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UP FRONT
7  From the Desk of the President of the Automotive Parts Manufacturers’ Association
9  APMA’s Board of Directors
9  Key APMA Contact Information
9  Stay Connected with APMA!

A CLOSER LOOK
15 NAFTA: Proposals & Potential Impacts on the North American Auto Industry

THE 2018 APMA ANNUAL CONFERENCE & EXHIBITION
11  A Personal Message from the Prime Minister of Canada
11  A Personal Message from the Premier of Ontario
12  Make it...Smarter, Lighter, Faster, Stronger: The 2018 APMA Annual Conference & Exhibition

FEATURES
23  Answering Industry 4.0 with the Digital Enterprise: Closed Loop Innovation with the Digital Twin
25  Maintaining a Competitive Edge in Manufacturing: A Review of the Landscape in Ontario & Canada
28  Who’s Steering? How Technology is Reshaping the Automotive Industry
31  How International Trade Deals May Impact Our Automotive Landscape
34  McMaster-Mohawk Partnership Addressing Skilled Worker Shortages
36  The History of Auto Manufacturing in Canada & the U.S.

IN EVERY ISSUE
39  Leading, Reaching & Connecting: 2018 APMA Highlights
41  Meet APMA’s Members
42  Meet APMA’s Newest Members
42  Meet CAMM’s Members
43  Service Excellence: APMA’s Three-Pillar Approach
46  BUYER’S GUIDE

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The fictional Dr. Bruce Banner of Marvel Comics fame is a smart, benevolent nuclear physicist working in a research facility that is accidentally irradiated by deadly gamma energy. The after-effects turn him in to a raging, heaving beast known to readers as the Incredible Hulk. Easily enraged and lacking many of Bruce’s temperate qualities, his alter-ego is equal parts unpredictable, powerful, and blunt. His triggers are unknown, his limits unchecked, and his friends learn that they must completely rethink how to deal with him when the menace begins.

This is NAFTA 2.0 discussions, and the Hulk is the USA. Canada and Mexico have been alternating between negotiating with the good Doctor and reconstruction after the rampage.

Ultimately, this work is not done in a vacuum. People—real people—are in rooms designated for discussions of terms on a schedule of meetings. Real people look across the tables and wonder whether they are seeing Bruce or the Hulk. Or Bruce, then the Hulk. Or the Hulk, and then Bruce. I have had occasion to spend a lot of time with those people and so have many of you. And they are the unsung heroes of the Canadian NAFTA effort.

When the current federal government was elected in November 2015, Prime Minister Justin Trudeau named Chrystia Freeland as his Trade Minister, and the first meeting she had with stakeholders in that job was to come see us at the Automotive Parts Manufacturers’ Association (APMA). She brought with her the new Minister of Industry, Navdeep Bains, and the chief negotiator for the TransPacific Partnership Agreement (TPP) and the Deputy Minister responsible for industry. It was quite the show of force here and fairly unexpected, but we assembled a great group of you to meet with them and air it out.

That meeting set the tone for a new discussion between this sector and the federal government on trade matters. We were very dissatisfied with the secretive and combative tone of the TPP discussions, and I wasn’t shy to express this very publicly. The new Minister wanted to set the relationship right immediately, and to her immense credit, she brought Team Canada to the table for a frank conversation about how we can help each other.

Fast-forward a year, and our partners to the south elected a new President and ushered in a new era in foreign relations and trade ideology. Canada was the subject of many factually incorrect but politically valuable assertions about why the USA had suffered under NAFTA. The facts were wrong, but the problem was real. The Hulk had reared its head, a NAFTA pullout was threatened, negotiations had begun, and a temperate Canadian counter had to come alive. The Prime Minister went to Washington for that famous handshake, Minister Freeland and the Global Affairs Canada led an all-out congressional and state level outreach, and Canadian auto executives mobilized the same.

We have a great history of trade negotiations and advocacy at APMA. Ronald S. Wood was a Canadian trade official in Washington, DC in 1952 when the APMA recruited him to be first executive director of the newly formed association. He was recruited then because Canada was engaging two powerful giants—the United Kingdom and the U.S.—in a potential trade agreement that never came to fruition. His first external consultation effort is summarized in a December 1952 letter to Industry Minister C. D. Howe and Secretary of State Lester B. Pearson. Canadian auto suppliers were going to offer tariff protections we were willing to let go of in an effort to help the government get a better pan-Canadian deal. That was leadership.

In his spirit, and in recognition of a crazy year negotiating with the Hulk, we choose to honour the Canadian negotiating team at our Annual Conference in Windsor on June 6, 2018. Minister Freeland has been a great quarterback, but we will also recognize her dedicated and hard-working officials. Canada’s Chief Negotiator Steve Verheul and his automotive rules team led by Martin Thornell, Karen LaHay and Andrei Marinescu will be presented with the inaugural Ronald S. Wood Leadership Award for their work on the North American Free Trade Agreement. Ronald stood on as the head of the APMA for 22 years until his retirement. We think that Team Canada at the tables this past year has acquitted itself in a very professional way for our sector and that the team members are very deserving of this honour. I have spent a lifetime around public sector leaders, and I confidently say this group is among the best I have ever worked with.
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Dear Friends,

I am pleased to extend my warmest greetings to everyone attending the Annual Conference & Exhibition of the Automotive Parts Manufacturers’ Association (APMA).

This meeting offers APMA members an unsurpassed opportunity to network with colleagues and industry stakeholders. With a wide range of activities, workshops, and information sessions, this conference will provide delegates with critical information on the latest developments in the automotive parts industry.

I would like to commend the organizers for putting together an exciting program. I am certain that everyone attending this conference and exhibition will benefit from the opportunities and information presented here.

On behalf of the Government of Canada, I offer my best wishes for a productive and memorable event in Windsor.

Sincerely,

The Rt. Hon. Justin P.J. Trudeau, P.C., M.P.
Prime Minister of Canada

A Personal Message from the Premier of Ontario

I am pleased to extend warm greetings to everyone attending the Annual Conference & Exhibition of the Automotive Parts Manufacturers’ Association (APMA).

Ontario has long been an automotive superpower, a fact that has translated into jobs for hundreds of thousands of people. Looking forward, this province has the skilled workforce needed to stay ahead of the curve as the auto sector evolves and innovates.

This year’s conference theme, Make it... Smarter, Lighter, Faster, Stronger, exemplifies this fact. This province’s producers of parts, equipment, tools, supplies, and services are playing a significant role in improving processes and boosting competitiveness.

The APMA plays a vital role in promoting the automotive supply manufacturing industry, both domestically and internationally, thereby strengthening Canada’s position in the global automotive industry.

Best wishes for a productive and informative conference and exhibition.

Kathleen Wynne
Premier of Ontario
The automotive industry is evolving at an exponential pace. Technological advancements continue to “disrupt” the industry while improving its outputs. The rapid convergence of manufacturing technologies and new product enhancements are changing product offerings. Customers are demanding more and more from suppliers.

The 2018 APMA Annual Conference & Exhibition brings together the Canadian automotive OE supplier industry and international delegates to cover key strategic issues and opportunities. This year’s theme, Make it... Smarter, Faster, Lighter, Stronger, features a one-day format event of industry leading speakers addressing key issues facing the industry while sharing strategic insights to focus on opportunities. APMA’s concurrent sessions integrated within the conference format will highlight and discuss key strategic areas of focus for automotive suppliers that will shape the next generation of the auto industry.

Key focus areas
- Economic intelligence and industry insights;
- Using innovation and technology in manufacturing, including Industry 4.0, Advanced Manufacturing, and AI;
- Technology trends in vehicles;
- Globalization and impacts on suppliers;
- Supply chain development opportunities;
- Industry insight from multinational corporations; and
- OE perspectives on the industry and its future direction.

Speakers
The one-day format features plenary and concurrent sessions, providing a broad range of insight and technical information to attendees about the future of our industry, how globalization will affect you, the key drivers of future success, and how innovation and technology demands will change business models. Some of the incredible and educational speakers include:
- Economic and Industry Outlook: Peter Hall, Chief Economist, Export Development Canada; and Michael Robinet, Managing Director, IHS Markit Automotive.
- NAFTA Trade Panel: Tim Quinlan, Director & Senior Economist, Wells Fargo Securities; Sean Donnelly, President & CEO, ArcelorMittal Dofasco; and Kristin Dziczek, Vice-President, Industry, Labor, & Economics, the Center for Automotive Research (CAR).
- Industry 4.0: Federico Magno, Managing Director Automotive, Porsche Consulting GmbH, Porsche AG.
- Mobility, Autonomous Driving, Connectivity and Electrification: James Schwyn, Chief Technical Officer, Valeo North America, Valeo S.A.
- The Global Automotive Footprint: Joseph Hinrichs, Executive Vice-President and
Concurrent sessions
This year’s concurrent panels feature technical insight on:


- **Advanced Manufacturing Supercluster Panel**: This Innovation Supercluster Initiative creates an important dialogue between industries, companies, and communities focused on building the next generation of manufacturing firms in Canada. Featuring: Next Generation Manufacturing Canada.

- **Additive Manufacturing Panel**: Providing leading-edge technology and leadership on additive manufacturing technologies to increase competitiveness, productivity, and quality. Featuring: National Research Council; Exco Technologies Limited; and Promotion.

- **Artificial Intelligence (AI) in Manufacturing and Supply Chain Management Panel**: An industry-led consortium that will shape the new global supply chains platform, bolster Canada’s leadership in AI, and accelerate industry adoption of enabling technologies through collaborative and incremental projects. Featuring: Scale.AI; Acerta Analytics Solutions; and Canvass Analytics.

- **Manufacturing Innovation and Leadership in Real-Time Panel**: Highlighting best practices and showcasing examples and incremental steps to getting started on the journey toward Industry 4.0. Featuring: Crest Mold Technology Inc. and Axiom Group.

- **Industry 4.0 – Every C-Suite Needs a Chief Value Officer Panel**: Value is created by high performance growth. High performance growth thrives when you intelligently incorporate capital allocation, culture, and technology. Domain knowledge is not sufficient; a CVO is a proven entrepreneur and C-suite leader. Featuring: Valitas Capital Partners.

- **Autonomous Vehicle Innovation Network Panel**: Catalyzing the growth of a vibrant and diversified automotive and transportation technology ecosystem in Ontario and allowing it to reinforce its position as a North American leader in transformative automotive technologies, transportation, and infrastructure systems. Featuring: Ontario Centres of Excellence; City of Stratford; AVL Powertrain Engineering, Inc.; APMA’s Demonstration Zone; and APMA’s Annual Conference Exhibitors.
NAFTA: Proposals & Potential Impacts on the North American Auto Industry

By Kristin Dziczek, Michael Schultz, Bernard Swiecki & Yen Chen, Center for Automotive Research

The automotive Rules of Origin (ROO) are a fundamental part of the North American Free Trade Agreement (NAFTA). Current proposals for the automotive ROO include raising the threshold for the Regional Value Content (RVC), adding a requirement on the share of NAFTA steel and aluminum in certain parts, and adding a requirement that a certain percentage of a vehicle’s content be produced in a country where labour earns more than the median North American wage for automotive manufacturing.

This briefing is an excerpt from a report that provides an overview of current automotive and parts manufacturing trends in the NAFTA region and estimates the impact of the proposed changes to the automotive ROO. Key points include:

- The U.S. cannot self-supply: There is more demand for light vehicles in the United States than U.S. producers can supply. In 2017, U.S. production totaled 11 million units, and sales were 17.3 million.
- U.S. light vehicle production is split between domestic and international firms: 56 per cent of light vehicles sold in the United States in 2017 were produced in U.S. assembly plants; most of these vehicles were produced by U.S.-based firms, but more than 25 per cent of vehicles sold in the United States in 2017.
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were made in the United States by international automakers.
• NAFTA partners provide half of all U.S. light vehicle imports: In 2017, 44 per cent of U.S. vehicle sales were imported; of these vehicles, half were manufactured in Canada or Mexico (11 per cent each). Vehicles imported to the United States from Mexico contain approximately 20 to 30 per cent U.S. content.
• NAFTA makes North American vehicle production internationally competitive: North America is the third-largest producer of light and medium duty vehicles and second-largest producer of automotive parts in the world. International automakers from Asia and Europe have built over 27 production plants in the United States to take advantage of NAFTA preferences.
• NAFTA makes North America a complete automotive region: Low and high wage jobs are distributed to optimal regional locations based on cost, capability, and proximity to critical assets.
• Every global automotive producing region relies on low-cost content to be competitive: If U.S. automakers do not rely on Mexico, they will find other sources for low-cost automotive parts; in 2017, 31 countries each imported more than $100 million U.S. in automotive parts to the United States.
• The automotive industry in the NAFTA region supports consumer choice and new vehicle affordability: The new vehicle consumer price index (CPI) rose seven per cent since NAFTA went into force in 1994, yet the overall CPI is up 86 per cent since 1994.
• High NAFTA content requirements could result in less U.S. automotive and parts manufacturing:

If the cost of meeting the NAFTA ROO exceeds the Most Favoured Nation (MFN) tariff plus any transportation and logistics costs, then production will move outside of North America to lower-cost regions. Roughly 20 per cent of 2017 U.S. parts imports from Canada and Mexico do not use the NAFTA trade preference.
• High content requirements raise the cost of U.S. vehicle and parts production and negatively impacts exports: The United States exports 22 per cent of the total vehicles made in the country to our NAFTA trading partners and beyond. Over 71 per cent of U.S. vehicle exports go to Canada and Mexico. Raising production costs will limit the ability of U.S.-built vehicles to compete in the global marketplace and will negatively impact U.S. production and employment.

Key findings
In a study conducted in late-April, the Center for Automotive Research (CAR) found the following impacts:
• Unintended consequences: Setting a very stringent automobile ROO with the goal of bringing manufacturing back to the United States and the NAFTA region could have the opposite effect if the content targets are set too high or the rules are too onerous.
• The U.S. proposal that was current as of April 26, 2018 would disrupt the market: Under this recent U.S. proposal, at least 46 and as many as 125 vehicle nameplates would be disqualified from trade using the NAFTA preference. In 2017, the 46 nameplates represented a combined 25 per cent of U.S. sales.

If the manufacturers pass through the entire cost of the estimated tariffs from the recent U.S. proposal to consumers, the result would be an estimated loss of $60,000 to $150,000 annual U.S. light vehicle sales.
sales and the 125 nameplates represented a combined 87 per cent of U.S. sales.

- Increased consumer costs: CAR estimates the recent U.S. proposal could result in MFN tariffs that add, at minimum, a $2.1 to 3.8 billion U.S. tax on U.S. consumers. The tariffs of 2.5 per cent on cars and parts, and 25 per cent on light trucks and cargo vehicles, would add between $470 U.S. and $2,200 U.S. to the cost of these particular vehicles.

- Lower U.S. vehicle sales: If the manufacturers pass through the entire cost of the estimated tariffs from the recent U.S. proposal to consumers, the result would be an estimated loss of 60,000 to 150,000 annual U.S. light vehicle sales.

- Fewer U.S. auto exports: The U.S. currently exports 2.4 million vehicles per year to its trading partners, representing 22 per cent of total U.S. production. The U.S. proposal would raise the cost of production, incur tariffs on U.S. vehicle exports that do not meet the higher NAFTA content threshold, and result in fewer U.S. vehicle exports.

- The U.S. Labour Value Content proposal would lead to less North American automobile industry production: Average wages in the Mexican automotive and parts industries fall so far short of the North American average that paying the MFN rate for Mexican exports will be the preferred strategy for nearly all manufacturers of vehicles that are not classified as trucks. Once manufacturers have to pay the MFN tariff, the work could move even further offshore with an even lower chance of there being any U.S. content in the resulting product.

- The U.S. proposal aims to increase U.S. and NAFTA automotive and parts production capacity, but the U.S. market is not growing to support new capacity: Automakers are meeting peak North American consumer demand with existing global capacity. Global overcapacity poses financial risks to the companies, and automakers and suppliers are cautious about investment decisions since overcapacity compounded the industry’s financial problems in the recent recession. Firms will not duplicate their Mexican investments in the United States unless the cost of building new capacity is lower than the cost of an MFN tariff strategy.

- The proposed limited transition periods are inadequate: Three years is the absolute minimum amount of time required for new capacity to

Automakers are meeting peak North American consumer demand with existing global capacity. Global overcapacity poses financial risks to the companies, and automakers and suppliers are cautious about investment decisions since overcapacity compounded the industry’s financial problems in the recent recession.
come online. There are often delays in the process of identifying the need for new capacity, securing corporate approval for the decision, arranging financing, selecting the site, negotiating state and local incentives, constructing the plant, installing the equipment, and launching production. Adjusting and re-sourcing the supply chain also takes significant time.

The state of NAFTA renegotiations

Canada, Mexico, and the United States kicked off the renegotiation of the now 24-year-old treaty in August 2017 and have since concluded eight formal rounds of talks to determine the parameters of a new NAFTA.

As of the end of April 2018, the U.S. proposal for the automotive chapter contained several fundamental changes to the Rules of Origin (ROO)—the way in which motor vehicles and parts will qualify for NAFTA preference under the new agreement. As of press time, the U.S. proposal has not yet been agreed to by the negotiating teams from Canada or Mexico. There are three main areas of change: Regional Value Content (RVC), Steel and Aluminum Content, and Labour Value Content (LVC).

1. Regional Value Content (RVC)

The existing RVC requirement is that NAFTA-
Setting a very stringent automobile ROO with the goal of bringing manufacturing back to the United States and the NAFTA region could have the opposite effect if the content targets are set too high or the rules are too onerous.

produced light vehicles must have 62.5 per cent NAFTA-originating content to qualify for the trade preference. This threshold is the highest RVC of any current U.S. trade agreement. The U.S.-proposed changes include:
• Changing the basis from light vehicles to include both light and medium duty vehicles;
• Raising the 62.5 per cent RVC; and
• Including a wider array of vehicle parts and components and eliminating both the existing tracing list and the “deemed originating” concept that allows automakers to roll-up the value of parts not on the tracing list to the value of the component or system.

2. Steel and Aluminum Content
The existing NAFTA agreement does not trace steel and aluminum content. The U.S. has proposed requiring a certain percentage of North American-sourced steel and aluminum to qualify for NAFTA preference.

3. Labour Value Content (LVC)
The existing NAFTA agreement has a side agreement for labour standards but does not incorporate LVC in the ROO determination. The U.S. has proposed requiring a certain percentage of the content of a vehicle originate in a country where the labour earns more than the median North American wage for automotive manufacturing, which is in the range of $15 U.S. to $16 U.S. per hour.
• Additionally, manufacturers can meet up to five per cent of the LVC requirement by counting certain research and development expenditures that the companies make within the NAFTA region.
• The LVC is operationally a carve-out guaranteeing a certain share of U.S. and Canada content in any vehicle traded using NAFTA preferences. Average assembly and parts hourly wages are above $20 U.S. per hour in both Canada and the United States; Mexican average wages for auto assembly were $7.34 U.S. per hour, and $3.41 U.S. per hour for automotive parts in 2017.1
• The U.S. proposal calls for a fairly short transition period, during which RVC will ramp up step-wise to the higher targets.

Sunset clause
While not part of the U.S. proposal at the time of CAR’s study, the U.S. has since re-introduced a proposal for a five-year sunset clause, which effectively forces a renegotiation every five years. Automotive investments are large and last as long as 40 to 50 years. The sunset clause poses additional risks to the automotive companies and suppliers that invest in North America since the rules of the game could change on a five-year cycle.
This study was produced by the Center for Automotive Research (CAR). CAR’s mission is to conduct independent research and analysis to educate, inform, and advise stakeholders, policymakers, and the general public on critical issues facing the automotive industry, and the industry’s impact on the U.S. economy and society. The Trade Leadership Coalition provided funding for this briefing. The full report is available at www.cargroup.org under the “Publications” heading.

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In the past, things were different. You hailed a taxi. Today, you ride share. You bought music albums in a store. Today, you stream songs to every device. Phone numbers were found in a phone book. Today, they’re found online.

Digitalization has changed everything. No industry is immune from this disruptive change. It’s not “if.” It’s “when.”

In order to survive this disruption, you will need to define an innovation strategy. One that will transform the way products are designed, engineered, and produced.

You must change the overall management of your manufacturing operations and allow for reduced-risk innovation to deliver the highest quality products at the lowest price.

If you haven’t started, it’s not too late.

Regardless of your company’s level of digitalization maturity, you can meet these demands with technology trends in digital simulation, intelligent automation, analytics, and virtual interconnectivity. You will discover new revenue and value producing opportunities through new business models.

Historically, many industrial processes were supported and managed by technical information systems with tools that were perfected in standalone environments. These tools were traditionally focused on specific applications and were not developed for broad usage or openness.

Today, this is not enough. Companies can no longer think in silos. They must think in a holistic end-to-end transparency concept that supports optimal decision-making on key manufacturing parameters.

Digitalization is much more than digitizing information or applying silo technologies.

Digitalization is the process of moving to a digital business.

The industry transformation is commonly referred to as Industry 4.0, Smart Factory, the Internet of Things, and The Internet of Everything. But, regardless of the phrase that is used, each is an attempt to describe the direction that the industry will develop under the influence of digital technologies.

As we look to the future, it is certain there will be further convergence between the physical world and the digital one. Manufacturers will need to unify product knowledge, manufacturing, and service process innovation across their company’s complete operations, from ideation through realization and utilization.

This holistic automation approach interlinks the digital twin of product, production, and performance. As all relevant stakeholders have real-time access to information, they are able to transform from a sequential approach to a quasi-parallel working approach, and therefore increase speed, efficiency, quality, and time-to-market.

Digital twin of product
Designing automotive products in a virtual environment allows manufacturers to simulate every aspect of product design and performance without having to build a costly physical prototype. Regardless of whether it is mechanical, electromechanical, or...
an electronic design, automotive manufacturers can simulate almost everything. For example, you can simulate aerodynamics, the sound of exhaust, and the electronic controls in a digital twin environment.

Changes can be immediately communicated to all stakeholders—the mechatronics designer, the electronic designer, or the simulation specialists. By combining the design and simulation processes in one digital data management environment, a faster design cycle is achieved.

**Digital twin of production**

One of the great benefits of digitalization is that manufacturers can design and develop the entire production process while continuing to design their product. This is enabled by collaboration platforms that connect automotive designers with manufacturing floor production planners. The digital data model provides information that influences the design process and enhances collaboration between various operational stakeholders.

With process and plant simulation technology, manufacturers are able to simulate single production cells or entire floor environments to ensure that production is tuned to the required cycle times, output, and efficiency.

After the product has been designed and the production process has been completed, peak production can be realized immediately, as everything has been built, vetted, and tested in a virtually simulated environment.

An often-understated benefit of digital twin technology is that worker-friendly environments can be ensured by simulating productivity and by reducing the risk of physical and ergonomic injuries and fatigue.

Further, a digital twin production environment can then be extended to the real environment. Manufacturers are able to transfer the automation codes directly from the digital twin to the engineering framework. This allows for engineering validation by using a virtual controller rather than by testing new program code for the first time in the real plant.

The seamless use of data from product design and production planning helps reduce the effort during automation engineering. The validated engineering can be transferred directly to the engineering framework, and from there, to the physical devices on the shop floor.

**Digital twin of performance**

Manufacturers will reach the highest level of efficiency by optimizing the best operations sequence according to material, resource availability, and constraints in single planning software.

With digital twin solutions, manufacturers would be able to automatically provide manufacturing floor employees with work instructions, as well as up-to-date technical and safety information. Virtual world information can also be leveraged to create instructions in a tablet and guide operators away from errors.

But, manufacturers are not only producing products, they are also producing data. This data can be measured, analyzed, and transformed into valuable knowledge. Cloud-based solutions offer the greatest flexibility, security, and cost efficiency to develop descriptive, predictive, prescriptive, and deductive insight. For example, design errors can be logged directly into the digital twin. Here, they can be viewed and resolved by engineering teams in close collaboration with operations and service teams.

This enables closed loop manufacturing and completes the digital twin with data from products and production performance.

Siemens knows from its own implementation that every organization will have a different starting point based on the technologies it has already implemented.

An integrated value chain is the only way to manage the increasing complexity of products and the increasing level of customer expectations.

Once organizations understand their current digital maturity and their future benefit expectations across the value chain, they can define a roadmap of customized digital solutions to realize a closed-loop Digital Enterprise.

Shalabh Bakshi is the director of Digital Enterprise at Siemens Canada.
The automotive sector in Canada faces increased challenges in 2018 due to decreasing demand, uncertainty resulting from trade relations, increased competition, and global pressures arising from the recent U.S. tax reform and industry reforms in China to drive up local production, as well as the wide sweeping changes to the existing Ontario workplace framework due to Bill 148. The resulting impact of increasing costs and decreased flexibility in an industry that works on just-in-time management will create increasing challenges in managing operations and surviving in an eroding competitive environment. In order to face these challenges, companies will be required to look beyond the current situation to rethink their production and business strategies and look for opportunities to maintain a competitive edge.

Shifts in demographics

The Conference Board of Canada’s report on the Canadian automobile manufacturing industry emphasizes that despite positive economic conditions of low interest rates and employment, the changing demographics of the United States have created a decrease in demand for new vehicles. Sales to aging Baby Boomers and urban Millennials are easing, with the latter group purchasing new vehicles at half the rate of the 35 to 54 age group. In addition, the purchase of a vehicle by the younger demographic group undergoes a different decision-making process than one by aging Baby Boomers.

This shifting trend has resulted in a change of thinking about how vehicles are marketed and designed in order to attract the younger demographic, whose population has surpassed that of Baby Boomers. They are more conscious of the environmental impact of a vehicle, with cost still always being a factor.

Although 2017 saw record-breaking sales in the retail sector, the change in trends is beginning to show.

“Millennials do not have the love affair with the automobile that the Boomers once did at their age. It’s a different emotion—and a more practical one,” says Laura Zanchin, executive vice-president of the Zanchin Automotive Group. “Millennials aren’t as attracted to a car as much as they are to the connectivity of a car,” adds Zanchin, who is a principal with the largest privately-owned dealer group in the Greater Toronto Area.

What the consumers are telling dealers like Zanchin must translate to how cars are then designed, manufactured, and marketed.
Global uncertainty

The U.S. and Canadian markets are highly integrated. The average vehicle manufactured in Canada has close to half the parts made in the United States. It is not the same for automobiles manufactured in the United States, where only 28 per cent have Canadian content. U.S. exports to Canada for auto parts ranks first, whereas imports rank second, with Mexico ranking first. The elimination of the North American Free Trade Agreement (NAFTA) will have a detrimental impact on both nations. Until negotiations are completed, there is only speculation, but should NAFTA be eliminated, there would most likely be a push for Canada to enter into a bilateral trade agreement with the United States. Globally, this is affecting all realms of the industry. New rules announced in China, combined with the move toward meeting new energy vehicles, will lead to a step change in the way carmakers operate in the region.

In the meantime, manufacturers will have to rethink their production strategies to meet the higher costs of resulting tariffs.

With the United States having backed out of the Trans-Pacific Partnership (TPP), the Canadian market still provides access to the Mexican market and vice versa for those companies that meet the rules of origin. This could create a restructuring of the flow of parts into Canadian-made vehicles. Only time will tell.

U.S. tax reform

U.S. tax reform has given rise to significant concerns surrounding Canada’s competitive edge when it comes to manufacturing, with some analysts warning that this will drive manufacturing south. There are a number of changes that directly affect this sector.

The most significant change talked about is the drop in the U.S. federal corporate tax rate, from 35 per cent to 21 per cent. When combined with state income tax rates, the impact is less significant, and the combined federal and state tax rates bring the tax rates relatively on par with the Canadian combined federal and provincial tax rates. For example, Michigan’s resultant combined tax rate is now 27 per cent compared to Ontario’s 25 per cent for a company meeting the criteria of a manufacturer. The competitive advantage of situating an automotive manufacturing operation in Canada, strictly based on tax savings, no longer exists.

The second area of impact, and probably the most concerning to the industry, is the new ability for a U.S. company to depreciate 100 per cent of capital investment immediately in the year of acquisition. Compared to Canada’s declining balance method, in which capital investment is depreciated over three to four years, it results in a significantly lower net outlay to U.S. manufacturers and a higher tax savings in the first year as opposed to deferring it over three to four years. It is important to note that the U.S. program of 100 per cent bonus depreciation will be phased out gradually starting in 2022 until 2026. It is also important to note that some states may not conform to this provision (currently more than half of all states do not conform to the bonus depreciation rules).

What is also impactful, but to a different extent, is that net operating losses for
U.S. companies that are generated in the years 2018 and beyond cannot be used to reduce more than 80 per cent of the taxable income in the year. These losses can now be carried forward indefinitely but can no longer be carried backward. In comparison, Canadian rules still allow full application of losses against taxable income and ability to carry back losses for three years, but only allow carry forward for 20 years. However, the ability to carry back losses in Canada is a significant benefit to companies in a cyclical industry, particularly in years of downturn, in order to recoup prior taxes paid and obtain much needed cash to continue to operate. As well, not all U.S. states may comply with this rule.

It should be noted that these changes cannot be viewed in isolation. The resultant implications of the renegotiation of NAFTA and the benefits of TPP, as mentioned above, need to be considered. In addition, on a significantly more positive note, tax incentive programs available to Canadian companies are far more generous than they are in the United States. For example, the Scientific Research and Experimental Development Program as it applies to Canadian Controlled Private Corporations provides up to 65.6 per cent of refundable and non-refundable tax credits on qualifying developmental labour for an Ontario-based company. In other words, a company can receive back up to $65.60 per $100 of labour costs that qualify under the program’s criteria for research and development. This is the biggest program available to manufacturers.

In comparison, the U.S. federal research and development credit is in the neighbourhood of five to nine per cent of qualified research and development expenses depending on method and related financial information. State R&D credits are usually around three to five per cent of qualified expenses. Of course, this varies by each state. In addition, there are numerous other incentive programs available in Canada, including the $25 million Smart Green fund established to help small- and medium-sized manufacturers reduce greenhouse gas and improve energy efficiency. The use of these incentive programs, where applicable, could significantly mitigate other challenges and should be explored.

Bill 148
The changes to the Ontario workplace framework due to Bill 148 have, by far, provided one of the most significant changes hitting closer to home and having the biggest impact on component manufacturers. According to Statistics Canada, approximately 130,000 people were employed in the automotive manufacturing space in 2016, with approximately 30 per cent in auto assembly and 70 per cent in parts manufacturing. In addition, component parts manufacturers not classified in auto manufacturing (such as rubber and glass manufacturers) bring the total closer to 141,000.3 This does not consider that for every vehicle manufactured, several more jobs are created.

Proponents for the bill argue that the increase in minimum wage from $11.60 to $15.00 by 2019 will increase the buying power of manufacturing employees as consumers and contribute to the economy. However, this positive impact will likely be seen at the retail level, but not at the manufacturing level in the automotive sector. The increase in minimum wage, along with increases in wages to part-time workers, will hit the industry particularly hard, making it more expensive to operate, and further erode competitiveness. In addition, changes to the treatment of part-time workers affects the just-in-time nature of the industry and the ability of companies to manage their operations in a flexible manner. As a result, economists estimate that these measures could cost the Ontario economy anywhere from 50,000 to 90,000 jobs.

Conclusions
The impact of the automotive industry is far reaching and goes beyond the 130,000 jobs created on the manufacturing floors. The multiplier effect creates further jobs that benefit Ontario and contribute significantly to the economy of Canada. The implications of these challenges, if not met head on, will be devastating not only to the industry but to the Canadian economy as a whole.

Canadian manufacturers need to seize opportunities as they arise and look for ways to meet the competitive challenges that 2018 will bring.

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In 1982, Buckminster Fuller, a renowned 20th century inventor and futurist, created the Knowledge Doubling Curve, a model that describes the rate at which human knowledge is doubling. According to Fuller and his model, until 1900, human knowledge was doubling every century, and by 1945 the rate was every 25 years. Once we started encoding our knowledge digitally, the rate of data accumulation grew exponentially. Today, with advances in 5G connectivity, the Internet of Things, artificial intelligence, and machine learning, the rate at which human knowledge is doubling is advancing to a matter of hours.

This dramatic acceleration of knowledge accumulation is affecting everything we do and manufacture, including the passenger vehicle, particularly given the rate of automotive production and its significance to the global economy. What do automotive industry executives think is going to happen, and where will change lead us? KPMG’s annual Global Automotive Executive Survey (GAES) is a window into this rapid pace of change. Now in its 19th consecutive year, the survey provides deep insight into the future of the automobile, its immediate environment, and the broader technological and social trends that impact the industry as a whole, both in Canada and globally. The men and women who plan production for millions of cars annually must be keenly aware of shifts in customer demands, consumer trends, and technology in order to maintain, or increase, their market share. The consequences of falling behind are severe.

If there is one word that captures the key theme of this year’s GAES report, it is “disruption.” The automotive industry continues to evolve through innovation and transformational change as industry players are adapting to shifting preferences on car ownership and new technological developments such as Autonomous Vehicles (AVs) and alternative drivetrains. These changes will have the biggest impact on how we drive cars and how they are built.

Declining car ownership

Original equipment manufacturers (OEMs) are redefining their future role in a fast-changing environment. Car sharing is still in its infancy, but nearly half (44 per cent) of executives surveyed in the GAES believe that the OEMs could be big winners in the battle for the direct customer relationships, and over one-third of global consumers agree. As technology advances, over 80 per cent of automotive executives strongly agree that the real viable option for the physical retail outlet is expansion into service factories and used car hubs. The pressure is on, however, as more than half of executives are highly confident that the number of physical retail outlets will be reduced by 30 per cent, to 50 per cent, by 2025. As a result, OEMs may not be as reliant on B2C relationships, as different providers may become more prominent in making cars available for consumer use.

KPMG's GAES shows a year-over-year trend of declining faith in car ownership among executives and consumers. This trend is evident across North America, as the rate of car ownership per household and the percentage of young people with a driver’s license is declining. However, those survey findings and consumer sentiment are at odds with industry statistics. According to DesRosiers Automotive Consultants Inc., 2017 was a banner year for automotive sales in Canada, with sales of light vehicles up five per cent last year, exceeding
two million units for the first time in history, and the U.S. auto market also posted a strong year. Some of the momentum in sales can be attributed to a resurgence since the 2009 recession, but the continued move towards Crossovers, SUVs and pick-up trucks are a clear signal that North America is still using passenger vehicles to move people and products. Regardless, the trends point to a potential different ownership model for cars in the future.

Bob Lutz, former vice-chairman of GM, predicts a dire future for the industry and the "end of the automotive era." He believes daily travel will migrate to standardized, shared passenger modules as the transformation of the traditional auto industry accelerates. He envisions a future where humans adapt to sharing cars with strangers, as self-driving cars dominate transportation. In its Rethinking Transportation 2020-2030 report, RethinkX, a San Francisco-based think tank, expects that by 2030, most road travel will be via shared vehicles. The good news is cars will still be on the road, but the companies that manufacture them may become less relevant if cars become a transportation commodity.

Autonomy or safety—or both?

KPMG’s GAES also revealed that the large majority of executives (94 per cent) believe that effective driving policy and regulations for autonomous driving will be established by 2040, at the latest. The main catalyst for autonomous driving is safety. Active cruise and steering control, lane departure warning systems, and automated braking are all designed to avoid collisions. While the by-product of this technology is a self-driving car, the real and immediate impact is fewer accidents. Collision avoidance will greatly impact and reduce insurance rates, the number of repair facilities, and the frequency of replacement rentals. The U.S. Department of Transportation’s National Motor Vehicle Crash Causation Survey and its 2008 report to Congress concluded that 93 per cent of collisions were caused by human error. Current crash statistics follow the same trend.

Does this mean that the pleasure of driving a car, as we know it (the ability to steer, brake, and control a vehicle), will be the responsibility of sophisticated programming and radar? Will manual driving someday become illegal? It could. But what remains clear is that autonomous driving is a new battlefield for the auto industry that will directly affect consumer demand and have a material and permanent impact on the role of OEMs in the car sharing economy and their future profitability.

Over time, human drivers will likely be seen as dangerous, and the ability to drive cars manually may be restricted. Of the executives surveyed in the GAES, 74 per cent believe that mixing autonomous and non-autonomous traffic will lead to severe safety issues. Fully autonomous vehicles and human drivers are unlikely to use the same roads and will require new infrastructure concepts and a unique regulatory environment. If we want autonomous driving to develop quickly, regulators will need to adopt a step-by-step approach and start very soon by separating areas to avoid mixed traffic of vehicles equipped with different levels of autonomous technology.

The development of "secured spaces" for an interim period might be a solution to disconnect AVs from the complexity of today’s transportation ecosystem. Establishing exclusive, separated car lanes for AVs could, however, limit the range of unusual eventualities that would otherwise be experienced in mixed traffic. This would make it nearly impossible to include the range of eventualities into an algorithm’s training data, which would be required for future integration of AVs and manually driven vehicles. But, if the segregated approach were successful, it may not be necessary to train autonomous vehicles to handle mixed transit. If it works for trains why shouldn’t it work for cars?

Future of combustion and electric readiness

Automotive executives are highly convinced that internal combustion engines (ICEs) will remain important. One of the biggest issues facing the adoption of electric vehicles (EVs) is where the electricity comes from. Some countries, like the U.S., still rely heavily on coal and other fossil fuels to power its electricity grid. In Canada, the majority (59 per cent) of Canada’s electricity generation is derived from hydro power, while the balance of the mix is split between nuclear, oil and gas, coal, and non-hydro renewables.

A gradual shift to e-mobility is generally intended to reduce carbon emissions and mitigate environmental impact. While hydro power is a relatively emissions-free energy source, increasing output of hydro power or burning more fossil fuels to power EVs would reduce the expected environmental benefits of e-mobility.

Global automotive executives believe there will be a balancing mix of alternative drivetrain technologies and ICEs. E-mobility is dominating executives’ key trend agenda, but its roll-out is progressing slowly. In addition to the problems associated with electricity generation, a successful infrastructure set-up seems to be the true showstopper for e-mobility.

For now, it takes too much time for the average consumer to charge an EV, and the options are limited. More than half (54 per cent) of executives surveyed still believe that pure battery EVs will fail due to the challenge of setting up the required infrastructure. Executives have become more optimistic as compared to last year, but the obstacles remain high and most consider fuel cell EVs as the real breakthrough. However, costs are the biggest obstacle, as fuel cell cars require an entirely new hydrogen infrastructure of reforming plants, pipelines, and filling stations. Despite the challenges, the advantage of fuel cell vehicles is that they can be “filled up” in a matter of minutes versus several hours for plug-in EVs.

The end of our love affair with cars?

Assuming Fuller’s knowledge curve speeds up dramatically due to new technological developments, many of the headwinds we face with alternate fuels and autonomous driving will eventually be overcome. But the lust for freedom and sense of adventure that comes with owning a car will persist.

Last year, a LaFerrari Aperta supercar sold for a record $10 million at an event in Italy marking the 70th anniversary of Ferrari, the most money ever fetched by a 21st century vehicle. The futuristic Aperta, which had yet to be assembled and was presented as a digital mock-up, sold for twice the amount auctioneers expected after a bidding war between at least 12 auction attendees. For some, the love affair with the automobile still burns brightly.

Peter Hatges is a partner, managing director and national automotive sector leader at KPMG in Canada. Peter has extensive experience in mergers, acquisitions, and financing assignments for public and private companies and has worked on cross-border assignments in Europe and the U.S. He is also a member of KPMG’s North American Corporate Finance Steering Committee.
Whether it is the North American Free Trade Agreement (NAFTA), the Trans-Pacific Partnership (TPP), or some future acronym, we are in an industry that cannot readjust overnight. Integrated global supply chains and multi-national corporations rely on labour pools, products, and resources across the globe to maintain shareholder value and profitability. Discussions on closing borders, protectionism in order to bolster domestic economies, and tariffs will ultimately reach into the consumer’s wallet. Therefore, it is necessary to analyze the impact of these potential actions on the automotive industry.

First, the approach of the U.S. Administration. President Trump promised his voters an end to NAFTA—or at least a rework that will favor the U.S. To make good on his promise, he focused his efforts on localized content, specifically with the intention to increase the U.S. portion. This is no small task in a globally integrated industry. The complexity in tracking the amount of times a part or material crosses a border to maintain content rules would prove to be exhausting and very ineffective in increasing U.S. competitiveness. As a result, President Trump set his sights on what seemed to be a simpler target, the core commodities of steel and aluminum. This new direction was under the guise of protecting both domestic jobs and overall security from Chinese influence. This position was more of a shotgun vs. laser approach and put a significant burden on Canadian consumers.

A backlash to this approach was replaced with a new plan putting China in the crosshairs. Now, we are in a series of actions and counteractions by both nations, each threatening tariffs on core commodities in an attempt to gain leverage. The stock market has responded with large fluctuations; however, industry insiders have developed a thick skin to these reactionary measures, waiting for the dust to settle before taking action.

Identifying the main players and risks
We need to spotlight the three main audiences: the vehicle manufacturers (VM), the supply chain, and the consumer. Although these are not the only players, they have the most at risk, and actions by one will affect the entire industry. Suppliers know they need to follow the money. U.S. protectionist actions are designed to force VMs to set up shop for local production, followed closely by their supplier base. U.S. consumers are different than the rest of the world. Americans like their large vehicles to move their stuff, so the continued push in crossovers, SUVs, and pick-up trucks will not diminish. Catering to this market, foreign VMs will continue building and expanding domestic manufacturing operations to offset potential and existing tariffs (i.e., the chicken tax) while hedging against exchange rate fluctuation. Just five years ago, the NAFTA Greenfield Investment chart (see Figure 1 on page 33) was heavily weighted toward Mexico for new investment. Looking at it from a 2017 baseline shows a balanced mix between the U.S. and Mexico.

From a consumer perspective, the focus is on vehicles that are sold in significant volumes in the U.S. but not produced in North...
America. Table 1 (on this page) lists the vehicles that maintain a sales volume over 50,000 units in the last 12 months and are 100 per cent imported. Production volumes in this range are significant enough to begin the investigation process for localized production to offset any tariff and exchange rate burdens. A majority of this volume is currently sourced from Japan, making the TPP agreement for that country very favourable.

Although the U.S. is not part of the TPP, Japanese VMs can still leverage the trade group’s relationship with Canada and Mexico while gaining more access under the current NAFTA arrangement. This is under the presumption that the underlying structure of NAFTA stays intact. On the flip side, the TPP deal also opens the door for more competition from Japanese suppliers. South Korea supplies a significant portion of these vehicles for U.S. consumption. Still more interesting is the European influence with Jeep Renegade sourcing—viewed as a very U.S. centric brand. From an investment perspective, this list of imported vehicles are prime candidates for NAFTA production and should be on the radar of both Canada and the U.S. to pursue.

So many questions, so few answers

There are still many grey areas with unanswered questions. Do protectionist actions force domestic production investments that will negatively affect the profitability of these vehicles? What is the ultimate effect on shareholder value? Will solidifying a NAFTA agreement place enough financial burden on imports to influence more foreign VMs to produce domestically? Could the TPP agreement allow foreign manufacturers to stay in their home countries and export at a lower cost? Will consumers be forced to shoulder the financial burden, and will they accept that responsibility? Do these

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**TOP PURE IMPORTED VEHICLES (OVER 50,000 UNITS)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Model</th>
<th>Production Source</th>
<th>U.S. Sales (12 Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Subaru Forester</td>
<td>Japan</td>
<td>173,191</td>
</tr>
<tr>
<td>2</td>
<td>Mazda CX-5</td>
<td>Japan</td>
<td>146,006</td>
</tr>
<tr>
<td>3</td>
<td>Toyota 4Runner</td>
<td>Japan</td>
<td>128,190</td>
</tr>
<tr>
<td>4</td>
<td>Subaru Crosstrek</td>
<td>Japan</td>
<td>123,362</td>
</tr>
<tr>
<td>5</td>
<td>Hyundai Tucson</td>
<td>South Korea</td>
<td>121,462</td>
</tr>
<tr>
<td>6</td>
<td>Kia Soul</td>
<td>South Korea</td>
<td>113,210</td>
</tr>
<tr>
<td>7</td>
<td>Jeep Renegade</td>
<td>Italy</td>
<td>102,748</td>
</tr>
<tr>
<td>8</td>
<td>Buick Encore</td>
<td>South Korea</td>
<td>93,424</td>
</tr>
<tr>
<td>9</td>
<td>Toyota Prius</td>
<td>Japan</td>
<td>93,407</td>
</tr>
<tr>
<td>10</td>
<td>Kia Sportage</td>
<td>South Korea</td>
<td>76,869</td>
</tr>
<tr>
<td>11</td>
<td>Lexus NX</td>
<td>Japan</td>
<td>61,571</td>
</tr>
<tr>
<td>12</td>
<td>BMW 3-Series</td>
<td>Germany</td>
<td>58,463</td>
</tr>
<tr>
<td>13</td>
<td>Mercedes-Benz GLC</td>
<td>Germany</td>
<td>55,940</td>
</tr>
</tbody>
</table>

Table 1
actions delay new car purchase decisions in favour of the used car market? In other words, will protectionism slow consumer buying decisions enough to negatively impact production schedules and ultimately reduce the domestic labour pool?

In terms of NAFTA and the TPP, neither provides a perfect solution. The U.S. and Canada have different baselines to support their decision-making process. The U.S. comes from a position of perceived strength, with a population 10 times that of Canada and core U.S. automotive brands which are a staple to the economy. Canada does not have a core vehicle brand and is highly dependent of the U.S. for both product and overall trade. Essentially, Canada needs global partners to offset its U.S. reliance. Without new investment, the decline in the Canadian automotive manufacturing footprint is expected to continue. Strategically, Canada is investing heavily in its value-added differentiation, placing emphasis on the intellectual and information technology skills the country has to offer on a global stage.

The next level of interest includes vehicles that are both assembled domestically and imported. (See Table 2 at the bottom of this page).

These vehicles are prime candidates for expanding manufacturing operations in North America. Again, a heavy influence of Japanese and Korean manufacturers with strong domestic roots. Each agreement should be positioned to attract these VMs for further North American investment.

Finally, we look at those vehicles that are imported from China. As of now, there are only three vehicles: Buick Envision, Cadillac CT6 PHEV, and the Volvo S60 long-wheel base. The Envision went on sale in 2016 with 41,000 imported in its first full year, and a 10 per cent increase expected for 2018. The S60 was much lower, at around 3,000 units per year, and the CT6 PHEV was even lower than that, at less than 500 units. Although these are small volumes, the primary significance is the products themselves.

With the success of Buick in the region, GM needs China. China provides a market for VMs to produce cars as the desire for the segment diminishes in the U.S. The logic in the past was to assemble low-margin cars in low-cost regions and high-profit vehicles, like CUVs, where they are sold. But the decision to make 100 per cent of the Envision CUV in China and export to the U.S. sheds light on a portfolio shift that may accelerate and spread to other VMs. Without protectionist measures, will we see more migration of production outside North America? Ford is using a similar strategy by moving Focus production to China. Like other VMs, Ford uses China for the necessary economies of scale to produce cars, import them when necessary to a car-declining U.S. market, and improve the use of domestic manufacturing plants to produce more profitable CUVs, SUVs, and pick-ups.

Unfortunately, any disruption into the cost structure of producing and selling vehicles will be passed onto the supply chain and the consumer. Over the last few decades, VMs have put more reliance on suppliers to deliver innovation. The competitive landscape has increased substantially, forcing suppliers to provide these solutions at low margins. Both the TPP and a reworked NAFTA will add further disruption to the cost model. Whether it is in the form of a tariff or increasing the number of competitors by opening up borders, something or someone in the process will be penalized. The final question is, “How do we offset the negative consequences with more positive outcomes?” The answer will require all stakeholders to get involved.

Joe McCabe is president and CEO of AutoForecast Solutions LLC, a premier supplier of global automotive production forecasting databases, business intelligence solutions to support global planning efforts, and strategic advisory services. Its team of automotive subject experts support the forecasting operations of suppliers, VMs, governments, financial institutions, and the academic community across the globe.

### Table 2

<table>
<thead>
<tr>
<th>Rank</th>
<th>Model</th>
<th>U.S. Sales (12 Months)</th>
<th>% Imported</th>
<th>Imported From</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nissan Rogue</td>
<td>418,498</td>
<td>69%</td>
<td>Japan / South Korea</td>
</tr>
<tr>
<td>2</td>
<td>Toyota RAV4</td>
<td>418,620</td>
<td>54%</td>
<td>Japan</td>
</tr>
<tr>
<td>3</td>
<td>Hyundai Elantra</td>
<td>191,071</td>
<td>42%</td>
<td>South Korea</td>
</tr>
<tr>
<td>4</td>
<td>Honda Civic</td>
<td>377,781</td>
<td>17%</td>
<td>United Kingdom</td>
</tr>
</tbody>
</table>

Strategically, Canada is investing heavily in its value-added differentiation, placing emphasis on the intellectual and information technology skills the country has to offer on a global stage.

![Figure 1](image-url)
In February 2018, the Globe and Mail reported that the shortage of skilled workers in the Canadian industrial sector has reached an all-time low and manufacturers indicate the lack of a qualified workforce is hindering growth. With an increasingly aging workforce that will soon be retiring, filling the gap in this sector is key to the survival of the manufacturing industry as a prominent part of Canada’s economy.

Meeting the demand of training a skilled workforce is a top priority for Dr. Mo Elbestawi, director of the W Booth School of Engineering Practice & Technology (SEPT) at McMaster University. SEPT, which was founded as an alternative to traditional research engineering programs, emphasizes a practice-based, flexible curriculum embedded with experiential learning strategies. The programs were designed to train graduates prepared to enter the workforce with a full complement of technical expertise and soft skills. The school’s unique engineering and technology programs focus on the intersection of technology and society through hands-on training. Graduates of the undergraduate degree programs complete their studies with at least one year of mandatory co-op experience while Master’s students complete a major project with the industry.

SEPT has integrated the vision of Industry 4.0 at the core of its quest to train personnel to work in “smart factories” or manufacturing factories of the future. Such factories will be fully automated with cyber-physical systems that will be able to communicate with one another and through corporate networks to achieve a common goal. The school has also begun to insert smart systems, artificial intelligence, and machine learning as a key subject matter in all of its programs. Through its partnership with Mohawk College, SEPT has made a significant investment to develop a state-of-the-art learning factory. The learning factory replicates a fully integrated factory of the future and features the core ingredients of Industry 4.0. Students and industry partners will use the facility to learn about Industry 4.0 in a hands-on environment.

The success of the SEPT programs relies on the school’s ability to be responsive to changes in the industry and trends in the market by adapting its curriculum and delivering customizable training. The flexibility of these programs to modify, enhance, and add new curricula to address the needs of employers is integral to the school’s goal of training a skilled workforce.

Modernizing the learning experience

The concept of the learning factory has been developed as one of the strategies to address skill shortages by improving learning and training in manufacturing. The aim is to modernize the learning process and bring it closer to the specific needs of current and future industrial practices, with particular emphasis on artificial intelligence and machine learning. Several objectives have been reported in literature, including the development of a modern and realistic manufacturing environment for experiential learning, the learning of interdisciplinary skills, abilities of synthesis, and adaptation to various situations.

“The learning factory is a shared space in which students, professors, and industry partners come together to design and manufacture items using modern processes and materials,” says Dr. Elbestawi. “It’s a place to tackle real-world manufacturing challenges through practice, technology, and mentorship.”

SEPT has taken two important steps in developing talents for a workforce trained in Industry 4.0 foundational education and skills. The first of these steps was the establishment of the SEPT Cyber-Physical Systems (CPS) Learning Centre, which will complement the student learning experience by providing new technical
skills that emphasize the inherent multidisciplinary nature of smart systems and advanced manufacturing.

The second more practical step was the establishment of the learning factory to demonstrate Industry 4.0 concepts. The SEPT Learning Factory includes a metal 3D printer, a CNC machine tool, and specialized stations that focus on Industry 4.0, Internet of Things, collaborative robots, and smart systems that are expected to address the educational, research, and training components of the SEPT CPS Learning Centre. Furthermore, the CPS Learning Centre will demonstrate lean manufacturing concepts related to Industry 4.0 to students and industry professionals.

“The incredible speed at which technology is moving requires a highly trained workforce,” says David Santi, the dean of engineering technology at Mohawk College. “The learning factory will enable us to train employees with advanced hands-on training in a variety of areas of technical expertise.”

**Digitizing the production line**

The fundamental approach the learning factory will implement is the digitization of a production line. While producing a physical object, a series of sensors will collect information from the production line modules, transmit to cloud-based servers using various types of communication networks, and use controllers and actuators to automatically control other modules of the production line. The systems will perform data analytics and provide information to the user for monitoring and control.

In developing the learning factory, the SEPT design team considered four main characteristics of Industry 4.0:

1. Vertical networking of production systems;
2. Horizontal integration of global value chain networks;
3. End-to-end engineering of overall value chain; and

These disruptive technologies embrace artificial intelligence, augmented reality, 3D printing, and include a significant use of smart systems; collaborative and specialty robotics; and advanced- and micro-sensors and automation components for microprocessors and microcontrollers. The use of these technologies has already been proven to advance major areas such as the Internet of Things and cyber-physical systems, big data and analytics, and communications infrastructures.

“The learning factory is revolutionizing our education programs and making them more accessible to the industry,” says Dr. Dan Centea, associate director of undergraduate studies for SEPT. “Our students and industry partners will benefit from working together on real-world problems, creating sustainable and readily applicable solutions.”

By collaborating with the industry, SEPT stays on trend when updating its curriculum, and unlike traditional engineering programs, it can rapidly respond to employer training demands.

In addition to its current complement of educational programs and customer-specific training, the school is developing new corporate training and micro-credentialing programs for the industry centred on manufacturing management, Industry 4.0, and carbon mitigation. This specialized training for the industry will enable companies to improve their employee skills sets and provide opportunities for advancement through higher learning. Courses delivered onsite to companies in a workshop format will lead to a certificate over a short period of time.

With a strong focus on micro-credentialing and de-risking the adoption of new technology, SEPT is at the forefront of the skilled worker shortage, working directly with the industry to deliver the required hands-on training for industry professionals.

Yvonne Maidment is the business manager for the McMaster-Mohawk Bachelor of Technology Partnership and the W Booth School of Engineering Practice and Technology at McMaster University.
NAFTA media coverage has restored currency to terms like protectionism, tariffs, and free trade.

It’s somewhat ironic that those same issues challenged Canadian and U.S. auto pioneers at the dawn of the 20th century, when Canadian protectionism—a punishing 35 per cent tariff on products manufactured in the U.S.—was a primary catalyst in establishing a viable industry.

It was a time when brilliant engineers and master mechanics in both countries—schooled in carriage, wagon, marine engine, and bicycle manufacturing—shared a common dream: to build affordable, self-powered mobility machines.

Americans like Olds, the Dodge Brothers, Ford, Buick, Leland, and Durant, were matched by Canadians like McGregor, Tudhope, St. Clair, Russell, and McLaughlin.

Protectionism

Reciprocity (free trade) with the Republic in natural products was the norm in the mid-19th century and remained popular in regions with traditional north-to-south trade relationships after Confederation.

Re-establishing free trade and including industrial goods proved, however, to be a non-starter for the new Dominion, which was determined to establish a prosperous, self-reliant nation with an east-to-west focus.

Without a tariff wall, it was feared that Canada’s comparatively immature industrial base would be quickly overwhelmed by imports from its larger, better-financed neighbour.

The combination of low population and risk-averse capital markets led to the implementation of The National Policy in 1878, which established safeguards for Canadian industry that remained in place, with periodic fine-tuning, until just prior to World War 2.

Larger markets and mass production

Delivering affordable automobiles required widespread demand and volume production techniques. Progressive assembly—machine-tooled, interchangeable parts assembled at sequential, dedicated work stations—was familiar to early automakers.

Ransom Olds used the process to produce his Curved Dash Oldsmobile. Others followed suit, but it was Henry Ford who invented the game-changer: the moving assembly line.

For Canadians, it was a different story. It was clear that affordable vehicle production would require working in tandem with their U.S. colleagues.

The answer was already in place: Imperial Preference—duty-free and preferential access for Canadian manufactured goods to the British Empire’s 460 million inhabitants and its world-wide network of most-favoured-nations, which did not include the U.S. U.S. automakers were interested. Partnerships with Canadian auto builders were underway.

The early days

In 1904, Walkerville Wagon Works in present-day Windsor formed The Ford Motor Company of Canada. Neither a subsidiary nor a branch plant of Ford Motor Company, its principal, Gordon McGregor, secured all Ford patent rights and selling privileges in the Empire, excluding Great Britain, where Ford was moving forward with plans to manufacture in County Cork, Ireland, his ancestral home.

Henry Ford held 13 per cent of the Canadian company, which was only acquired by Ford Motor Company after World War 2.

In 1907, Sam McLaughlin founded the McLaughlin Motor Car Company in Oshawa with his friend, Billy Durant, supplying engines from his Buick Company—soon to be part of General Motors (Buick and Oldsmobile), which he formed, lost, and reacquired due to the success of Chevrolet, which he formed during his interregnum. Chevrolets were also built by McLaughlin.

With the proviso that the McLaughlin brothers would stay in charge, General Motors purchased McLaughlin in 1918, forming General Motors of Canada.

And finally, the Chrysler saga. Walter P. Chrysler’s ancestors were among the founders of Chatham, ON. His father, Henry, emigrated to Kansas and worked in
railway construction. Walter was also a railway man and built a well-deserved reputation as a turnaround specialist focused on production efficiencies.

In 1912, he was contacted by Charles Nash, president of the Buick Motor Company to save that brand, which he did.

In 1921, he was recruited to resuscitate Maxwell Motors. Once again, he succeeded, so well that he purchased the company in 1925. An existing Maxwell assembly plant in Windsor led to the formation of Chrysler Canada, shortly after the incorporation of its U.S. parent, The Chrysler Corporation.

By the end of the decade, led by Big Three plants in Windsor and Oshawa, Canada was the world’s second largest vehicle producer.

The Great Depression and World War 2

The collapse of 1929 hammered the auto industry. New vehicle deliveries declined by 75 per cent in four years. The high-end of the market was eviscerated, but budget-priced brands rose to 80 per cent of sales. More than 50 per cent of automakers closed their doors.

GM and Chrysler, both of which had avoided vertically integrated parts production, adjusted and survived.

Ford’s business model made it vulnerable, but it endured, due to significant cash reserves and, ultimately, the positive impact of the retooling / repurposing of Big Three facilities for war-time production, The Arsenal of Democracy.

Ford’s fortunes further improved with its post-war recruitment of operations and logistics experts from the U.S. military, The Whiz Kids, led by Robert McNamara.

Post-war boom

The industry rebounded spectacularly, fueled by pent-up demand, rapid population growth, and the mobility required by suburban developments.

In the mid-1950s, Canadian automotive plants were thriving, based on domestic demand, as well as exports to Europe, where automakers were still recovering from the war.

By the early 1960s, however, the proliferation of vehicle styles, models and options required to meet buyer demand, was impacting Canadian assembly plants, which had been designed to accommodate scheduled retooling to produce a limited number of volume vehicles for domestic customers. Imports of cars and parts from the U.S. was increasing.

The Auto Pact: Economies of scale and growth for the parts industry

Concerned with future viability, Canadian federal began discussions with the U.S. government and auto companies to reshape production and cross border trade. Discussions were sometimes heated, but in the end, a workable solution emerged.

continued on 38
The Auto Pact (1965) was really a conditional form of free trade. Auto plants in Canada could be dedicated to producing lengthy production runs of vehicles for all North America, and American makers could export to Canada duty free.

The conditions included the following:
- Branch plants could build as many cars and trucks as they sold in Canada, provided base levels of spending were sustained; and
- Fifty per cent of vehicles exported state-side had to be built here, discouraging offshore makers from setting up operations to re-export off-shore vehicles into the U.S.

The impact in Canada was that assembly plant employment and productivity increased. Another important feature was the provision of value-added requirements, enabling the rapid growth of automotive parts manufacturers to supply domestic assemblers producing in volume for all of North America.

In the 1980s, rapidly increasing demand for Japanese vehicles, as well as the near-demise of the Chrysler Corporation, led Canada to enact trade measures to slow imports from Japan and the establishment of plants by Toyota, Honda, and CAMI (GM-Suzuki joint venture).

NAFTA
An outgrowth of the Canada-U.S. Free Trade Agreement, which replaced The Auto Pact in 1989, the North American Free Trade Agreement (1993) (NAFTA) has been a mixed blessing. Canadian vehicle assembly volumes were impacted and remain under pressure, due to competition from the southern U.S. states and Mexico.

Automotive parts manufacturers have, however, thrived.

The impending conclusion of NAFTA 2.0 negotiations will determine the future of the Canadian industry, ideally with sustained assembly activity and continued growth for the parts sector, predicated by our productive, highly skilled workers, aggressive private and public research and development investments and open access to the U.S. and global markets.

Jack Daley is managing partner of DALEYgroup, a MarCom consultancy whose extensive network of leading SMEs provides custom, cost-efficient solutions to select clients, primarily within the automotive vertical. Daley can be reached at daleygroup@aol.com.
Leading, Reaching & Connecting
2018 APMA Highlights

FEBRUARY 8-11, 2018
India Auto Expo
New Delhi, India

The Automotive Parts Manufacturers’ Association (APMA), along with the Government of Canada and the Government of Ontario, recently coordinated a Canadian Pavilion and Trade Mission around this event. The show occurred from February 8 to 11, 2018 in New Delhi, India. The Canadian Pavilion was 120-metres-squared and featured eight Canadian companies in the space. The Pavilion also featured meeting areas and representation from APMA and Canadian Association of Mold Makers (CAMM) at the information kiosk to greet visitors and field general industry inquiries. The Pavilion also hosted other Canadian companies that traveled to India to attend the event and meet with other suppliers.

FEBRUARY 15, 2018
Automotive News Canada Congress

APMA was a lead partner at the second annual Automotive News Canada Congress focused on automakers, their original-equipment suppliers, and franchised car dealers from a Canadian perspective. Over 300 hundred business leaders representing manufacturers, suppliers, major dealer groups, consultancies, media, and more to share insights, strategies, and solutions to key challenges and opportunities.

MARCH 5-7, 2018
APMA Mission to Porsche AG and Porsche Consulting GmbH

APMA led a select group of Canadian companies to Porsche AG headquarters in Bietigheim-Bissingen, Germany in March 2018 to visit with Porsche Consulting executives. The purpose of the visit was to learn more about the company and explore opportunities for Canadian manufacturers.

Porsche Consulting was established in 1994 after a restructuring out of Porsche AG. At the time, the subsidiary was responsible to pass on knowledge on streamlined production and lean management to Porsche suppliers. The methods used at Porsche are now shared with clients outside the automobile industry. Today, 30 per cent of Porsche Consulting’s workload is commissioned by clients from the Volkswagen Group, with the balance coming from external clients.

MARCH 12-13, 2018
G7 Global Automotive Suppliers Meetings
Geneva, Switzerland

Representatives of the seven leading automotive supplier associations from the major vehicle regions in the world (Brazil, Canada, Europe, India, Japan, Mexico, and the U.S.), met to discuss the importance of supporting a global automotive value chain and to reflect on the challenges facing the sector.

The meeting participants exchanged views on the latest developments and megatrends in the automotive and mobility sectors related to: decarbonization of transport and energy; technology neutrality; skills shortages and future employment needs; counterfeiting; industry competitiveness and new business models; connected and automated driving; big data, cyber security and in-vehicle-generated data; road safety; technical harmonization; and the facilitation of global value chains and trade.

Trade Matters: NAFTA, CPTPP, Tariffs

APMA has continued its leadership role on all trade matters regarding North American Free Trade Agreement (NAFTA) negotiations, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership ratification, steel tariff discussions, and all trade matter issues.

In the past few months, APMA has provided invaluable input for the negotiation meetings in Ottawa with Canadian government officials and at the NAFTA Rounds and also through channel discussions and dialogue between companies and key government negotiators. APMA has maintained a very public and consistent voice on behalf of our industry’s issues and positions, representing the interests of its members.

Automotive Supplier Competitiveness Improvement Program (ASCIP)

ASCIP is a partnership between the APMA, the Ontario Centres of Excellence and the Province of Ontario’s Ministry of Economic Development and Growth seeking to increase the sourcing capabilities of Ontario-based small- and medium-sized automotive suppliers, while encouraging innovation and productivity initiatives that increase success in growing export markets. In March 2018, the ASCIP program was extended for another year due to the success of its previous two phases. Stay tuned for new application intake information.

APRIL 9, 2018
Automotive News PACE Awards
Detroit, Michigan

The Automotive News PACE Awards have honoured superior innovation, technological advancement, and business performance among automotive suppliers for over
20 years. In 2018, APMA was the exclusive sponsor of this international event.

This prestigious award is recognized around the world as the industry benchmark for innovation. Thirty-three innovations from 27 component and technology suppliers around the world were selected as finalists for the 2018 Automotive News PACE Awards.

The 2018 Automotive News PACE Awards occurred on April 9, 2018 in Detroit.

JUNE 5-6, 2018
APMA Annual Conference & Exhibition & APMA/CAMM B2B Meetings

The 2018 APMA Annual Conference & Exhibition is supported by the association’s partners at CAMM and in close collaboration with the WindsorEssex Economic Development Corporation. This year’s theme, Make it... Smarter, Lighter, Faster, Stronger, features a one-day format event of industry-leading speakers addressing key issues facing the industry while sharing strategic insights to focus on opportunities.

APMA’s concurrent sessions integrated within the conference format will highlight and discuss key strategic areas of focus for automotive suppliers that will shape the next generation of the auto industry.

OCTOBER 16-18, 2018
IZB Automotive Supplier Fair Canadian Pavilion
Wolfsburg, Germany

APMA is working with its colleagues at the Government of Canada and the Province of Ontario on this initiative to organize a Canadian Pavilion at the IZB Automotive Supplier Fair. On the footsteps of Volkswagen’s world headquarters, this fair provides a valuable opportunity for companies seeking to gain exposure to Volkswagen or its suppliers.
Meet APMA’s Newest Members

Please join us in welcoming the following companies as new members of the APMA. We salute these new members, along with all of our faithful existing members, who continue to provide us with their support.

**REGULAR MEMBERS**

**Acerta Analytics Solutions Inc.**
151 Charles Street West, #199
Kitchener, ON N2G 1B6
Representative: Gonen Hollander,
Chief Operating Officer
Alternate: Alex Oulendro,
Director of Business Development
Tel: (519) 799-7232
E-mail: ghollander@acerta.ca
www.acerta.ca

**Amino North America Corporation**
15 Highbury Avenue
St. Thomas, ON N5P 4M1
Representative: Walter Cunial,
Technical Sales Engineer
Alternate: Trent Maki, President
Tel: (519) 637-2156
Fax: (519) 637-7443
E-mail: wscunial@aminonac.ca
www.aminonac.ca

**Applanix**
85 Leek Crescent
Richmond Hill, ON L4B 3B3
Representative: Louis Nastro,
Director of Land Products
Alternate: Steve Woolen,
President
Tel: (289) 695-6019
Fax: (905) 709-6027
E-mail: asottl@applanix.com
www.applanix.com

**Asteutech Industries Inc.**
381 Speedvale Avenue West
Guelph, ON N1H 1C7
Representative: Nirav Joshi,
Director of Finance & Controlling
Alternate: David Dembksi,
Chief Operating Officer
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Fax: (519) 836-7996
E-mail: njoshi@asteutechgears.com

**Stackpole International**
1310 Cormorant Road
Ancaster, ON L9G 4V5
Representative: Ann Herten,
Global Head of Human Resources
Alternate: Karen Kemp, Executive Assistant
Tel: (905) 304-9455
Fax: (905) 304-2706
E-mail: contact@stackpole.com
www.stackpole.com

**Products:** Engine oil pumps, transmission oil pumps, vacuum pumps, tandem pumps oil and vacuum, e-modules, planetary carriers, clutch components, gears and sprockets, high-strength synchronizer hubs, and pump and WT components.

**Testech Industries Inc.**
705 Fountain Street North
Cambridge, ON N1R 5T2
Representative: Marcus Morson,
Vice-President, Manufacturing
Alternate: Pamela Deibert,
Associate Vice-President
Tel: (519) 650-6363
Fax: (519) 650-6368
E-mail: marcus.morson@cowangroup.ca
www.cowangroup.ca

**Products:** Insurance.

**ASSOCIATE MEMBERS**

**Acenx Analytics Inc.**
20 Wellington Street West, Suite 402
Toronto, ON M5H 1B6
Representative: Courtney Deinert,
Founder, Market Strategy
Alternate: Humera Malik, CEO
Tel: (647) 558-0019
E-mail: info@acennx.io
www.acennx.io

**Products:** Acenx provides IoT advanced analytics software designed specifically for the industrial environment. The turn-key solution connects data from any source-devices, IoT platforms or sensor aggregators—and provides real-time insights and predictive analytics using pre-built analysis, automated data modeling, and deep learning.

**Cowan Insurance Group**
705 Fountain Street North
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Vice-President, Manufacturing
Alternate: Pamela Deibert,
Associate Vice-President
Tel: (519) 650-6363
Fax: (519) 650-6368
E-mail: marcus.morson@cowangroup.ca
www.cowangroup.ca

**Products:** Insurance.

**Valitas Capital Partners Inc.**
4 King Street West, Suite 402
Toronto, ON M5H 1B6
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E-mail: info@valitascapital.com
www.valitascapital.com

**Products:** Valitas Capital Partners is a boutique advisory firm that collaborates with passionate business owners to unleash value over time and realize that value through a well-timed exit. The company’s work is bespoke, tailored to the unique priorities and circumstances of each client, recognizing the legacy they have built through years of dedication and sacrifice. Valitas delivers global firm capability from an agile, entrepreneurial platform. Its value creation excellence is rooted in best practices developed by leading global investment banks and private equity firms. Over the team’s careers, they have completed almost 200 M&A and financing transactions with an aggregate value exceeding $180 billion, including some of the most notable and complex M&A transactions in Canadian history.

**Willis Towers Watson**
175 Bloor Street East
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Toronto, ON M4W 3T6
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Client Relationship Director
Alternate: Brian Parsons, CEO
Tel: (416) 960-7495
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www.willistowerswatson.com

**Products:** Willis Towers Watson (NASDAQ: WLTW) is a leading global advisory, broking, and solutions company that helps clients around the world turn risk into a path for growth. With roots dating to 1828, Willis Towers Watson has 40,000 employees serving more than 140 countries. Its team designs and delivers solutions that manage risk, optimize benefits, cultivate talent, and expand the power of capital to protect and strengthen institutions and individuals. The company’s unique perspective allows teams to see the critical intersections between talent, assets and ideas—the dynamic formula that drives business performance.

**Advanced Manufacturing Driving Industry in Brampton**

With a population of over 600,000, Brampton is the ninth largest city and the second fastest growing city in Canada, averaging 14,000 new residents per year. With a median age of 36.5 Brampton has the lowest average age among Canada’s largest cities.

Brampton’s highly diversified economy, steady flow of well-educated, skilled labour and strategic position in the middle of the Innovation Super Corridor make Brampton’s advanced manufacturing sector a world-class powerhouse of production. It is the largest sector in the city, accounting for over twenty percent of its total workforce. From Fiat Chrysler Automotive (FCA), to ABB Robotics, Brannon Steel and Almag Aluminium Inc., Brampton’s advanced manufacturing sector is home to both multinational organizations and family owned businesses that have stood the test of time.

Daryl VanMoorsel, Advanced Manufacturing Sector Manager
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**Brampton Economic Development**
Meet APMA’s Members

ABC Group  
Acerta Analytics Solutions Inc.  
Advanced Technology Emission Solutions Inc.  
AGS Automotive Systems  
Airbus Helicopters Canada  
Alcohol Countermeasure Systems Corp.  
American Industries Group  
Amino North America Corp.  
Anchor Danly  
Aon Reed Stenhouse Inc.  
Applanix  
Applied Precision Inc.  
ArcelorMittal Dofasco Hamilton  
Arent Fox LLP  
AutoForecast Solutions LLC  
Automotive Centre of Excellence – UOT  
Balluff Canada Inc.  
Bank of Canada  
BDC – Business Development Bank of Canada  
Bowman Precision Tooling  
Brose Canada Inc.  
Canadian Centre for Product Validation  
Canvass Analytics Inc.  
CARR Corp.  
Chemetall Canada Ltd.  
City of Brampton  
CN  
Combined Metal Industries (CMI)  
Commercial Spring and Tool Company Ltd.  
Comoldco Corp.  
Corporate Benefits Division  
Cowen Insurance Group  
CW Bearing, Canada Inc.  
DBI Electronics Ltd.  
DG Canada Ltd.  
Deloitte  
Dickinson Wright LLP  
Dovercourt Management Corp.  
Dynaplas Ltd.  
Eagle Press & Equipment Co. Ltd.  
EAS Engineering Services  
ECC – Export Development Canada  
Entrada Group  
Epicor Software Corp.  
Ernst & Young LLP  
Ernest Hymen Group North America, Inc.  
ETAS Embedded Systems Canada  
Exco Technologies Ltd.  
F&P Manufacturing, Inc.  
Festo  
Fibrotek Advanced Materials  
FreePoint Technologies Inc.  
Grande International Services  
Group Sector Canada Inc.  
Hematite Manufacturing  
Henkel Canada Corp.  
HOERRBERGernadelstamping Inc.  
HR/Flow  
INAGD Corp.  
Intelligent Mechatronics Systems Inc., IMS  
Int’l Chain Corp.  
investStratford (Stratford Economic Enterprise Development Corp.)  
Invotech Electronics Inc.  
Italian Chamber of Commerce of Ontario  
KPMG LLP  
KUKA Robotics Canada  
Lenox Manufacturing Inc.  
Linamar Corp.  
Linear Transfer Automation Inc.  
Limos Automation Inc.  
Larco  
Magna International Inc.  
Martineau International Inc.  
Maxwood Metal Fabrication Ltd.  
Mazcor-Matsu Group Inc.  
McMaster University  
Mentor Works Ltd.  
Metalex Products Inc.  
MetroCan Stamping Co. Inc.  
MGI Research Corp.  
Miller Canfield  
MicronVision Technologies Inc.  
Mitchell Plastics  
MNP LLP  
Mohawk College  
Naraco Group (The)  
The National Research Council of Canada (IM)  
Niagara Region – Economic Development  
Nive Plastics Inc.  
Offshore Group (The)  
Omega Tool Corp.  
Omrorn Automation Americas  
Ontario Centres of Excellence  
Papp Plastics & Distributing Ltd.  
Patrick Plastics Inc.  
Pegaysia Inc.  
Phantom Intelligence Inc.  
Plex Systems  
Poitras Foundry Ltd.  
Pravala Network Inc.  
Precision Resource Canada Ltd.  
PricewaterhouseCoopers LLP  
Promation Automotive (A Division of Promotion Engineering Ltd.)  
Promexico  
QNIX Software Systems Ltd.  
Racer Machinery International Inc.  
Raufoss Automotive Components Canada G.P.  
Revere Plastics Systems  
Samuel Automotive, a Division of Samuel, Son & Co.  
Sanyo Corporation of America  
Schukra of North America Ltd.  
Sciematic Instruments, Inc.  
SEW Eurodrive Company of Canada Ltd.  
SEWS Canada Ltd.  
Sherrard Kuzz LLP  
SHW Pumps & Engine Components Inc.  
Siemens Canada Ltd.  
Sintertis Inc.  
Sie-Co Manufacturing  
Smart Attland  
SME  
Specialty Innovations and Manufacturing (Maxtech Licensee Co.)  
Stackpole International  
Studio 63 Inc.  
Supply Chain Optimizers  
Swift Components Corp.  
Tieling Tianhe Mechanical Manufacturing Co. Ltd.  
TM4 Inc.  
Topbin Insurance Solutions  
Toronto-Dominion Bank (The)  
Trinity Tech Inc.  
TRQOSS Inc.  
Tyco Electronics Canada ULC  
University of Waterloo – WatCAR  
University of Windsor  
UpchainKLX  
Valbruna Canada Ltd.  
Valitas Capital Partners Inc.  
Velcro Canada Inc.  
Waterloo Region Economic Development Corp.  
Wells Fargo Equipment Finance  
Willis Towers Watson  
Windsor Mold Group  
Windsor Essex Economic Development Corp.  
Woodbridge Group (The)  
Zerust/excor Corrosion Solutions

Meet CAMM’s Members

The Automotive Parts Manufacturers’ Association (APMA) and the Canadian Association of Mold Makers (CAMM) have teamed up to offer members an even better member experience! Please join us in welcoming the following CAMM members. We salute them for their support.

AAkers Tool & Mold Inc.  
Aarkel Tool & Die Inc.  
Acetronic Industrial Controls Inc.  
Agramol Ltd.  
Active Burgess Mould and Design Advantage Engineering  
AlphaKOR Group  
Amger Tool and Mould  
Arlen Tool Company Ltd.  
BDO Canada LLP  
Blow Mold Tooling Inc.  
BORGDE Engineered Abrasives  
Briadco Tool & mould Inc.  
Build-A-Mold Ltd.  
Calfraxman Technologies  
Cana-Datum Moulds Ltd.  
Canada Mold Technology Inc.  
Canadian Metalworking Cap Thin Molds  
Capital Assist (Valuation) Inc.  
Cavalier Tool & Manufacturing Ltd.  
CB Mould Services  
Cimaton Technologies Inc.  
Circle S Tool & Mold Inc.  
Clinton Aluminium Canada ULC  
Collins Barrow Windsor LLP  
Concours Mold Inc.  
Contents Processing Centre  
Cottam Diecasting Ltd.  
Crest Mold Technology Inc.  
Crystallium Delmo Molds Inc.  
DMF of Canada Ltd.  
DNS (Canada) Ltd.  
Dynamic Metal Treating, Inc.  
Elliott-Matsuura Canada Inc.  
Ellwood Specialty Metals Enterprise Mold Ltd.  
FGL Precision Works Inc.  
Finkl Steel  
Haidlmair North America  
HUB International Ontario Ltd.  
I. Thibault Inc.  
INCOE Corporation  
Injection Technologies Inc.  
Integrity Tool and Mold Inc.  
Ives Insurance Brokers Ltd.  
JDL Technical Services  
Jesse Garant & Associates Metrology Center  
KLS Molds  
Laurentian Bank of Canada  
Laval International  
Leemark Enterprises  
Longterm Technology Services Inc.  
MegaForm Ltd.  
Mega Mold International Inc.  
Megatek Inc.  
Metric Mold (1983) Inc.  
Mold-Spec Inc.  
Mold-Tech Canada  
Neolysis Technology Inc.  
Nova Tool & Mold Inc.  
Optimoule Inc.  
Paroian Skipper Hewitt  
Parpas America Inc.  
PBL Insurance Ltd.  
PDP Aluminum  
PSCS Company  
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Rupinpiyas North America  
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Schmaltz+Bickenbach Canada Inc.  
Sorel Forge Inc.  
Spartan Sling Manufacturing  
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SST Canada  
St. Clair College of Applied Arts & Technology  
Stack/Teck Systems Ltd.  
Superior Tool & Mold Inc.  
Synergetic Engineering Inc.  
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Take Advantage of our Referral Program

To serve our industry better, APMA and CAMM are seeking (and rewarding) your assistance in obtaining new members! If your company is a current member of APMA/CAMM and you refer a new manufacturing member who joins the association(s), you will both receive a discount on your membership! This result in APMA and CAMM serving a higher volume of companies throughout the industry and presents additional networking opportunities for our members. It’s a win-win!

Go to www.apma.ca to learn more.
The Automotive Parts Manufacturers' Association

The APMA’s mission is to grow and promote a vibrant and globally competitive Canadian automotive supply chain. APMA members are engaged, recognized and act as a central partner in helping to build our country’s economic future.

We do this through:
• Establishing meaningful contact between suppliers and customers;
• Championing the cause of our members to all levels of government;
• Raising public awareness of issues important to our membership; and
• Bringing forward trade and export initiatives with an OEM focus in NAFTA countries, the European Union, India and China.

The APMA is Canada’s largest and most influential association, representing OEM producers of parts, equipment, tools, supplies and services for the worldwide automotive industry—an industry whose shipment value is $32 billion and directly employs over 96,000 people.

Its more than 240 members account for 90 per cent of parts production in Canada, including machines, and tool, die and mould makers.

Members represent all Tier levels, technology providers and component suppliers, which include many of the largest and most qualified companies.

The APMA has a three-pillar approach to providing service excellence: advocacy, industry intelligence, and broadening opportunities.

To learn more or to join APMA, contact Nick Persichilli, APMA’s senior manager of stakeholder relations and business development, at (416) 620-4220, ext. 224 or npersichilli@apma.ca.

Advocacy advances member organizations through productive and influential dialogues with all levels of government leadership and North American industry leaders. The association acts collaboratively with its membership to address common issues and concerns through APMA Committees and Working Groups.

Industry intelligence provides intel on government priorities and objectives and makes market intelligence accessible through APMA’s searchable industry database. It also delivers and connects members to financial programs, cost containment and savings opportunities.

Membership broadens opportunities by offering impressive industry and networking events with relevant keynotes, industry executives and key government officials. APMA also facilitates supplier and technology forums to showcase automotive capabilities, enhance the supply base and develop new business.

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Ownership: All State Fastener is a private, family-owned company with strong core values and a solid financial background. Our environment is designed around employee well being, work culture, strong business ethics and ultimately unsurpassed customer satisfaction.

All State Fastener Competitive Advantage:

- **Manufacturer level pricing without product limitation**
  ASF has developed best-in-class manufacturing by product niche and enhanced strategic pricing levels through exclusive partnerships, long term agreements and investments. Additional economies of scale are a direct results of ASF's secondary operation capabilities.

- **Supplier Consolidation**
  Customized consolidation programs range from platform relocations, supplier directed projects, to direct takeover and supply. Bolts, screws, nuts, clips, rivets, pins, bushings, highly engineered items and small assemblies encompass the core of ASF's wide product range. We will leverage your spend with our supply chain, identify savings, manage the transition and execute implementation.

- **Expert Technical Support**
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- **Quality Control**
  ASF has validated a longstanding history of exceptional quality with awards from General Motors, Ford, FCA, Navistar, ZF, Mahle, Wabash, and DTE Energy. Supplying standard, safety critical, and powertrain parts, ASF operates within a zero defect culture.
ABRASIVES
Boride Engineered Abrasives.......................... 46

ADVANCED MANUFACTURING PROCESSORS,
CUSTOM AUTOMATED ASSEMBLY SYSTEMS &
SUPPLIES
Centerline (Windsor)................................. 20

ALUMINUM LIGHTWEIGHT SUSPENSION
COMPONENTS
APMA, Raufoss Technology......................... 30

ASSEMBLY MODULES & FLUID MANAGEMENT
SOLUTIONS
APMA, Martinrea International Inc................... 12

AUDIT, TAX & ADVISORY SERVICES
APMA, KPMG LLP.................................... 21

AUTOMATED PICKING SYSTEMS
Witron Integrated Logistics Corp.................... 40

AUTOMOTIVE PARTS & SERVICE
APMA, Magna International
Inc...................................................... 8

BLOW MOLDING & PLASTIC PARTS
APMA, ABC Group..................................... 8

BUSINESS FINANCE & LEASING SERVICES
APMA, BDC – Business Development Bank.... 3

COMPLETE AUDIT, TAX & CONSULTING
SERVICES
RSM Canada........................................... 45

DRIVERTRAIN COMPONENTS
APMA, Poitras Foundry Ltd......................... 24

ENCLOSED VEHICLE TRANSPORTATION
Thorsons (EVT).................................... 45

ENGINEERED RUBBER PRODUCTS
AirBoss of America................................... 22

ENGINEERING MANAGEMENT PROGRAMS
APMA, University of Windsor – Faculty of
Engineering............................................ 10

HIGH-STRENGTH FLAT CARBON
APMA, ArcelorMittal
Dofasco............................................. 45

INDUSTRIAL BRUSHES
Tanis Brush Inc...................................... 37

INDUSTRIAL LAND FOR SPACE & LEASE
APMA, City of Brampton............................ 4, 41

INDUSTRIAL LUBRICANTS
Stuff Lubricants..................................... 43

INJECTION MOULDINGS & ASSEMBLY
APMA, Sle-Co Manufacturing........................ 6

MACHINE & FABRICATION EQUIPMENT
Modern Tool......................................... 22

MACHINERY & ACCESSORIES
Index Corporation.................................... 40

PCR PLASTIC RESINS
EFS Plastics........................................... 35

PLASTIC TOOLING SOLUTIONS
Arlen Tool............................................. 14

PLASTICS MANUFACTURING
APMA, Patrick Plastics Inc......................... 40

PRECISION MACHINING & GRINDING
Densmore Tool & Die Works Ltd..................... 38

PROTOTYPING & TESTING SERVICES
APMA, Canadian Centre for Product
Validation............................................... 17, 19, 21

QUALITY INSPECTION EQUIPMENT
Keyence Canada..................................... 16

RISK MANAGEMENT
APMA, Banco BASE................................. 16

SEATING
Leggett & Platt Automotive......................... 13

SENSOR TECHNOLOGY
APMA, Balluf Canada Inc........................... 26

SOUND & VIBRATION INSTRUMENTATION
Scantek Inc............................................ 45

STANDARD & ENGINEERED FASTENERS
Allstate Fastener Corp................................ 44

STEEL & ALUMINUM DISTRIBUTION
Ellwood Specialty Metals............................ 18

STRUCTURAL METAL STAMPINGS
APMA, Narmco Group............................... 43

SURFACE TREATMENT TECHNOLOGIES
APMA, Chemetall US Inc......................... 32

TEST & MEASUREMENT INSTRUMENTS
Fischer Technology Inc............................ 32

WELDING PRODUCTS
Tregaskiss Welding Products....................... 38
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