Making an impact:
Driving productivity & advanced manufacturing growth opportunities in Hamilton

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Agenda

*Driving productivity & advanced manufacturing growth*

1. The shifting global manufacturing landscape
2. Canadian manufacturing in context
3. Hamilton advanced manufacturing sector
   - Assets, strengths & opportunities
   - Challenges & vulnerabilities
4. Future of productivity
5. Recommendations

Sheila Botting
National Leader & Senior Practice Partner, Deloitte Real Estate
The Shifting Global Manufacturing Landscape
The Evolution of Advanced Manufacturing

What is advanced manufacturing?
Advanced manufacturing is best viewed as a cluster of economic activities encompassing much more than manufacturing focused enterprise alone. It includes all facets of research, development, production, sales, distribution, logistics, customer service, marketing, and support. Advanced manufacturing extends from the development of physical products to the delivery of services.

Advanced manufacturing moves toward technology based processes
Over the past few decades, manufacturing has evolved from a labour-intensive set of mechanical processes, or “traditional manufacturing”, to a sophisticated set of information-technology-based processes. This evolution includes:

- The universal role of IT
- Growing reliance on modeling and simulation in the manufacturing process
- Acceleration of innovation in global supply chain management
- A move towards rapid flexibility in the production process
- Growing acceptance and support of “sustainable” manufacturing

The Third Industrial Revolution

Described by the Economist as the “third industrial revolution”, **manufacturing is going digital**, and **remarkable new technologies are converging**, including advanced software, materials, robotics, processes and a range of web-based services.

While the factory of the past was based on mass production of identical products, the **factory of the future will be increasingly focused on new processes and products**:

• Additive manufacturing
• Nanotechnology
• Synthetic biology and genetic engineering

*Sources:* The Economist “The third industrial revolution”. April 2012.
Global Future of Manufacturing
Opportunities to drive growth

Deloitte’s research shows that:

The global manufacturing ecosystem has driven more change and impacted the prosperity of more countries than any time since the Industrial Revolution.

Success for any country depends on:

- strong infrastructure,
- foreign direct investment,
- resources and affordable energy,
- accelerated innovation,
- talented human capital and
- strategic use of public policy for economic development.

North America is becoming increasingly competitive as rising labour, supply chain risk & other issues in Asia affect site selection decisions.

Sources:
North America “Re-shoring” Opportunities
Some manufacturing can be re-shored to North America from Asia/Emerging Economies

Recent studies have shown that China / Asia is increasingly challenging for some manufacturers:
• Quality a challenge for high value items
• Supply chain challenges
• Increasing Asian labour costs
• Increasing risk / liability
• Increasing red tape / regulation
• Competing in innovation

Drivers for North America:
• Strong R&D and innovation capabilities
• World class universities & labs
• Infrastructure
• Established supplier network
• Talented and productive labour
• Large middle class consumer base
• Strong intellectual property protection policies
• Quality healthcare
Global Future of Manufacturing
Opportunities to drive growth for North America

Deloitte Research shows that:

US jobs can be created
- 600,000 unfilled jobs from skills shortage
- 500,000 potential jobs from growth
- 2.75 MM jobs from related industries
  (1 manufacturing job generates 2.5 jobs)

= 3.85 MM new US jobs driven by manufacturing
Global Manufacturing Markets

Based on Deloitte’s annual research, Canada is a top global manufacturing competitor

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Index Score, 10=high, 1=low</th>
<th>Rank</th>
<th>Country</th>
<th>Index Score, 10=high, 1=low</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>China</td>
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<td>1</td>
<td>China</td>
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<tr>
<td>2</td>
<td>Germany</td>
<td>7.98</td>
<td>2</td>
<td>India</td>
<td>8.49</td>
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<tr>
<td>3</td>
<td>US</td>
<td>7.84</td>
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<td>Brazil</td>
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<tr>
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<td>Germany</td>
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<td>South Korea</td>
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<td>5</td>
<td>US</td>
<td>7.69</td>
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<tr>
<td>6</td>
<td>Taiwan</td>
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<td>6</td>
<td>South Korea</td>
<td>7.63</td>
</tr>
<tr>
<td>7</td>
<td>Canada</td>
<td>7.24</td>
<td>7</td>
<td>Taiwan</td>
<td>7.18</td>
</tr>
<tr>
<td>8</td>
<td>Brazil</td>
<td>7.13</td>
<td>8</td>
<td>Canada</td>
<td>6.99</td>
</tr>
<tr>
<td>9</td>
<td>Singapore</td>
<td>6.64</td>
<td>9</td>
<td>Singapore</td>
<td>6.64</td>
</tr>
<tr>
<td>10</td>
<td>Japan</td>
<td>6.6</td>
<td>10</td>
<td>Vietnam</td>
<td>6.5</td>
</tr>
</tbody>
</table>

North America “Re-shoring” Opportunities

Some manufacturing can be re-shored to Canada

Canadian re-shoring can be enhanced:

• comprehensive strategy for industry & government
• reinvestment in plant, machinery & equipment
• reinvestment in ICT
• accelerated innovation
• lower competitive labour costs
• small business encouraged to grow
• efficient tax structure
• economic incentives

If US can re-capture 3.85 million new jobs

Canada 10% “rule of thumb”
= 385,000 ++ new jobs?
City of Hamilton
Manufacturing

Sector Assets, Strengths & Opportunities
City of Hamilton Market Strengths

Located within a competitive economic region

- In 2012 the City experienced the 10th highest GDP growth across Canadian CMAs, placing it ahead of Toronto.
- While Ontario markets appear to be challenged, Hamilton has an opportunity to outperform. From 2013 to 2017, Hamilton is projected to maintain GDP growth of 2.3%

Canadian CMA GDP Growth Projections

Source: Conference Board of Canada, 2013
City of Hamilton Market Assets

Proximity to major markets

- Capacity to reach 150 million people in major markets in Toronto, Montreal, New York, Boston, Philadelphia, Columbus, Dayton, Chicago, and Detroit
- Located in close proximity to the GTA and other significant centers of manufacturing activity in Southern Ontario

<table>
<thead>
<tr>
<th>Destination</th>
<th>Km</th>
<th>Driving Time</th>
<th>Destination</th>
<th>Km</th>
<th>Driving Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto</td>
<td>70 km</td>
<td>1 hour</td>
<td>Pittsburgh</td>
<td>450 km</td>
<td>4.5 hours</td>
</tr>
<tr>
<td>Waterloo</td>
<td>70 km</td>
<td>1 hour</td>
<td>Boston</td>
<td>830 km</td>
<td>8 hours</td>
</tr>
<tr>
<td>Guelph</td>
<td>50 km</td>
<td>45 min</td>
<td>Washington</td>
<td>720 km</td>
<td>8 hours</td>
</tr>
<tr>
<td>Ottawa</td>
<td>520 km</td>
<td>5 hours</td>
<td>Baltimore</td>
<td>680 km</td>
<td>7.5 hours</td>
</tr>
<tr>
<td>Montréal</td>
<td>610 km</td>
<td>6 hours</td>
<td>New York</td>
<td>730 km</td>
<td>11 hours</td>
</tr>
<tr>
<td>Detroit</td>
<td>310 km</td>
<td>3 hours</td>
<td>Chicago</td>
<td>775 km</td>
<td>7 hours</td>
</tr>
<tr>
<td>Cleveland</td>
<td>415 km</td>
<td>4 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
City of Hamilton Market Assets

Diverse infrastructure assets & prime location

Port of Hamilton
- Handles more than 12 million tonnes of cargo annually
- Links Ontario’s manufacturing heartland to the St. Lawrence Seaway
- Grown to be Canada’s busiest commercial Great Lakes port, 4th largest port in Canada

John C. Munro International Airport
- Canada’s top multi-modal cargo and courier airport, Ontario’s only 24-hour inter-modal cargo hub

Network of highways
- QEW provides regional access to the GTA, Hwy 401 and ring road system to move goods throughout the City quickly

International rail lines
- CP / CN, provide complete rail freight services across North America
City of Hamilton Market Assets
Access to strong science technology engineering & mathematics programming / research

- McMaster University
  - McMaster Manufacturing Research Institute
  - McMaster Innovation Park
  - McMaster Institute for Automotive Research and Technology
  - McMaster-Mohawk Bachelor of Technology Partnership

- Mohawk College
  - iDeaWORKS - Based on partnerships between Mohawk students and start-ups, small businesses and non-profit organizations
  - ArcelorMittal and Mohawk College Enterprise Corporation’s Steel Worker for the Future Program
  - Mohawk College Enterprise Corporation’s Advanced Manufacturing Workshop Series

Hamilton Health Sciences & St Joseph’s Healthcare
- Employs nearly 10,000, comprised of 6 unique hospitals and cancer centre
- Recently selected by GE Healthcare to be the first site in the world to receive new prototype technologies for molecular breast imaging research program
City of Hamilton Sector Strengths

Conference Board of Canada forecasts that manufacturing will rebound

- Manufacturing employment is projected to rebound and grow significantly in the longer term, reaching an estimated 54,300 by 2017 largely due to recovering US and global economies.

- This forecast is largely fueled by some anticipated recovery in the steel industry, significant recent investment by Canada Bread and Maple Leaf, and other expansions

Hamilton manufacturing employment

Source: Conference Board of Canada, 2013
## City of Hamilton Sector Strengths

### Recent manufacturing investment in Hamilton:

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ace-Plastix</td>
<td>McMaster Automotive Research Centre (MARC)</td>
</tr>
<tr>
<td>Adventec Manufacturing</td>
<td>National Asset Recovery Specialists Ltd</td>
</tr>
<tr>
<td>Agrico Canada Inc.</td>
<td>Navistar</td>
</tr>
<tr>
<td>Baffin Inc.</td>
<td>Paletta International Corporation</td>
</tr>
<tr>
<td>Coreslab Structures (Ont) Inc.</td>
<td>Radwell International Inc</td>
</tr>
<tr>
<td>Ecodyne Limited</td>
<td></td>
</tr>
<tr>
<td>Empire Steel America</td>
<td>Salerno Dairy Products</td>
</tr>
<tr>
<td>Eveley International Corporation</td>
<td>Staalduinen Floral Ltd</td>
</tr>
<tr>
<td>Fibracast Inc.</td>
<td>Stackpole – Engineered Products Division</td>
</tr>
<tr>
<td>Flynn Canada Ltd</td>
<td>Sylvite AgriServices</td>
</tr>
<tr>
<td>John C. Munro Hamilton International Airport Intermodal Cargo Facility</td>
<td>Yellow Line</td>
</tr>
<tr>
<td>Kube Steel</td>
<td></td>
</tr>
</tbody>
</table>

Source: Conference Board of Canada, 2013

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City of Hamilton Sector Strengths

Ontario has an established advanced manufacturing cluster

- Hamilton’s advanced manufacturing cluster is part of a much larger regional cluster of manufacturing sector activity and supporting industries across southwestern Ontario.

- Such a regional advanced manufacturing based presence results in widespread benefits as new organizations locate in the region, and start to source inputs from Hamilton.

### Ontario’s Leading Sectors / Industries

<table>
<thead>
<tr>
<th>Industry</th>
<th>Revenue (billions)</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials &amp; Machinery</td>
<td>$40.0</td>
<td>100,000+</td>
</tr>
<tr>
<td>Automotive</td>
<td>$68.5</td>
<td>100,000+</td>
</tr>
<tr>
<td>Environment / Clean tech</td>
<td>n/a</td>
<td>50,000+</td>
</tr>
<tr>
<td>Aerospace</td>
<td>$6.5</td>
<td>25,000+</td>
</tr>
<tr>
<td>Food and Beverage Processing / Manufacturing</td>
<td>$32.0</td>
<td>100,000+</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>$10.0</td>
<td>20,000+</td>
</tr>
<tr>
<td>Information Technologies</td>
<td>$100.0</td>
<td>250,000+</td>
</tr>
</tbody>
</table>
City of Hamilton Sector Strengths

Significant industry revenue and employment generation

2005-2009 Average Hamilton Manufacturing Revenue (billions)

- More than 1,000 manufacturing companies employ an estimated 13% of the local workforce. Charts below show revenue and employment by major sectors in Hamilton.
- Thousands of diverse products are manufactured in Hamilton, and sold globally

2005-2009 Average Hamilton Manufacturing Employees

Source: Statistics Canada, Principal statistics for manufacturing industries, by North American Industry Classification System

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City of Hamilton Sector Opportunities

Hamilton drives significant manufacturing export activity

With respect to top export destinations for goods:

- The US accounts for 77% of all Ontario exports
- Ontario’s exports largely comprised of auto (24.9%), gold (10.7%), motor vehicle parts (5.1%) and nickel (5.1%)
- Economic wealth generated from Hamilton manufacturing is driven by exports, with over 96% consumed by the US
- Approximately 80% of Hamilton manufacturers are exporting their products to US markets
- The City supports Ontario’s primary export products, largely through its extensive automotive manufacturing
City of Hamilton Sector Opportunities

FDI driven by advanced manufacturing

• In 2012, Ontario FDI projects were driven by advanced manufacturing, including transportation equipment, engines, turbines and industrial machinery

• Such areas align well with Hamilton’s advanced manufacturing sector, and represent a potential future growth opportunity

Increasing competition for FDI

• Manufacturing accounted for 26% of global FDI in 2010, generating 1.1 million jobs

• As public funding challenges mount, the competition between nations for FDI will increase dramatically

• Membership in the World Association of Investment Promotion Associations has increased by 2.5 times over the past ten years

• For companies, the multitude of potential investment options will be increasingly hard to differentiate and navigate
City of Hamilton Manufacturing

Sector Challenges & Vulnerabilities
City of Hamilton Market Challenges & Vulnerabilities

Industrial market steadily tightening

- Hamilton’s industrial real estate market is currently very tight, and has seen a substantial reduction in the amount of industrial space available on the market.

- The City’s vacancy rate for industrial space was **2.8% at Q4 2013**, a significant decrease from 2010 and 2011 levels, where vacancy ranged from 3.4% to nearly 7%.

- Hamilton’s vacancy is tight relative to various markets in the west GTA.
City of Hamilton Market Challenges & Vulnerabilities

Regulatory hurdles and labour union considerations

- **Regulatory hurdles**: Ontario ranks 5th for Independent Business Red Tape report
  - Ontario ranked 5th in 2013 Canadian Federation of Independent Business Red Tape Report Card, as many business owners feel that cost of compliance is high
  - Ontario employers face approximately 385,000 requirements, largely from Ontario’s Ministry of Labour, Workplace Safety and Insurance Board, and the Province’s environmental regulations – among nation’s strictest

- **Labour union considerations**
  - Hamilton stakeholders identified the City’s unionized manufacturing environment as a potential challenge to sector growth
  - Southern Ontario’s unionized environment may pose challenges to businesses during periods of slow economic growth, and given less costly US labour options available
  - Increasing trend within the US involves pushing the country’s auto belt south from Michigan and Ohio into areas such as Alabama and Mississippi in search of cheaper labour and fewer costly union battles
City of Hamilton Market Challenges & Vulnerabilities

Perceptions/misconceptions of Hamilton manufacturing

• Strong perceptions around manufacturing for traditional, factory, assembly based activities

• Lack of understanding around the advanced skills, processes, technology and innovation employed in manufacturing today

• Given Hamilton’s association with manufacturing, there is also some degree of negative perception / misconception associated with the City itself
City of Hamilton Market Challenges & Vulnerabilities

Hamilton manufacturing leaders note that re-positioning needs to evolve and capture innovation & advanced technology

Deloitte interviewed numerous leaders across Hamilton’s manufacturing community. They told us that the City image and positioning needs to change. The City of Hamilton needs to be positively viewed for:

- a community that embraces the advanced manufacturing sector
- its advanced manufacturing strengths and assets
- its focus on the technological, innovative and sophisticated aspects of manufacturing – “advanced manufacturing”, in addition to its more traditional manufacturing activities
- positive quality of life and sustainable environment
Deloitte
The Future of Productivity

The innovators time is now
Recommendations
The Future of Productivity

Recommendations

Business
• Real estate: enhance opportunities for development and occupancy
• Move beyond “status quo”
• Build national and multinational business
• Leverage new capital equipment
• Invest in talented minds
• Create more clusters
• Invest and then reinvest

Government
• Encourage foreign direct investment
• Continue to improve Canada’s immigration system
• Provide incentives for growth rather than remaining small
• Remove barriers and red tape for growth
• Expand trade inflows and outflows
• Foster fact-based decision making

Academia
• Create the curriculum to support productivity
Hamilton Advanced Manufacturing Recommendations

Update Marketing and Branding
- Showcase City’s advanced manufacturing sector
- Update City’s advanced manufacturing sector’s marketing materials
- Position Hamilton as part of broader GTA and beyond
- Market Hamilton as a top location to live, work and play

Enhance Business Retention
- Understand needs of large and strategic advanced manufacturing firms
- Identify key service providers and supply chain linkages
- Identify opportunities to assist existing businesses
- Maintain regular contact with key industry leaders

Develop Investment Attraction Strategy
- Assess opportunity for targeted financial incentives
- Lead tours of the City’s advanced manufacturing facilities
- Regularly monitor FDI opportunities
- Aggressively pursue high profile investments with tools and local leadership
- Aggressively engage in industry events including CORENET, NAIOP etc

Develop Strategy to Enhance Talent & Skills
- Identify gaps in local demand and supply of advanced manufacturing talent
- Support and expand education and technical training programs
- Encourage local entrepreneurship and innovation