The Changing Automotive Landscape: An Introduction

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Vehicles are evolving into mobile computing centers, which include connectivity between vehicle to vehicle and vehicle to infrastructure through the internet.

— Key Informant
EXECUTIVE SUMMARY

The advent of advanced technologies is changing long-standing automotive industry practices. Vehicles are evolving into mobile computing centers, which include connectivity between vehicle to vehicle and vehicle to infrastructure (traffic lights, road ways, etc.) through cloud and the Internet of Things (IoT)\(^1\). Automakers and the automotive aftermarket industry have continued to look at ways of modernizing the next generation of vehicles, and put consumer needs at the forefront. Since digital technologies are pervasive throughout the automotive industry, the need for innovative strategies and approaches is increasingly important. Given this new reality, it is critical to get an in-depth understanding of how the automotive aftermarket industry views innovation.

The Automotive Industries Association (AIA) of Canada partnered with Information and Communications Technology Council (ICTC) to develop this report. It offers a quick overview of the state of innovation in the automotive aftermarket industry which consists of manufacturers, remanufacturers, retailers, distributors and suppliers of all vehicle replacement parts, accessories, tools, equipment, and services. This paper attempts to answer the following crucial questions:

- What recent technological innovations have been the greatest disruptors in the aftermarket industry?
- What skills/talents will be required for the aftermarket industry given the changes?
- What strategies are currently employed by aftermarket industry players to take advantage of technological innovations?
- What are some of the government policies that encourage innovation and research and development (R&D) in the automotive industry?

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**Key Findings**

- Telematics, Autonomous Vehicles (AVs), Electric Vehicles (EVs), and Additive Manufacturing (3D Printing) are the top disruptors in the industry.
- Emergence of non-traditional players like Google and Tesla has increased competition in the industry.
- Increased focus on vehicle security and safety due to use of telematics systems.
- The labour market is slow in adapting to the technological shifts and skills needed.
- More science, technology, engineering and math (STEM) and digital skills are required in the industry as a result of the changing landscape.
- Technological innovations will negatively or positively impact the aftermarket depending on how business managers leverage the opportunities they present.
- Government at all levels need to provide more incentives to encourage innovation.

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\(^1\) IoT is the extension of the Internet into the physical world through embedded technology that can communicate in real time. Cisco (2014). The Internet of Everything — A $19 Trillion Opportunity.
INTRODUCTION

The automotive industry is Canada’s largest manufacturing sector and accounts for 15% of North American vehicle production\(^2\). It has been a beneficiary of a range of promising technological innovations spurred by the emergence of non-traditional automakers like Google, Tesla, and services such as e-commerce, Internet of Things (IoT), Machine to Machine (M2M), Robotics, 3D printing, data, and analytics. Most industry players estimate that as a result of these trends, by 2020, the automotive industry will move beyond basic vehicles to embrace more connected vehicles. Although there is no unified viewpoint on how the industry will look in 10 to 15 years, the popular consensus among consumers and key industry players is that the technological advancements have introduced new features in cars and is leading to the naissance of a new ecosystem of suppliers with new regulatory laws established in areas of safety regulations, cyber security and data privacy\(^3\). Future innovations are centering on seven functional areas including autonomous driving, safety, entertainment, human health/well-being, vehicle management, mobility management, and home integration\(^4\). Industry players agree that technological advancements hold a lot of promise due to their high revenue yields and the increased business avenues they afford.

Experts agree that these technological innovations will escalate an already intense war for skilled talent by 2020. The shift from traditional mechanics to software programming will necessitate that automotive service professionals of the future have a more complex, multifaceted set of skills than today. Programming and cybersecurity skills will become one of the most soughtafter talents for the future industry workforce. Currently, numerous cars have millions of lines of code embedded in them and servicing these sophisticated, software laden cars will require a technology savvy workforce.

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EFFECT ON THE AFTERMARKET INDUSTRY

The aftermarket segment will be heavily impacted by the technological advancements as repair cycles change, demand for vehicle parts decreases and the skills needed for vehicle repair and maintenance become more complex. However, it is not all gloom and doom for the aftermarket segment. Telematics and other emerging technologies could give the industry a chance to explore more revenue opportunities. Currently, aftermarket industry players are investing in more training for employees and exploring innovative strategies to take advantage of these revenue opportunities.

As Canada continues to assert itself as a leading innovator in the global economy, government support is crucial as the automotive industry makes this huge transition. Governments at all levels – municipal, provincial and federal will need to continue to intervene and be even more active in supporting the industry by investing in the sector through emergency loans and incentive packages. This support will be sure to set the pace for growth of talent and innovation in the automotive and aftermarket industries over the next few years.

METHODOLOGY

In developing this paper, two methodologies were employed - Key Informant Interviews (KIIs) and secondary research validated by the KIIs. A total of 7 KIIs from the aftermarket industry were consulted to gather their insights around the impact of technology on the sector. Senior executives were interviewed to understand and gauge the technological trends in the industry, identify the opportunities and challenges for innovation and skills development, and provide key recommendations for strengthening the aftermarket industry in Canada.
Electric vehicles will be the next greatest disruptor because it will mean going from several parts in a vehicle to about 5 or 7 parts. That will greatly reduce demand and supply.

— Key Informant
TRENDS & ANALYSIS

(A) Telematics

Telematics in motor vehicles collects data while in motion through sensors for assisted driving, vehicle speed, fuel consumption, braking, transmission control systems, air bags, tire pressure and wiper speed, as well as geospatial and environmental conditions in order to provide consumers with a greater mobile experience. A vast amount of vehicle data is generated each second and in 2014, an estimated 26 million connected cars collected more than 480 terabytes of data. Aftermarket industry players report the ability to manage this data as a growing concern in the industry. Based on the type of telematics, the market is segmented into Automotive Original Equipment Manufacturers (OEM) and the aftermarket industry. Traditional automotive OEMs focuses on traffic safety while aftermarket highlights media, entertainment and other personalized services for consumers (i.e Delphi’s AutoIQ, track and trace services, remote start, automatic emergency notification, Pandora Radio, Hulu TV and curbside assistance). The global telematics market is expected to grow exponentially from 2016 to 2020 with a compound annual growth rate (CAGR) of 33.7% and approximately 104 million connected new cars are expected to flood the market by 2025. As the telematics market continues to witness exponential growth, the central question is how the aftermarket can best position itself to sustain or increase market share while accelerating the adoption of telematics into the mainstream.

Data generated from telematics will deliver a new level of value to the aftermarket industry looking to operate increasingly efficient transportation systems. Hundreds of millions of cars on the road today lack embedded solutions while their drivers display an increasing appetite for in-vehicle connectivity. Motorists want their car – and their service, repair, and maintenance experience – to be up-to-date, delivering the connectivity and convenience they expect in the rest of their lives. Aftermarket telematics devices can now monitor vehicle health, identify the need for preventative maintenance, send remote vehicle diagnostic reports when something goes wrong, and even schedule service appointments.

Mounting concerns over the effect of telematics for the aftermarket industry are that telematics services will be exploited to entice and direct drivers back to the Original Equipment dealers impacting virtually every aftermarket supplier. This is more likely in situations where the automaker has exclusive access to the vehicle’s diagnostic system and will therefore have exclusive control over repair recommendations. Therefore, the future market share of the independent aftermarket in some product categories could be at risk.

6 Ibid.
8 Big Market Research (2015). Global Consumer Telematics Market
This potential risk to the aftermarket raises compliance concerns with regards to the Canadian Automotive Service Information Standard (CASIS) as the aftermarket calls for more open vehicle information while auto manufacturers strongly oppose it\textsuperscript{11}.

Opportunities however exist as telematics can transmit vehicle diagnostic information to technicians ahead of service appointments which in turn can reduce diagnostic time. This will require a lot of investment in equipment and training for the aftermarket. If leveraged wisely, telematics can strengthen relationships between the automotive repair shops and their customers.

\begin{itemize}
  \item Telematics is changing the fundamental ways people decide to get their repairs done.
  \item Exhaust & emission control and diagnostic equipment are product categories most likely to be impacted by telematics.
  \item Shops have to change their business models to become more service oriented and offer quick diagnostic capabilities.
  \item Telematics will have a positive and negative impact on the aftermarket business depending on how business executives handle it.
\end{itemize}

\textbf{(B) Autonomous Vehicles}

Self-driving cars have transitioned from science fiction to becoming a future reality. Autonomous Vehicles (AVs) are being designed not just from the traditional automotive sector but also from non-traditional automotive players like Google and Tesla. Self-driving cars have the potential to improve road safety and human well-being by reducing the number of vehicle crashes due to human error or fatigue. This “crash-less” future is estimated to eliminate personal injury and property damage associated with car crashes and save more than 30,000 lives per year\textsuperscript{12}.

The implications for vehicle design and manufacturing are profound as industry experts estimate that autonomous cars will require less structural parts than regular cars. Research indicates that this will have huge implications for the automotive aftermarket as there will be a fall in the demand and manufacturing of structural steel, air bags, roll cages among other safety features\textsuperscript{13}. Vehicle repair and maintenance shops could also lose revenue as the OE dealers will be better equipped to repair the cars they have manufactured.

\textsuperscript{11} See AIA Canada CASIS Agreement setting out the terms between AIA Canada, NATA, CVMA and AIAMC on the right to repair. \url{http://www.natacanada.ca/pdf/CASIS-AGREEMENT-AppendixIII.pdf}


\textsuperscript{13} Ibid.
Ultimately, the size, shape and design of the future vehicles will be different and open up new opportunities for business globally. Industry players cite unclear legal and regulatory frameworks, technical constraints, infrastructure barriers, unpredictable consumer acceptance and cost of development as impediments to investment and growth in this technology.

A report by the Boston Consulting Group estimates that autonomous cars might have a market potential of $42 billion by 2025. Most industry players underestimate how far the technology has advanced for self-driving cars and how imminent the disruption is. Interviews with some aftermarket company executives bring to the forefront the lack of awareness of the shifting forces in the industry and their possible impact. Mercedes, one of the leading OEMs championing the revolution with autonomous cars already has a car model that can drive on the freeway provided the driver keeps their hands on the wheel. This revolution is already upon us and the aftermarket industry will need to create strategic pathways to understand the innovation and market trends in order to reap the full benefits.

Key Findings

- Opportunities will open up for the aftermarket supply in different product categories, such as comfort, accessories, viewing, storage etc. as opposed to speed and acceleration.
- Most self-driving cars will be electric which will mean less need for structural parts and less need for repair.
- Technicians will require extensive technical knowledge of every car component and any change to the vehicle will require a recalibration of certain systems.
- Focus R&D investments on AV solutions that generate the most value for your customers.
- Use digital media and smartphones to promote features and facilitate customer transactions.
- Invest in employee (on-floor, sales and technicians) and driver training, and customer awareness.
- Restructure aftermarket business model to address new retail competition that may spawn from AV deployment.
Additive Manufacturing (AM) is the industrial version of 3D printing. Over the last few years, significant developments in 3D printing have transformed potential ways in which products are designed, manufactured, developed and distributed. As materials needed for cars are changing, manufacturing equipment needed for these new materials will also be significantly different. Additive Manufacturing (AM) has created new opportunities for the automotive sector by encouraging newer designs, cleaner, lighter and safer products, shorter lead times and lower costs. It has functioned not as a technology but as an enabler to derive greater business value. AM is useful in manufacturing products with custom features making it possible to add improved functionalities. AM also has the added advantage of lowering handling and inventory costs by only making use of materials necessary to produce a particular component or by producing different varieties of a product at lower cost. Within the automotive industry, OEMs and their suppliers have been able to maximize AM potentials to enhance overall manufacturing capabilities and reduce costs.

One of the most important bases of competition for automotive aftermarket suppliers is part availability and delivery times. Given the high cost of carrying inventory, most suppliers only hold commonly demanded products with less demand or expensive parts held at different locations. According to an aftermarket company executive, “there are too many different parts on the road and it is hard to meet up supply”. AM can help match the supply and demand by enabling on-demand manufacturing of components at locations closer to their point of use. Certain vehicle parts which are expensive to replace or repair can also be manufactured using AM at service locations, for example drivetrain or engine components. Aftermarket suppliers should look at exploiting AM capabilities to deliver better services at greater value to consumers.

The availability of materials to be used in the development of electrical components for vehicles has been a source of concern to the automotive industry. While traditional manufacturing makes use of a variety of materials such as metals, alloys and composites, AM has a limited number of usable materials which in turn makes it expensive. Industry players also report limitations in using AM to manufacture large parts. Given this limitation, companies still have to undergo mechanical or welding processes to attach together large parts. R&D investments need to be made to support the development of AM materials and equipment capable of producing large parts. Some AM specific skills are found in areas of CAD design, AM machine making, operation, maintenance, raw material preparation and management. With the expansion of AM applications, there will be a greater need for formal and extensive training and skill development programs in the application and management of AM. These programs require collaborative efforts among academic institutions, AM service providers, and end-user industries to standardize training and create a stable and capable workforce.

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15 Ibid.

16 Ibid.

17 Ibid.
The Changing Automotive Landscape: An Introduction

Key Findings

- Manufacturers are experiencing limitations in the use of AM to manufacture large parts.
- Lack of inexpensive materials for AM manufacturing compared to conventional manufacturing.
- Talent and skills shortage in handling AM equipment.
- Unclear intellectual property protection laws for AM products.
- Partnering with AM service providers.

(D) Electric Vehicles

The Electric Vehicle (EV) is not a recent development. It has been around for over 100 years with France and England being the first nations to develop it in the 1800s. Recent technological advancements have led to the development of various forms of EVs such as hybrid, plug in, electric battery and fuel cell. Industry statistics estimate that by 2018, there will be at least 500,000 highway capable EVs on Canadian roads. This means that future EVs will have the capacity to operate on all roads within current infrastructure and meet Canadian Motor Vehicle Safety Standards.

The overall performance of the EV is expected to exceed that of current vehicles in all aspects including comfort, convenience and environmental standards. By 2030, EVs could account for 50% of all vehicle sales. The speed of consumer adoption will be determined by consumer pull and regulatory push, with adoption projected to be highest in developed cities that have strict emission laws and lucrative consumer incentives. For aftermarket suppliers, an increase in lightweight cars and EVs on the road will mean a reduction in the number of parts needed for vehicles and would significantly affect their revenue as EVs generally require fewer parts than traditional vehicles. According to two aftermarket company executives, “cars are lasting longer than they used to be, so the repair cycle is not moving and parts are not getting replaced as frequently which affects our business”.

20 Ibid.
22 Ibid.
THE CYBERSECURITY CONVERSATION

Topping the list of challenges facing the automotive industry is the question of building a connected car that is safe from cyber attacks. Embedded telematics software exposes the vehicle to added security threats such as the takeover of critical car functions like braking and steering; attacks on car door locks; attacks intended to extract or leak identity, financial or personal information managed on the vehicle; and attacks on vehicle systems intended as a pivot point to exploit other systems.

With new cybersecurity measures of designing closed systems being taken by automakers in order to forestall cyberattacks and reduce the risk of hacks, there is a fear that such closed systems could result in a lack of access for the aftermarket and could leave shops unable to diagnose and make proper repairs. Given the divide between protecting consumers and giving access to aftermarket repair shops, it is important that industries continue to work together to ensure the aftermarket has access to vehicle information, tools and software it needs.

**Counter Measures**

- **Avoid Bugs**: Most attackers take advantage of loopholes in the security system to launch attacks. Bugs can be avoided by putting in place secure software standards or design rules; installing secure software metrics and tools; and taking adequate measures to avoid known bugs and exploits.

- **Enforce Trust Boundaries**: Establishing a closed network of trusted peers and rejecting every ‘unknown’ can help to maintain safe and secured systems. This can be achieved by enabling core cryptographic features, secure data storage, and tamper resistance car door locks.

- **Resilience**: Maintaining operational integrity even when compromised as well as constant monitoring and early detection of security threats and loopholes will reduce the risk of cyberattacks. Automakers must also design cars with features such as redundancy management and automated recovery.

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Nowadays, the automotive industry is “gender-neutral” because now you do not need a hammer but programming and analytical skills to repair a car.

— Key Informant
## People and Talent

### Current and Future Skills Required in the Automotive Industry

Competition in the automotive industry is intense as the sector grows and changes. Successful businesses must constantly innovate by introducing new technology to differentiate and improve their brands. These emerging technologies will have an impact on the research and development of future processes therefore requiring continuous development and training of the current and future workforce. The current skills landscape of the automotive industry is much different than that of the past and will continue to evolve in the future. As vehicles integrate more software into their systems and the divide between automotive and technology industries becomes increasingly blurred, more talent is needed, including those from the science, technology, engineering, and mathematics (STEM) fields. It is recommended that the automotive industry, educational sectors and the government develop the right set of skills and apprenticeship training programs to keep up with current and future industry talent needs.

### Current Critical Skills
- Mechatronics
- Electronics
- Programming
- Metrology

### Future Critical Skills
- Advanced Integrated Technology
- Basic Engineering
- Clean Vehicle Technology
- Robotics
- Computer Aided Design (CAD)
- Advanced Problem Solving
- Analytical and Programming
- Leadership Training

### Skill and Talent Strategies
- Development of locally tailored educational programs
- Broaden recruitment search to foreign talent
- Review salary and benefit packages to attract more talent
POLICY RECOMMENDATIONS

A Lack of Awareness of Government Policies

Consultation with industry has revealed a lack of awareness of current government policies, specifically provincial programs, put in place to support research and innovation within the automotive aftermarket industry.

Since August 2016, 14 funding programs suited for Ontario automotive businesses have been made available (Appendix B), with three specifically designed to support research and innovation activities.

Voices from the Industry

1. Create more conversations and cooperation among governments, industries and stakeholders

Businesses in the automotive aftermarket industry are looking forward to more open and in-depth conversations with the government. It will help to create more applicable tax credit programs with a focus on encouraging scientific research and experimental development.

2. Set up standardization on imported vehicles and parts.

There is a lack of regulation on the quality of parts that are imported from other countries. Consumers tend to purchase less expensive imported parts, and it leaves Canadian aftermarket businesses in an unfavourable situation. According to one aftermarket company executive, “Those imported parts are not as good as those made in Canada; the government should use the same product standards that apply to Canadian businesses and regulate those imported products.”

3. Establish more formalized and comprehensive technician training among the industry.

According to a company executive, technicians who obtained their training decades ago are still eligible to work on newer vehicles even though vehicles have evolved and are very different from older models. “In some jurisdictions, you need to get your training hours or you will get fined, I think it’s necessary to set up more formalized and comprehensive technician training within the industry.”
Top **SIX** Auto Industry Concerns around Innovation:

1. Lack of clear regulations.
2. Insufficient IP protection laws.
5. Inadequate talent/skills.
6. Emergence of non-traditional players with unfair cost advantage.
RECOMMENDED ACTIONS FOR GOVERNMENT/POLICYMAKERS

- A review of the eligibility criteria of federal and provincial level programs will help open up opportunities for more automotive aftermarket businesses to get involved in the innovation agenda.

- Better collaboration between governments, original equipment manufacturers and the aftermarket to establish regulatory standards for the intellectual property (IP) protection for design and manufacturing of the car components, and new technologies on the horizon such as telematics and 3D printing.

- Continued interest by the government to invest in the industry and provide incentives for advanced research and development (R&D) of new technologies that will help position Canada as a global thought leader.

- More synergy between policymakers and automotive sector associations to inform its members of the available provincial and federal programs that promotes innovation. This can be done through periodic consultations with the industry.

- A unified approach by the government, automotive industry and the education sector while designing and developing innovative programs to help build the talent required for the rapidly shifting automotive sector.

CONCLUSION

The advent of emerging technologies in the automotive sector is creating a new world of R&D and economic opportunities for the industry. To harness these opportunities, the aftermarket sector needs to invest in the development of skills and talent. While this report provides a bird’s eye view of how the sector is changing, further in-depth studies are vital to understand the impact the technological advances of the automotive sector will have directly on the aftermarket industry.
APPENDIX A

AIA CANADA INNOVATION STUDY INTERVIEW QUESTIONS

INTRODUCTION
As you are probably aware, ICTC is partnering with AIA Canada to get an in-depth understanding of how the automotive industry and its multiple sub-sectors view innovation.

As part of this important initiative, we are seeking input from leading Canadian businesses in the automotive aftermarket industry. Your participation will help identify trends and talent needs for this industry, and formulate strategies and recommendations for boosting innovation in this sector.

The goal of this interview is to have a discussion with you about your business, where you see it going and the opportunities/challenges you face in reaching your goals. More specifically, the purpose of this interview is to:

- gather background information about yourself and your organization;
- understand which trends and challenges will most heavily impact your organization and the Canadian economy; and
- look for additional insights that may be gleaned from a more open dialogue.

In advance of the interview, please find below the questions the interviewer will ask you during your discussion with them.

BACKGROUND INFORMATION

1. What is your role within your organization?
2. What is your organization’s core business?
3. How many employees work for your organization?
4. What’s your company’s business scale (Annual Revenue/Profit)?
5. What is the location(s) of your major Canadian operation(s)?
**TRENDS AND CHALLENGES**

1. In the last 3 years, what will you say has been the greatest driver of change in the automotive/after-market supply industry?

2. In your opinion, which recent technological innovations are the greatest disruptors in the automotive/aftermarket supply industry?

3. Have these technological innovations positively or negatively impacted your business? How?

4. Given the radical shift in the automotive industry in recent years, has your skill requirement for employees changed? (if yes, please specify the skills)

5. Do you face any technological challenges in your business? (please specify the challenges and indicate which is the biggest)

6. In response to 4 above, what strategies are you employing to take advantage of technological innovations and to tackle the challenges you face?

7. Which government/industry policies do you think can positively enhance technological innovation in the automotive industry and which current policies do you think negatively inhibit technological innovation?

8. Any other comments, thoughts or insights you would like to add?
<table>
<thead>
<tr>
<th>PROGRAM</th>
<th>MINISTRY</th>
<th>PROGRAM FOCUS</th>
<th>TYPE / DESCRIPTION</th>
<th>HOW IT WORKS</th>
<th>KEY ELIGIBILITY CRITERIA</th>
</tr>
</thead>
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<tr>
<td>Ontario's Business Research Innovation Tax Credit</td>
<td>Ministry of Finance</td>
<td>Research &amp; innovation</td>
<td>Refundable tax credit</td>
<td>20% refundable tax credit for qualified expenditures on scientific research and experimental development work performed in Ontario under contract with eligible research institutes.</td>
<td>An eligible expenditure: - is incurred for scientific research and experimental development carried on in Ontario - qualifies under section 127 of the federal Income Tax Act - is attributable to a permanent establishment in Ontario.</td>
</tr>
<tr>
<td>Ontario's Research &amp; Development Tax Credit</td>
<td>Ministry of Finance</td>
<td>Research &amp; innovation</td>
<td>Non-refundable tax credit. A 4.5% per cent non-refundable tax credit on eligible scientific research and experimental development expenditures performed in Ontario to reduce their Ontario corporate income tax payable.</td>
<td>Corporation must carry on scientific research and experimental development in Ontario during the year and: - is eligible to claim the federal investment tax credit under section 127 of the federal Income Tax Act - is not exempt from corporation income tax - has filed a scientific research and experimental development expenditures claim on federal form IT1611 for the year.</td>
<td>A qualified expenditure: - is incurred for scientific research and experimental development carried on in Ontario qualifies under section 127 of the federal Income Tax Act - is incurred when the corporation has a permanent establishment in Ontario - capital expenditures made after December 31, 2014 no longer are qualifying expenditures.</td>
</tr>
<tr>
<td>Ontario's Innovation Tax Credit (OITC)</td>
<td>Ministry of Finance</td>
<td>Scientific research &amp; experimental development</td>
<td>Refundable tax credit. A 10 per cent refundable tax credit for qualified expenditures on scientific research and experimental development performed in Ontario.</td>
<td>Maximum tax credit is $200,000 based on an expenditure limit of $3 million. The expenditure limit is gradually reduced if: - the federal taxable income of the prior tax year exceeds $500,000 and is totally eliminated at $800,000 - the prior year's taxable capital exceeds $25 million and is totally eliminated at $50 million.</td>
<td>A qualified expenditure: - is incurred for scientific research and experimental development carried on in Ontario qualifies under section 127 of the federal Income Tax Act - is incurred when the corporation has a permanent establishment in Ontario - capital expenditures made after December 31, 2014 no longer are qualifying expenditures.</td>
</tr>
<tr>
<td>Ontario's Innovation Tax Credit (OITC)</td>
<td>Ministry of Research and Innovation</td>
<td>Recent startups that are commercializing IP developed at Canadian universities and colleges</td>
<td>Tax refund. For a newly established corporation in certain sectors (e.g. bioeconomy/ cleantech), you could be eligible for a refund of the corporate income tax and corporate minimum tax your business paid in its first 10 taxation years.</td>
<td>You also: - must be incorporated between March 25, 2008 and March 24, 2012 - cannot be formed by way of an amalgamation or merger - must be commercializing intellectual property developed at a Canadian university or college.</td>
<td>-</td>
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<td>PROGRAM</td>
<td>MINISTRY</td>
<td>PROGRAM FOCUS</td>
<td>TYPE / DESCRIPTION</td>
<td>NEW WAYS</td>
<td>KEY ELIGIBILITY CRITERIA</td>
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<tr>
<td>Industrial Accelerator Program (IAP)</td>
<td>Ontario Power Authority (OPA) / Ministry of Energy</td>
<td>Helps companies (1) fast track capital investment in major energy-efficiency projects.</td>
<td>Reimbursement</td>
<td>Designed to assist eligible transmission-connected companies to fast track capital investment in major energy-efficiency projects. The program will provide attractive financial incentives to encourage investment in innovative process changes and equipment retrofits so the rate of return is competitive with other capital projects. Eligible participants can receive funding of up to 70% for major energy-saving projects, including process and system changes, retrofits and new construction. The same program will provide financial incentives to encourage investment in innovative process changes and equipment retrofits. In exchange, participants will commit to delivering specific conservation targets within a set period of time and to maintaining them over the expected life of the project.</td>
<td>Customer must be linked to ESO transmission grid. Eligible facilities are indicated in the following link: <a href="http://www.industrialaccelerator.ca/eligible-lists">http://www.industrialaccelerator.ca/eligible-lists</a>. (Companies not on the list can contact an OPA Business Manager indicated in the above link)</td>
</tr>
<tr>
<td>saveONenergy Business Electricity Conservation Programs</td>
<td>Ontario Power Authority (OPA) / LCEs</td>
<td>Incentive programs to reduce energy usage by increasing efficiency</td>
<td>Program types: - Retrofit Program (to encourage usage of high efficiency lighting, motors, heating/cooling systems) - New Construction (to encourage exceeding Ontario Building Codes for electricity efficiency) - Process &amp; Systems (to implement &amp; validate energy efficiency projects)</td>
<td>Example of benefits: - Retrofit Program e.g. up to 50% of project costs for upgrading old or inefficient equipment - Audit Funding e.g. Up to 50% of the cost of an audit to identify opportunities for energy efficiency upgrades and eligible incentives - Process &amp; Systems e.g. Up to $50,000 for engineering studies and up to 70% of capital costs for energy efficiency upgrades - Small Business Lighting e.g. Qualifying businesses can receive up to $1,500 in new energy efficient lighting</td>
<td>Eligibility differs according to the specific incentive program. Eligibility for individual programs is explained at: <a href="https://www.saveonenergy.ca/Business.aspx">https://www.saveonenergy.ca/Business.aspx</a> Businesses can also contact their electrical utility for further information on eligibility. Businesses should contact their local electricity utility to determine eligibility and availability of specific saveONenergy incentives and programs</td>
</tr>
<tr>
<td>Natural Gas Commercial Conservation Programs</td>
<td>Enbridge &amp; Union Gas Natural Gas</td>
<td>Conservation and incentive programs to reduce energy usage (e.g. space heating, water heating)</td>
<td>Various. Can be financial incentives, technical advice or connections to energy service providers</td>
<td>E.g. Incentives to conduct an energy audit, demand control ventilation systems</td>
<td>Contact natural gas utility.</td>
</tr>
<tr>
<td>New Economy Stream - Food &amp; Beverage Growth Fund Strategic Partnership Stream</td>
<td>Ministry of Economic Development, Employment and Infrastructure</td>
<td>New Economy Streams: to build innovation capacity, improve productivity, performance &amp; competitiveness, and increased access to global markets</td>
<td>Primarily offered as GRANT, although a loan or combination of grant/loan may be possible</td>
<td>The stream is available for projects with at least $10 million in eligible project costs. It is aimed at large, strategic projects in Ontario's key sectors, including advanced manufacturing, life sciences, and information and communications technologies. The maximum grant is 20% of eligible project costs.</td>
<td>You may be eligible if your company has: - Substantial operations (generally 3 years) - Project has at least $10 million in eligible project costs; project contributes to a priority sector such as: - Advanced manufacturing - Life sciences - Information and communications technology - Strategic / anchor investments (projects that have the potential to draw additional investments that are key to the next generation of talent, innovation and productivity in Ontario)</td>
</tr>
<tr>
<td>Southwestern / Eastern Ontario Development Fund</td>
<td>Ministry of Economic Development, Employment and Infrastructure</td>
<td>Support to businesses, municipalities and non-profit organizations for economic development in southwestern Ontario.</td>
<td>Grant or loan support on eligible project expenditures up to 15% of eligible project costs to a maximum grant of $1.5 million. Investments of more than $10 million that also create more than 50 new jobs may be eligible for a loan of up to $5</td>
<td>The fund supports projects that: - creates jobs - encourages innovation, collaboration &amp; attracts private sector investment</td>
<td>Projects in these sectors are eligible for funding: - Advanced manufacturing (automotive, aerospace, plastics, clean technologies) - To be eligible for the business stream, businesses need to: - employ at least 10 people - commit to creating at least 10 new jobs - be able to provide 3 years of operations/financial statements - be located in, or plan to locate in, a community in southwestern Ontario - invest at least $500,000 in their project. Note: Criteria for &quot;regional stream&quot; is different. See link</td>
</tr>
</tbody>
</table>
### Traditional Peers

<table>
<thead>
<tr>
<th>Tier 1 Auto Suppliers</th>
<th>Auto Manufacturers</th>
<th>Retailers</th>
<th>Aftermarket</th>
<th>Non-traditional Industry Segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson Controls</td>
<td>Toyota</td>
<td>Penske</td>
<td>Advance Auto Parts</td>
<td>Traditional Radio Broadcasting</td>
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<tr>
<td>DENSO</td>
<td>Daimler</td>
<td>Group 1 Automotive</td>
<td>Genuine Parts Co.</td>
<td>Stored Media (CDs, USBs)</td>
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<tr>
<td>MAGNA International</td>
<td>Ford</td>
<td>Imperial Holdings Inc.</td>
<td>LKQ Parts</td>
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<td>Honda</td>
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<td>O’Reilly Auto Parts</td>
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<td>London Black Cabs</td>
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<td>Yellow Cabs</td>
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<td>Radio Taxis</td>
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<td>Hertz Car Rentals</td>
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### New Entrants

<table>
<thead>
<tr>
<th>Tier 1 Auto Suppliers</th>
<th>Auto Manufacturers</th>
<th>Retailers</th>
<th>Aftermarket</th>
<th>Non-traditional Industry Segments</th>
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</thead>
<tbody>
<tr>
<td>Windows Embedded</td>
<td>Google</td>
<td>TRUECar</td>
<td>eBay</td>
<td>Spotify</td>
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<tr>
<td>HERE</td>
<td>Apple</td>
<td>edmunds</td>
<td>Amazon</td>
<td>AT&amp;T</td>
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<tr>
<td>Mobileye</td>
<td>CRUISE</td>
<td>Tesla</td>
<td>US Auto Parts</td>
<td>Apple</td>
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<td>T-Mobile</td>
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<td>Orange</td>
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</tbody>
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### New Business Opportunities

- Growing relevance of digital components for features of interaction, connectivity and automation
- Digital companies
- Creating self-driving cars
- Converting regular cars into self-driving
- Creating 3D-printed cars
- B2C retail witnessing rise of online portals offering reviews, comparisons and other information to guide purchase behaviour
- E-commerce substituting traditional channels
- Advent of preventive and at-your-doorstep services
- Media and Connectivity providers creating a customized in-vehicle digital ecosystem
- Transport services shifting mindset around vehicles as services to be consumed vs. products to be owned