to remain competitive.

#### Expand the teaching of innovation in secondary school

Ontario is often said to lack a culture of innovation, which is a main factor that holds it back in the innovation and productivity rankings.<sup>99</sup> While this problem is largely based on anecdotal evidence and is impossible to quantify, it is nevertheless an issue that should be addressed in Ontario's innovation policy. Many businesses in Ontario do not introduce innovations simply because they feel they are unnecessary. This attitude must change.

<sup>98</sup> Task Force on Competitiveness, Productivity and Economic Progress, Twelfth Annual Report, *Course correction: Charting a new road map for Ontario*, November 2013.

<sup>99</sup> See, for example, Expert Panel on Business Innovation, *Innovation and Business Strategy: Why Canada Falls Short*, Council of Canadian Academies, 2009; Don Drummond and Alistair Bentley, *The Productivity Puzzle: Why is the Canadian Record so Poor and What Can Be Done About It?* TD Economics, June 2010.

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The Rotman School of Management, in partnership with the Institute for Competitiveness & Prosperity, has introduced several initiatives to try to tackle this attitudinal issue. The Rotman DesignWorks program was launched in 2005, aiming to teach innovation to students of all disciplines and all ages. Similarly, the Big Ideas: Creativity, Design and Innovation Camp is currently running at six different locations in southern Ontario with over 1,100 students in grades 5, 6, and 7 participating in camp and classroom workshops.

Building on the success of the Big Ideas project, the Rotman School of Management's I-Think Initiative is working with the Ministry of Education Student Success/Learning to 18 team to develop a core innovation and entrepreneurship curriculum. Over the course of a year, I-Think will build a framework and toolkit for its Innovation, Creativity, and Entrepreneurship program, train teachers to use the resources, and evaluate the project in partnership with the Ministry of Education. This project will be piloted with 72 school boards across Ontario reaching over 1,000 students.

These programs are striving to make systematic innovation education part of the core school curriculum in Ontario. Innovation and entrepreneurship are quickly catching on as key components of many post-secondary programs in Toronto and Waterloo, but the Task Force believes these core skills should be engrained earlier. The goal is to have future generations of Ontarians understand how to turn ideas and solutions to problems into marketable products and services. The process of recognizing problems, formulating ideas, and prototyping solutions forms the core of the innovation process and is an essential part of all businesses' strategies. The Task Force believes that through these programs, Ontarians

can learn that innovation is not simply about having an idea; it is about generating ideas continuously and applying them to create value.

The Task Force recommends that all secondary school students in Ontario undergo innovation education to fulfil its vision that innovation is crucial to the province's economic future. Ontarians need to recognize how innovation works and why it is important. This starts with early education and will persist throughout their working lives. It is not enough to focus just on stimulating R&D or bolstering certain industries to carry the torch on innovation. All Ontarians must apply the general principles of innovation into their organizations.

#### [Create a Productivity Ontario initiative modeled after Productivity Alberta](#)

Low levels of innovation are inextricably linked to Ontario's low productivity. Without the introduction of new and improved products, processes, and marketing techniques, Ontario will never be able to overcome its lagging productivity. High levels of R&D and new technologies are all highly associated with productivity gains. In turn, tackling Ontario's innovation problem is part of the much broader issue of tackling Ontario's prosperity gap.

Low productivity is arguably one of the greatest challenges Canada faces with an aging population and increasing global competition. This problem affects businesses across the province in all industries.

Alberta is one major outlier from this trend. With by far the highest productivity level in Canada, Alberta is unquestionably the national leader in economic performance, largely thanks to the strength and rapid growth of the province's natural resources sector.

A recent provincial initiative to increase productivity, however, may have contributed to Alberta's productivity growth. In 2008, the provincial government established Productivity Alberta to help increase productivity and competitiveness among small and medium enterprises in the construction and manufacturing sectors. Now a private, non-profit corporation, Productivity Alberta offers a range of services that help businesses identify and address productivity gaps, as well as increase efficiency. Featuring coaching and workshops, it disseminates the latest productivity improvement tools, resources, and services to businesses across the province.

Ontario would greatly benefit from a similar initiative. The current public policy approach emphasizes financial incentives to introduce business improvements, such as tax credits for R&D and other investments. Yet this incentive has had relatively little uptake. Alberta's more proactive approach offers a less costly, and potentially more effective, method of encouraging businesses to improve their operations.

This method would also offer more sector-specific support for innovation that does not just benefit firms that conduct R&D. Instead of focusing only on tech- and research-heavy forms of innovation, a productivity initiative could encourage firms to implement other types of innovation, such as the adoption of best practices or strategies for entering new markets. A similar initiative would work to instill innovation as a key corporate strategy and in turn boost productivity among Ontario businesses.

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**Innovation is a precondition for Ontario to succeed in the modern economy. Currently, its investment in key innovation inputs, such as R&D and patents, is lower than that in most of its peers, putting its future competitiveness in jeopardy.**

**By improving the tax system for innovation expenditures and income, and reorienting innovation policy away from indirect forms of support to direct funding and advisory services, Ontario would take a new tack to promote innovation among businesses. Fostering a culture of innovation among business leaders is a critical step to improving Ontario's subpar productivity performance and to closing the prosperity gap. This starts with education but, more important, it starts with a firm public policy commitment to change the way we think about, support, and apply innovation in the economy.**

#### **Areas for Further Study**

How can Ontario boost licensing and commercialization from the higher education sector?

How can Ontario create another successful tech giant?

Which public sector research programs have succeeded and which ones have failed?  
Where could Ontario target its support?



# How Ontario can find its own way

Ontario's challenges are a product of sweeping changes to the global economy that have altered the industries that matter and the human capital that is needed to succeed. Ontario's prosperity has fallen far behind that of its peers. To catch up, the Task Force has proposed a number of novel policy recommendations that offer a new avenue to heightened economic growth. By emphasizing innovation and identifying core skills needed for the occupations and industries that will be in demand, Ontario's economy can find a different way to compete in the twenty-first century.

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**FOR THIRTEEN YEARS**, the Task Force has tracked Ontario's economic progress in relation to a select group of the most prosperous regions in North America and abroad. While the prosperity gap has declined since the late 1990s, it remains stubbornly above \$11,000 in GDP per capita and is now trending upward. Ontario's ranking has dropped to second last out of the sixteen North American peers. The Task Force's goal of closing the prosperity gap continues to be elusive.

This year's Annual Report has sought to dig deep into the root causes of the prosperity gap and provide an explanation of how major differences in industrial composition, employment trends, and business patterns could account for Ontario's historically low GDP per capita. Using extensive data on employment, wages, exports, and clusters for Ontario and the North American peers, the Task Force has unearthed some alarming trends and likely contributors to Ontario's low productivity.

**Ontario has lost economic activity in important infrastructure industries**  
Nonresidential and utility system construction industries showed a significant gap in share of total employment between 1998 and the mid-2000s. Ontario also had relatively fewer building contractors than the US peers prior to the 2009 recession. While residential building construction has grown in Ontario in step with the US peers over the past two decades – and now far surpasses it in terms of share of total employment – other critical elements of economic development have suffered. The vital infrastructure of commercial buildings and power lines is only now being built at a level comparable to the US peers. Over a decade of under investment has cost the province in terms of labour and capital productivity and put Ontario at a severe economic disadvantage.

**Business support industries have grown faster in the US peers**  
Employment in human resource services and management of companies and enterprises was more prominent and grew faster in the peers between 1991 and 2013. These industries are important for a region's competitiveness and enhance productivity by facilitating labour matching. Whether the peers' stronger performance in these industries reflects their greater scale and overall economic strength, or whether they contributed to it, is impossible to determine. Yet it is clear that Ontario lags in these crucial support industries.

**Ontario is falling behind in advanced manufacturing**  
The decline in manufacturing in North America has been well documented. Both Ontario and the US peers saw a decline in their share of employment in manufacturing between 1991 and 2013. However, this decline was steeper and more significant for Ontario.

This shift was accompanied by the rise of advanced manufacturing. A smaller proportion of Ontario's manufacturing is in advanced manufacturing relative

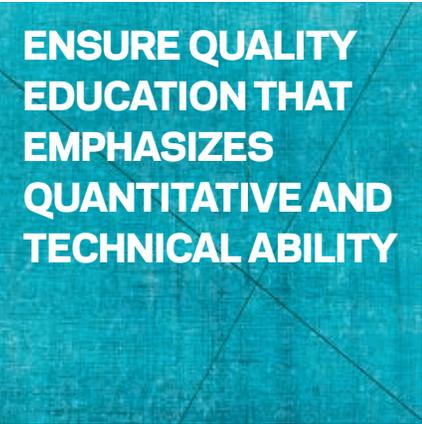
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to its peers, and of this, most of it is in the motor vehicle parts industry. Advanced manufacturing accounts for nearly 45 percent of manufacturing employment in the US peers and comprises a diverse range of high-tech and high value added industries. This could pose major challenges for Ontario, as many manufacturing industries continue to be outsourced, and the province relies on a few industries to sustain its high value added manufacturing base.

#### Ontario is failing to develop large, global firms

Ontario's US peers are scaling up much more rapidly than Ontario, where large firms account for a smaller proportion of total establishments, and fewer industries are seeing growth in the number of large firms. Canada ranks lower than other developed nations on average market value for its top global 500 companies (many of them based in Ontario), indicating that the value of its top firms is low compared to other countries. This means that Ontario is not doing enough to grow large, global businesses. Too many of its industries are dominated by small, less productive players. As the US peers continue to take advantage of scale, Ontario may see a further widening of the productivity – and, in turn, prosperity – gap.

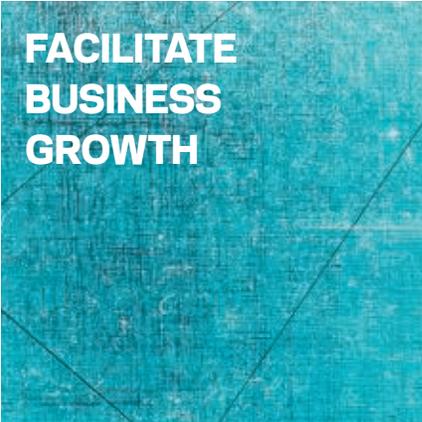
These findings have shed new light on how Ontario can move forward after two decades of subpar economic performance. The Task Force has identified three areas where Ontario should focus its effort. These areas were selected for having the greatest potential to take the province's economy in a new direction. By strengthening education, Ontario can ensure future generations have the skills necessary to compete for the jobs in demand. Encouraging businesses to grow will enable Ontario to emulate its peers in spurring innovative, global companies. And finally, improving public support for innovation will enhance productivity and end years of low commercialization of inventions and low levels of R&D expenditure.



## ENSURE QUALITY EDUCATION THAT EMPHASIZES QUANTITATIVE AND TECHNICAL ABILITY

Ontario students' poor performance on math and science test scores is concerning, given the growing importance of these skills in today's economy. Occupations requiring math and science exhibit the strongest wages and most promising projections for growth. The Ontario government should examine its core curriculum to ensure these basic skills are being instilled. This may require new curriculum or adjustments to teacher

training. To remain competitive in technologically-advanced industries, Ontario's students today must have sound math and science capabilities to be able to fill this rising labour market demand. The Task Force recommends that the province's educators home in on quantitative skills so students can compete for the province's most in-demand jobs.



## FACILITATE BUSINESS GROWTH

### Introduce smart regulations

Canada has a largely stable and transparent regulatory environment in which to conduct business. However, the Task Force has found that on several measures of basic requirements for operating a business, Canada ranks poorly compared to other OECD countries. It takes nearly double the amount of time to obtain necessary licences and permits for construction and almost twice the cost and time to get electricity for business enterprises in Canada relative to the OECD average. It is also above average in the cost of importing and exporting and the time and cost to enforce commercial contracts. These are essential facilities in the economy that are often taken for granted. The Task Force recommends that the Ontario government introduce the following regulatory reforms to be at least in line with the OECD average:

- Reduce the time needed to obtain construction licences and permits
- Reduce processing times and cost of getting electricity
- Reduce costs associated with importing and exporting
- Reduce the time and cost to enforce commercial contracts.

### Encourage competition by opening industries up to trade

Competition drives innovation and productivity for firms. The need to gain competitive advantage motivates businesses to develop new products, cut costs, streamline production, expand into new markets, and better organize themselves. These all enhance productivity and add to a region's prosperity. The Canadian government has worked to increase competition in industries such as telecommunications and is finalizing negotiations on the Comprehensive Economic and Trade Agreement (CETA) with the European Union. It has also signed a free trade agreement with South Korea.

These efforts should be pursued further by continuing to participate actively in the Trans-Pacific Partnership and exploring other free trade agreements with emerging economies. Canada should also look to reduce foreign investment and take-over restrictions to facilitate business growth and increase foreign competition. This will ameliorate protectionist policies still in place in many industries and stimulate business growth. Canada must adapt to the realities of global competition by opening its borders and allowing market forces to drive productive improvements.

### Amend tax policy to incentivize growth

The Task Force believes that Ontario's and Canada's current tax policy discourages growth by setting different tax rates for businesses of different sizes. By becoming a large business, firms are subjected to significantly higher taxes and are entitled to a non-refundable, substantially reduced tax credit rate to conduct R&D, despite contributing disproportionately to employment and innovation in the economy. This bias in the tax structure must change. Encouraging growth should be an explicit and central goal of corporate tax policy. The Task Force recommends that governments work to harmonize marginal effective corporate tax rates and reduce the discrepancy in SR&ED credits for large and small businesses. The savings from harmonizing the tax rates could be used toward lowering the general corporate tax rate and creating a new tax policy whereby any profit increases in excess of the previous tax year is tax free. This would incentivize business growth, while ensuring a predictable and stable stream of tax revenue. Moreover, it would propel Ontario to become one of the most competitive tax jurisdictions in the world – a necessary step to attract major global business.



## FOSTER A COMPETITIVE INNOVATION ECOSYSTEM

### Rebalance and consolidate direct and indirect support for R&D

Canada stands apart from other countries for having some of the most generous public funding support for R&D, yet middling business R&D investment. This is a result of a broken and inefficient model that relies on indirect forms of support for R&D, primarily through the SR&ED program. Countries that spend more on R&D, especially Canada's top competitors such as the United States, the United Kingdom, and Germany, all overwhelmingly rely on direct forms of support for R&D through grants and contracts to businesses and other organizations.

Canada should re-orient its R&D policies toward direct forms of funding and reducing the portion that is refundable. The federal government should also create a centralized body focused on industrial R&D to coordinate funding and consolidate overlapping programs. Provincial support for R&D should divert funding away from tax credits and toward targeted support of growing sectors of Ontario's economy, as well as the recently introduced Commercialization and Innovation Voucher program. This will create a stronger and more cohesive model that makes better use of public funds to support R&D.

### Improve intellectual property protection laws

A crucial counterpart to R&D expenditure is the resulting intellectual property. This contributes to the commercialization of new inventions and innovative goods, services, and processes. Ontario does not file as many and invests less in key forms of intellectual property such as patents and licensing than its US peers. This indicates that the commercial use of innovations is lagging in the province relative to its competitors.

To boost commercialization, the federal government must take action to strengthen intellectual property laws to ensure companies can retain the commercial value of their innovations. One of the factors that may be deterring businesses from patenting is the poor level of protection afforded to them through the Canadian Intellectual Property Office. Instances of pharmaceutical patents being rejected as a result of the inability to appeal or lack of utility have been reported by both the US and Canadian Chambers of Commerce. The Task Force recommends that the Canadian government ensure greater transparency with respect to what is considered a utility patent and loosen these regulations to coincide with other patent offices. Government should also work to reinforce counterfeit and piracy laws to protect intellectual property, as well as ratify the World Intellectual Property Organization Copyright Treaty. These actions will be necessary as Canada continues its involvement with the Trans-Pacific Partnership and other free trade agreements. Businesses both at home and abroad will be more likely to innovate if they know the fruits of their innovations will be protected.

### Introduce a patent box

Various countries, such as the United Kingdom, Netherlands, Belgium, France, and Spain, have introduced some form of a patent box, which allows companies to reduce their tax liability on income received from patents, licensing, and other forms of intellectual property. This has resulted in an increase in intellectual property transfers from Canada to these jurisdictions and other tax havens. The Task Force recommends that Canada adopt a patent box system to incentivize corporations to retain and repatriate their intellectual property domestically. This will work to curb the exodus of

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innovations from Canada and act as a “pull factor” to boost commercialization in Ontario.

#### Set up a crown corporation to protect patents abroad

Ontario firms would benefit from being able to insure against patent infringement abroad. This will spur more companies to expand into new markets and commercialize their innovations. The federal government could set up a crown corporation modeled after, or incorporated into, Export Development Canada to provide a mix of advisory services and loss recovery insurance to firms operating abroad. This will help companies protect their intellectual property and, in turn, provide a stronger innovation ecosystem.

#### Create better benchmarking data on innovation

Many businesses in Ontario do not innovate simply because they think it is unnecessary or they are unaware of the actions of their competitors. The Task Force believes that better benchmarking data can help overcome this. Statistics Canada’s *Survey of Innovation and Business Strategy* provides a useful template for innovation metrics, but the survey needs to be expanded substantially to provide

statistically significant results at the industry, region, and business size level. The Task Force recommends that Statistics Canada refine and expand this survey to provide more detailed results and work with statistical agencies elsewhere to replicate this survey. Canadian companies need to know the actions of their competitors at home and abroad to make informed decisions on business strategy and innovation goals. These data could also be collected annually as for other important economic surveys.

#### Continue efforts to teach innovation in secondary school

Innovation has become a dominant public policy goal in order to boost Ontario’s economic performance. Business leaders and policymakers are recognizing that to succeed in the global marketplace, businesses must find ways of developing new products and ideas continuously. Meeting this challenge requires systemic change. Several initiatives have been undertaken by the Rotman School of Management, in partnership with the Institute for Competitiveness & Prosperity, to educate younger generations on the importance of innovation and how to apply it to solve complex problems. The Task Force

aims to have all students in Ontario undergo systematic innovation education as part of the general curriculum. This will help build a future workforce in the province that regards innovation as a central part of all economic activity.

#### Establish a Productivity Ontario initiative

Ontario’s productivity gap is increasing, posing a significant threat to the province’s future prosperity and competitiveness. The Task Force believes that boosting innovation is one of the best ways to tackle Ontario’s productivity challenge and that a possible tool to implement this is through the creation of a Productivity Ontario initiative. Modeled after Productivity Alberta, a productivity initiative in Ontario could be responsible for disseminating information on best practices and new efficiency tools to businesses across the province. With workshops, coaching, and mentoring, Productivity Ontario would help transform businesses into innovative, global players with high potential for growth. This hands-on approach to improving productivity could have a substantial impact and be less costly than tax credits for productivity-enhancing investments.

Ontario’s economic progress rests on the ability of policymakers and business leaders to respond to the shifts that have occurred over the past two decades. Demographics, industrial changes, and technology have all played a role in shaping Ontario’s competitive position relative to its peers. These changes will undoubtedly continue to affect the province’s competitiveness. To adapt, Ontario needs to examine ways of boosting innovation among businesses and ensuring students have the skills they will need to succeed in the modern global economy. The Task Force believes Ontario has solid foundations for building economic strength, but it needs to create a greater capacity for growth by taking a different tack. The Task Force has provided a series of realistic recommendations to help Ontario achieve its full potential. It is now up to policymakers and businesses to lead the change for a better economic future for Ontario.

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## Previous Publications

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### Task Force on Competitiveness, Productivity and Economic Progress

- FIRST ANNUAL REPORT – *Closing the prosperity gap*, November 2002
- SECOND ANNUAL REPORT – *Investing for prosperity*, November 2003
- THIRD ANNUAL REPORT – *Realizing our prosperity potential*, November 2004
- FOURTH ANNUAL REPORT – *Rebalancing priorities for prosperity*, November 2005
- FIFTH ANNUAL REPORT – *Agenda for our prosperity*, November 2006
- SIXTH ANNUAL REPORT – *Path to the 2020 prosperity agenda*, November 2007
- SEVENTH ANNUAL REPORT – *Leaning into the wind*, November 2008
- EIGHTH ANNUAL REPORT – *Navigating through the recovery*, November 2009
- NINTH ANNUAL REPORT – *Today's innovation, tomorrow's prosperity*, November 2010
- TENTH ANNUAL REPORT – *Prospects for Ontario's prosperity*, November 2011
- ELEVENTH ANNUAL REPORT – *A push for growth: The time is now*, November 2012
- TWELFTH ANNUAL REPORT – *Course correction: Charting a new road map for Ontario*, November 2013

### Institute for Competitiveness & Prosperity

#### Working Papers

- WORKING PAPER 1 – *A View of Ontario: Ontario's Clusters of Innovation*, April 2002
- WORKING PAPER 2 – *Measuring Ontario's Prosperity: Developing an Economic Indicator System*, August 2002
- WORKING PAPER 3 – *Missing opportunities: Ontario's urban prosperity gap*, June 2003
- WORKING PAPER 4 – *Striking similarities: Attitudes and Ontario's prosperity gap*, September 2003
- WORKING PAPER 5 – *Strengthening Structures: Upgrading specialized support and competitive pressure*, July 2004
- WORKING PAPER 6 – *Reinventing innovation and commercialization policy in Ontario*, October 2004
- WORKING PAPER 7 – *Taxing smarter for prosperity*, March 2005
- WORKING PAPER 8 – *Fixing fiscal federalism*, October 2005
- WORKING PAPER 9 – *Time on the job: Intensity and Ontario's prosperity gap*, September 2006
- WORKING PAPER 10 – *Prosperity, inequality and poverty*, September 2007
- WORKING PAPER 11 – *Flourishing in the global competitiveness game*, September 2008
- WORKING PAPER 12 – *Management matters*, March 2009
- WORKING PAPER 13 – *Management matters in retail*, March 2010
- WORKING PAPER 14 – *Trade, innovation, and prosperity*, September 2010
- WORKING PAPER 15 – *Small business, entrepreneurship, and innovation*, February 2012
- WORKING PAPER 16 – *Making sense of public dollars: Ontario government revenue, spending, and debt*, May 2013
- WORKING PAPER 17 – *Untapped potential: Creating a better future for service workers*, October 2013
- WORKING PAPER 18 – *Taxing for growth: A close look at tax policy in Ontario*, October 2013
- WORKING PAPER 19 – *The realities of Ontario's public sector compensation*, February 2014
- WORKING PAPER 20 – *Building better health care: Policy opportunities for Ontario*, April 2014

#### White Papers

- Strengthening management for prosperity*, May 2007
- Assessing Toronto's financial services cluster*, June 2007
- Time for a "Made in Ontario" Working Income Tax Benefit*, September 2009
- The poor still pay more: Challenges low income families face in consuming a nutritious diet*, December 2010
- Bringing "dead cash" back to life*, March 2013

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