Advanced Manufacturing Cluster: Background Material
**Introduction**

Thank you for participating in our Toronto Region Economic Summit. The Summit is designed to bring together private sector leaders from leading economic clusters to advance overdue ideas and better drive regional competitiveness by fostering stronger collaboration within and across key industries. The Summit will encourage business leaders to take a leading role in advancing an economic cluster strategy for the Toronto Region.

A key component of the Summit’s agenda are a series of cluster break-out sessions where industry leaders from each cluster, including yourself, can discuss joint issues and business strategies to enhance their industry’s competitiveness position. Following the keynote address by Dr. Michael Porter, we would greatly appreciate you joining the Advanced Manufacturing cluster for a 2-hour roundtable session. This session will be moderated to ensure maximum amount of participation and feedback.

What follows below is a primer on the Advanced Manufacturing cluster to assist you with preparation for this break-out. The primer is structured around key themes as follows: the big picture; why we’re here; 5-year outlook for the Advanced Manufacturing cluster; key facts about the Advanced Manufacturing cluster; and proposed discussion questions.

We wish to thank KPMG, the Summit’s presenting sponsor; and IHS Global Insight for their generous contribution to the Summit’s content development.

**The Big Picture**

We know what the Toronto Region’s strengths are: an enviable quality of life, a highly educated and diverse workforce and a critical mass of leading edge service and manufacturing-oriented industry clusters. Yet we can’t escape the effects of recent economic upheavals or the profound shifts in the global economic order, most notably the emergence of high-growth economies such as Brazil, China and India.

As part of the Toronto Board of Trade’s ongoing efforts to measure Toronto’s competitiveness, we have been publishing since 2009 our annual *Toronto as a Global City: Scorecard on Prosperity* (Scorecard) report. The reports’ findings are consistent and point to a troubling reality that despite our market size and major institutional assets like research hospitals and universities, the Toronto Region punches well below its weight.

*Scorecard 2012*’s results are no different. Regardless of the indicator one looks at, whether it’s GDP and productivity growth or average size of IPOs, our long-term performance puts us near the bottom of North American league tables. This has huge implications, not least of which is in our ability to sustain and pay for the vital public investments we need to make in our social and physical infrastructure.

Nevertheless, as the Drummond report laid bare and as we see with the budgetary challenges of municipal governments across the Toronto Region, the fiscal space for major government economic stimulus just is not there. Clearly, if we wish to sustain the long-term economic vitality of the region our businesses must be at the forefront of change.

Undoubtedly, there is no simple recipe for generating economic growth. But today, we make an important and groundbreaking step. We are setting in motion the development of a business-led roadmap to compete against the best-in-class city-regions from across the globe. It’s not about picking winners and elaborate industrial strategies. Instead, it’s about generating sensible approaches and collaborations between industry, government and other stakeholders that can enhance our business environment and make it that much more competitive and entrepreneurial.
On Monday March 26th, we will release Scorecard 2012 our benchmarking report which takes a unique and special lens on the North American position of Toronto’s key economic clusters. Scorecard 2012 will serve as a foundation document for the Summit. As clearly articulated in the Board’s provincial election campaign VoteOntario2011, cluster-based strategies will be an important element to drive economic growth and investment in the Toronto Region. Additionally, these strategies can provide a strong impetus for better positioning and branding of Toronto’s unique selling points.

Why We’re Here

With the help of economic consulting firm IHS Global Insight, the Toronto Region Economic Summit is the first step in helping kick-start a creative collaboration within and between Toronto’s key industry clusters. The firm has led many successful regional economic cluster strategies around the world including the Puget Sound (Greater Seattle Area); Bangalore (India); and Ottawa.

But first, a bit about clusters and why we think they’re important. Clusters are groups of interconnected companies in a particular sector that are located close to one another. Significantly, clusters also include related institutions like universities, government and trade associations which support clusters in different ways through workforce training, sector supports and advocacy. Examples of successful clusters recognized globally include New York as well as Toronto’s Financial Services, Silicon Valley’s Information & Communication Technologies (ICT), Boston’s Life Sciences and Israel’s High-Tech.

The Summit’s keynote speaker, the renowned business theorist Dr. Michael Porter, convincingly documents in his research how the geographic clustering of firms in related industries is critical to increasing productivity and innovation. These leading firms typically sell to markets beyond their local region. In addition, the presence of clustered industries generates opportunities for the success of regions, by creating a solid economic and institutional infrastructure which generates good paying jobs which in turn support local businesses in sectors like retail and restaurants.

So how does Toronto fare in terms of its concentration of clustered industries? On the positive side, Toronto has an excellent industry and cluster mix. However, cluster effectiveness, as measured by wages, innovation and productivity, demonstrates shortcomings when we compare ourselves with high-performing US city-regions like Seattle, San Francisco and Boston.

Since Toronto is home to many of the nation’s key industrial clusters from auto & parts to finance, to ICT and creative industries, it is critical we develop cluster-based strategies that boost the competitiveness of these sectors. According to Scorecard 2012, the following five clusters, out of ten selected for the study, show the most strength. These clusters are ranked among the top five in North America based on a unique set of economic indicators:

- Auto & Parts (#1 out of 12)
- Food & Beverage (#3 out of 12)
- Transportation & Logistics (#3 out of 12)
- Financial Services (#5 out of 12)
- Bio-Pharma & Bio-Medical (#5 out of 12)
The Summit will focus on six clusters as mentioned below to ensure ideal collaboration among participants.

- Advanced Manufacturing (includes Auto & Parts, Aerospace and Advanced Materials)
- ICT & Creative Industries (includes ICT and Creative & Entertainment)
- Life Sciences (includes Bio-Pharma & Bio-Medical, Hospitals and Medical Research Institutes)
- Food & Beverage
- Transportation & Logistics
- Energy

Example Of a Local Success Story: Financial Services Cluster Strategy

A good example of a cluster strategy in the Toronto Region is the Toronto Financial Services Alliance (TFSA) which convened key industry, government and educational sector stakeholders to develop a comprehensive cluster strategy for Toronto’s financial services cluster. This strategy is a great template of what could be achieved with other clusters.

Among other things, the strategy identified several emerging sub-clusters (risk & retirement management and support to mining, gas and oil companies) where Toronto can compete well on a global scale. The efforts of the TFSA members are recognized internationally, with Toronto ranked among the top ten financial centers of the world according to Global Financial Centers Index. Importantly, the reputation of Canada’s banking system soared in the wake of the recent recession further positioning Toronto as a strong global financial centre. When Forbes named Canada as the number one country to do business in 2011, the banking sector was showered with kudos: “Canada’s major banks, however, emerged from the financial crisis of 2008-09 among the strongest in the world, owing to the financial sector’s tradition of conservative lending practices and strong capitalization.”

Canada’s four largest public pension funds manage $640 billion of combined assets and are seen as global best-in-class for sound long-term strategy, governance and compensation practices. Toronto is also the leading global hub for mining, metals, and energy financing activity creating sizeable spinoff effects for professional services sector. The future of financial services and professional services clusters, at least in Toronto’s context, is inextricably linked. According to TFSA, the activity associated with financing mining, metals, and energy sectors is the source of estimated 7,000 financial services jobs in Canada including investment bankers, research analysts, traders, corporate lenders and other support and professional services. While Toronto’s current position is strong, there is a significant opportunity to proactively promote the region’s expertise through a more concerted effort among political leaders and industry.

Opportunities for Advanced Manufacturing Cluster

After some uncertainty, the outlook for advanced manufacturing in the Toronto Region and indeed North America is brightening (see Chart 2 below). The Canadian manufacturing sector has been enjoying a cyclical rebound from the recession with increasing consumer demand both in Canada and the U.S. helping to drive growth. National figures bear this out, with machinery and transportation manufacturing output up by 30% and 40%, respectively.

While the sector is forecast to recover, one can’t ignore the competitive challenges that were weighing on the sector prior to the recession. Manufacturers must step up their game in order to maintain and grow their presence in the Canadian and Toronto Region’s economy. Investing in innovative practices and technologies to increase productivity and contain unit labour costs is needed to improve their competitiveness. As well, diversifying away from the U.S. and tapping other faster growing markets will increase the pool of potential buyers of Canadian-made goods.

Taking a more granular look at the advanced manufacturing sector, we see some solid opportunities for growth in the Aerospace and Auto & Parts sectors, important contributors to the Toronto Region’s Advanced Manufacturing cluster. Unique challenges facing each of these sub-sectors will require creative business strategies to keep ahead of strong global competitors.
• **Aerospace at 10.5%** - Ontario aerospace is an export-oriented industry with nearly 80% of total sales driven by demand from global supply chains. Ontario is particularly strong in a number of niche markets such as landing gear, flight simulators and satellite sub-systems. These made-in-Ontario components are much needed inputs into the Airbus A380, Boeing 787 and US-led Joint Strike Fighter programs among nearly 100 other aerospace programs around the world. For example, over the next several years, one factor that would play to Ontario’s aerospace sector advantage is the rapidly growing Chinese aviation market. With many people in Asia reaching middle-class status and expressing strong interest in travel, the number of passengers flying on domestic airlines has almost quadrupled in the past decade. No doubt there is a great potential for massive further expansion given China’s population of 1 billion. Building on the Chinese government’s latest five-year plan (2011-2015) to substantially increase the number of airports from 175 to at least 230, Airbus and Boeing expect China to be the most valuable aircraft market in the world.

• **Auto & Parts at 5.6%** - In light of global platform integration and trend towards locating production facilities close to customer base (partly due to rising transportation costs), the assembly side of this cluster continues to face enormous competitive pressures. Developed markets now represent only 45% of global total (down from 65% in 2007) with emerging markets like Mexico, China and India increasingly looking to be in the game. IHS Global Insight forecasts that NAFTA output will shift in favor of the US South and Mexico by 2019 with Mexico producing 75% more light vehicles than Canada. The trend towards longer average age of cars on the road in the U.S. combined with Canadian dollar trading close to parity is another red flag. Still, with the current low interest rate environment firmly on hold until late 2014 and some pent-up demand in the U.S., positive factors can be found in every aspect of the supply chain. Toronto-based firms are likely to continue to play a key role in design and manufacturing of hydrogen and fuel cells for electrical vehicles, cutting-edge portable batteries and energy efficient technologies. On the assembly side, the strength of the yen combined with the push to diversify the supply base to mitigate the risk of another natural disaster will also play to Ontario’s advantage with Japanese OEMs likely to build more plants.

### CHART 1: Future North American Growth for Leading Toronto Clusters

Chart 1 provides an overview of Toronto’s leading clusters across three dimensions, two Toronto based and one North American:

- Cluster employment concentration, relative to the size of Toronto’s economy (far left side of chart)
- Size of cluster relative to Toronto economy (bubbles central axis)
- Projected North American growth rates for Toronto’s leading clusters (bottom of chart).

Overall, these clusters are expected to grow by 2.9% the next four years, with

- **T&L**
  - T&L expected to grow by just under 4%

- **ICT & Creative Industries**
  - ICT is expected to grow at about 5%, while creative/entertainment should grow at just under 3%

- **Food & Beverage**
  - Food and beverage is expected to grow by almost 2%

- **Health-life Sciences**
  - Health and life sciences expected to grow by about 4%

- **Advanced Manufacturing**
  - Two big segments of Toronto’s advanced manufacturing cluster, auto & parts and aerospace, are slated to grow by about 4% and 10% respectively.

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1. Includes Canada, US and Mexico.
2. North America, West Europe, Australia, Japan and Korea.
Advanced Manufacturing Key Facts

- **Relative Strength in North America (Scorecard 2012, Economic Clusters Lens):**
  Toronto ranks 1st in auto & parts cluster. This is largely a result of leading position in output and employment concentration.

  Both auto & parts and aerospace clusters account for over 2% of Toronto’s real GDP.

- **Concentration of Firms:**
  Auto & Parts: Strong results on firm density (Toronto is ranked ahead of 11 other metros in our lens) which makes it easier to attract new talent to the local economy and makes it easier to market the region externally in this cluster. This cluster is also highly productive after rounds of restructuring especially among the Big 3 (i.e. legacy costs and investment in M&E).

  Toronto is home to a number of large assembly plants for major OEM companies such as GM, Toyota, Honda, Chrysler and Ford as well as Canadian head office locations for 18 global auto manufacturers.

- **High-Value Added Potential:**
  Highly R&D intensive cluster which is globally integrated and supports large supply chains both here in Toronto and internationally. For example, more than 80% of vehicles produced in Canada are exported primarily to the U.S. In fact, 1 in every 6 vehicles produced in North America is produced in Toronto.

- **Well-educated Labour Force:**
  Close proximity to world-class engineering schools drives improvement in more traditional industries like steel-making but also results in great innovation in terms of advanced materials.

  Toronto is home to 89 science and engineering university programs and 30 steel and materials science research institutes.

  Toronto is ranked #4 in North America for new fuel technologies publication which is a major new auto innovation.

  Toronto Region universities are a hub of research excellence specifically focused on auto & parts: McMaster University, UOIT, University of Toronto, University of Waterloo and York University.
Discussion Questions for Breakout Sessions

The Board understands that Toronto’s businesses – though often competitors with each other in the marketplace – must collaborate to improve the competitiveness of Toronto’s economy. With this in mind, we see today’s Summit as the first step (see Four Steps to a Successful Cluster Strategy) below in a consultative process looking at ways we can strengthen Toronto’s sample of key industry clusters such as **Food & Beverage; ICT & Creative; Advanced Manufacturing; Life Sciences; and Transportation & Logistics. Energy** will be looked at as an enabling cluster to support the above-mentioned clusters. These five clusters (with their own unique and distinct opportunities for growth and development) have been selected as a starting point to highlight different stages of cluster development and evolution.

By supporting infrastructure development, facilitating the collaboration of business, research, and universities, through the financing of R&D projects etc., governments also have an important role to play in supporting this process.

The primary objective of the break-out session is to examine key strengths and opportunities in your cluster. Specific examples of questions your facilitator will be exploring during the session include:

1. **Existing Cluster Leadership Base**
   - What are your cluster’s comparative advantages (i.e., are there specific areas we excel at nationally & internationally?)
   - How well do firms in your cluster collaborate (e.g., with competitors, supply chains) on issues of common concern (e.g., workforce training, infrastructure)?
   - If all stakeholders critical to your cluster work together, what can be achieved collectively?

2. **Cluster Business Environment**
   - What are the main threats to competitiveness of your cluster in domestic and international markets?

3. **Cluster’s Access to Talent**
   - What are cluster’s key skills and talent strengths/challenges?
     - Access to specialized talent?
     - Access to leadership talent (i.e. management expertise)?
     - Access to on-the-job workforce talent training?
     - Educational institutions – are they responding to supply/demand issues?

4. **Cluster Accessibility & Infrastructure**
   - What are key infrastructure and accessibility strengths/challenges?
     - Broadband connectivity/ICT infrastructure?
     - Transport (roads, rail, air, public transit)?
     - Energy?
     - Infrastructure cost issues – fees, charges, rates?

5. **Innovation / Commercialization of R&D**
   - How well does your cluster promote innovation (new product development, business process/systems, strategy etc.)?
     - Links with universities - tapping into R&D, partnering on commercialization activity?
     - Driving innovation and improved product performance through relationships with suppliers and/or customers?
     - Sufficient levels of in-house R&D, new product development, process re-engineering?
Four Steps to a Successful Cluster Strategy:

**Step 1: Mobilization:**
- Recruit a private sector leader who can conscript broader participation
- Leader must convince participants that a cluster approach will improve their bottom line
- Rally around a common, tangible goal

**Step 2: Diagnosis:**
- Use data analysis tools to identify the strengths, weaknesses and challenges of the region’s strongest clusters

**Step 3: Collaboration**
- Devise cluster Working Groups with members from small and large firms
- Create Action Plans

**Step 4: Implementation**
- Assign to an existing - or create a new-body to manage the cluster initiative
- Identify sources of financing
- Monitoring system