

The Black Box Institute

Auto Parts Manufacturing
Scenarios: 2025 and beyond

Highlights

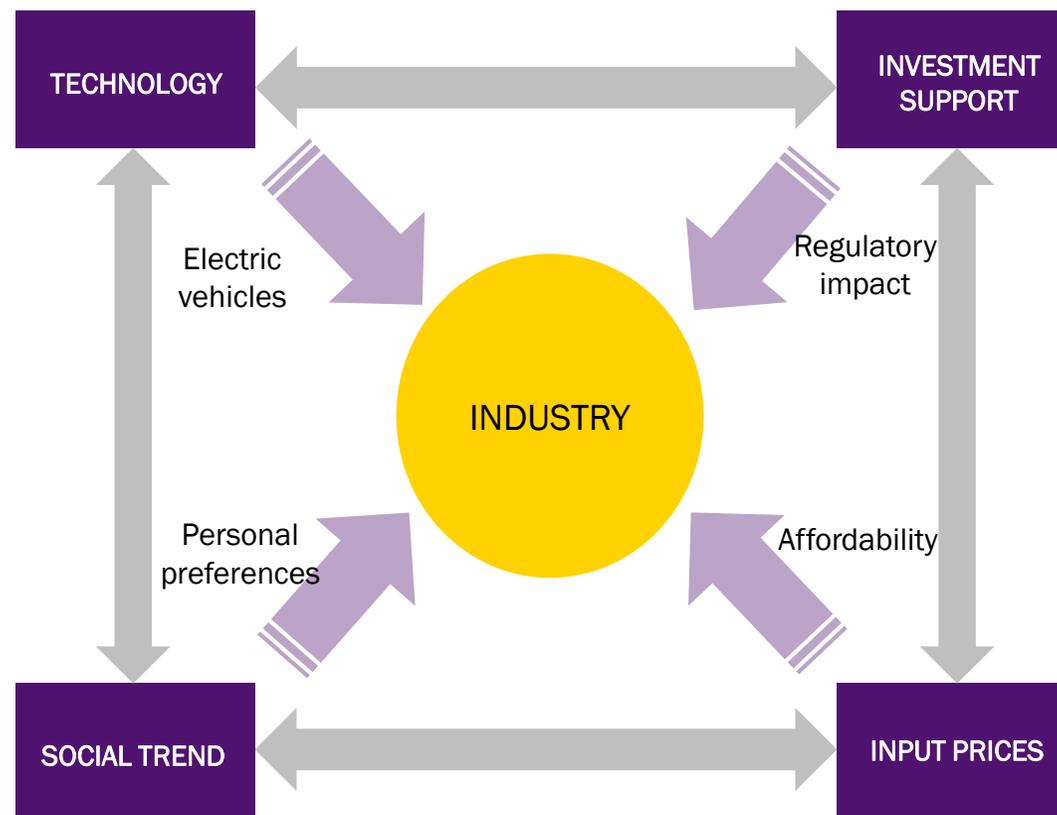
- Technological advancements, shifting consumer preferences, governmental influences and changing resource needs are all shaping the future of the auto parts manufacturing industry.
- Scenario planning is a tool that helps companies understand how current and future forces are going to shape the world we will live in tomorrow.
- By plotting multiple scenarios of the future, organizations are able to predict the most likely outcomes of the future while also being ready for the outcomes that do not look as likely at a first glance. The key opportunities are identified while key risks are managed.

The global auto parts manufacturing industry has been coping with uncertainty for some time, a situation that has only been exacerbated by the advent of the COVID-19 pandemic and the resulting economic upheaval.

COVID-19 has accelerated some trends while slowing down others, so there is no doubt that the pandemic has altered the direction in which the industry is heading. Auto parts manufacturing is highly dependent on the performance of downstream automotive sectors and the financial devastation caused by pandemic is an emerging macroeconomic trend that will likely reduce consumer demand and disrupt production. However, the long-term effects of a mixture of external factors will also play an important role in determining the future of the industry.

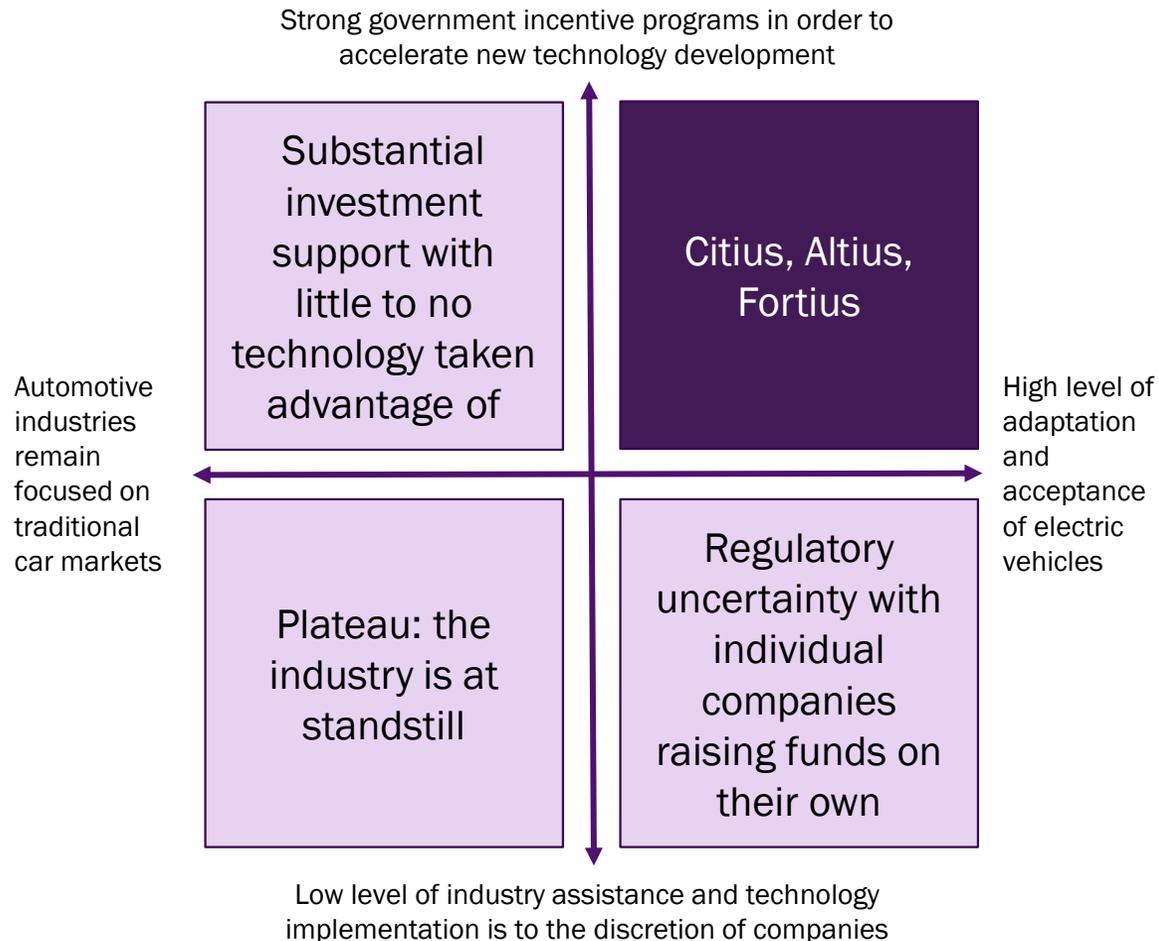
In this paper, we explore the highly uncertain future for Canadian auto parts manufacturing companies. This includes future market scenarios that consider the short-term market trends (including the consequences of the COVID-19 pandemic), as well as a broader long-term vision of how the manufacturing industry might adapt.

- *Electric mobility is expanding at a rapid pace.* In 2018, the global electric car fleet exceeded 5.1 million, up 2 million from the previous year and almost doubling the number of new electric car sales.
- *Technology advances deliver substantial cost cuts.* Key enablers are developments in battery chemistry and the application of big data to correctly size batteries.
- *Millennials* have a lower rate of car ownership than previous generations at their age.
- *75% of car buyers* find Internet research, including social media and review sites, to be the most helpful medium when selecting a car.



- Governments' tax revenue base derived from vehicle and fuel taxes is an important source of revenue for the development and maintenance of transport infrastructure.
- Governments can effectively allocate funds to accelerate research and innovation, looking in particular at advanced *lithium-ion and solid state battery technologies*.
- *Steel* composes around 22% of a vehicle and represents a *substantial cost*. Aluminum is more expensive but is growing in popularity as an alternative.
- Demand for fuel-efficient materials will likely rise as design standards increase in countries concerned about environmental impact. Improved technologies will likely change the proportion of materials used.

Example of Scenario Set in Auto Parts Manufacturing



- To develop each set of scenarios, we started out with two axes, each with significantly different outcomes at opposing poles. These outcomes were chosen keeping in mind ‘Mega trends,’ which will have an effect on the auto parts manufacturing industry in the future.
- The scenarios in the four boxes are deduced from a combination of outcomes on the X- and Y-axes. So, for example, if one considers a scenario that includes the right-hand side of the X-axis and the top of the Y-axis, that might look like the top-right box (shown in a darker colour) – a scenario in which strong government support and automotive companies’ willingness to innovate enables the industry to fully embrace new technologies.
- We considered three scenario sets, each equally important for the auto parts manufacturing industry. One of them has been shown here as an example.
- The value and limitation of this method of scenario planning is that the possibilities of potential axes are infinite, as are the resulting scenarios.

SCENARIO 1:

Citius, Altius, Fortius

The industry reaches its full potential with strong government incentive programs in order to embrace and implement new technology for the future of electronic and self-driving cars

SCENARIO 2:

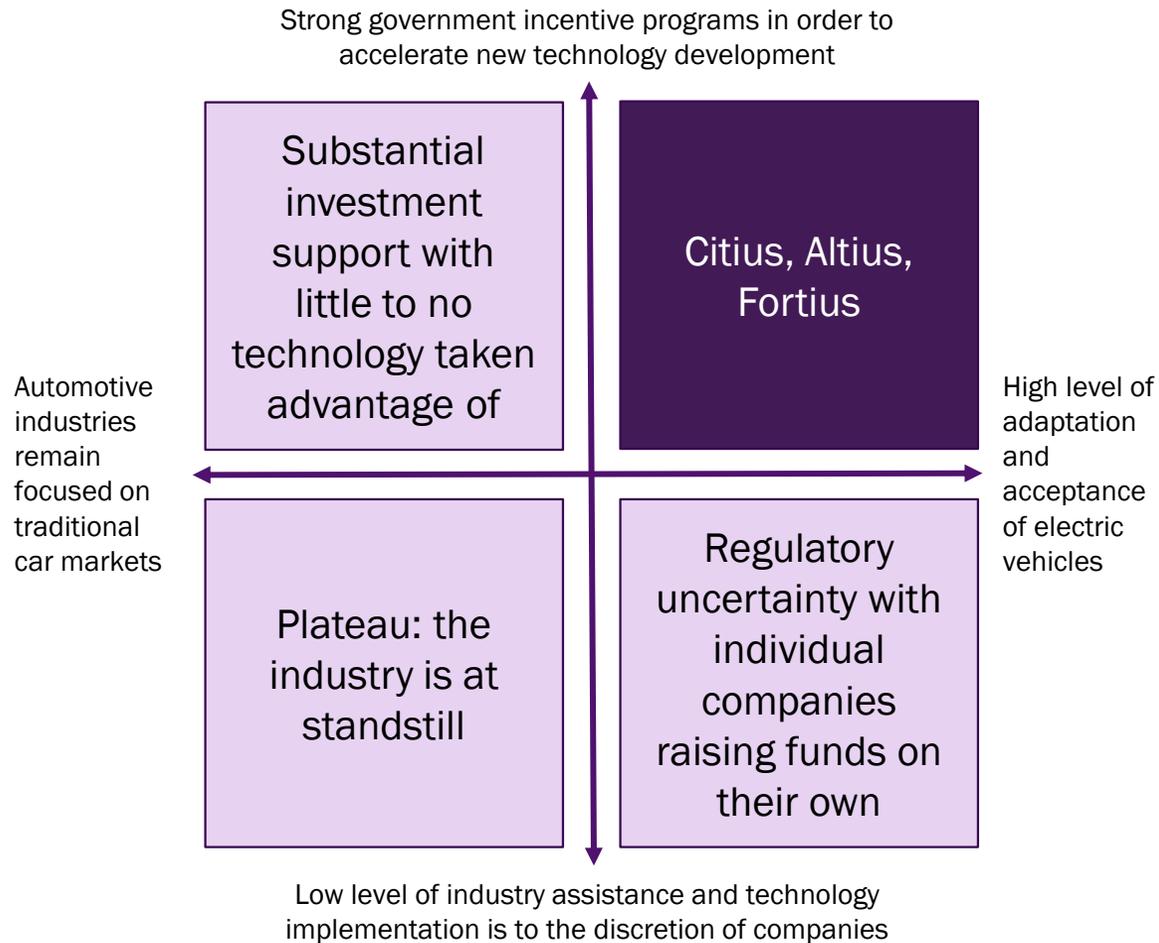
Supply Present, Demand Missing

Manufacturers benefit from affordable oil and steel prices, leading to a production surplus as people prefer alternative means to car ownership, such as ride sharing

SCENARIO 3:

Fasten your Seatbelt

Demand for new vehicles reaches an all-time high and clashes with manufacturers' inability to keep up with rampant demand due to production being affected by high input costs



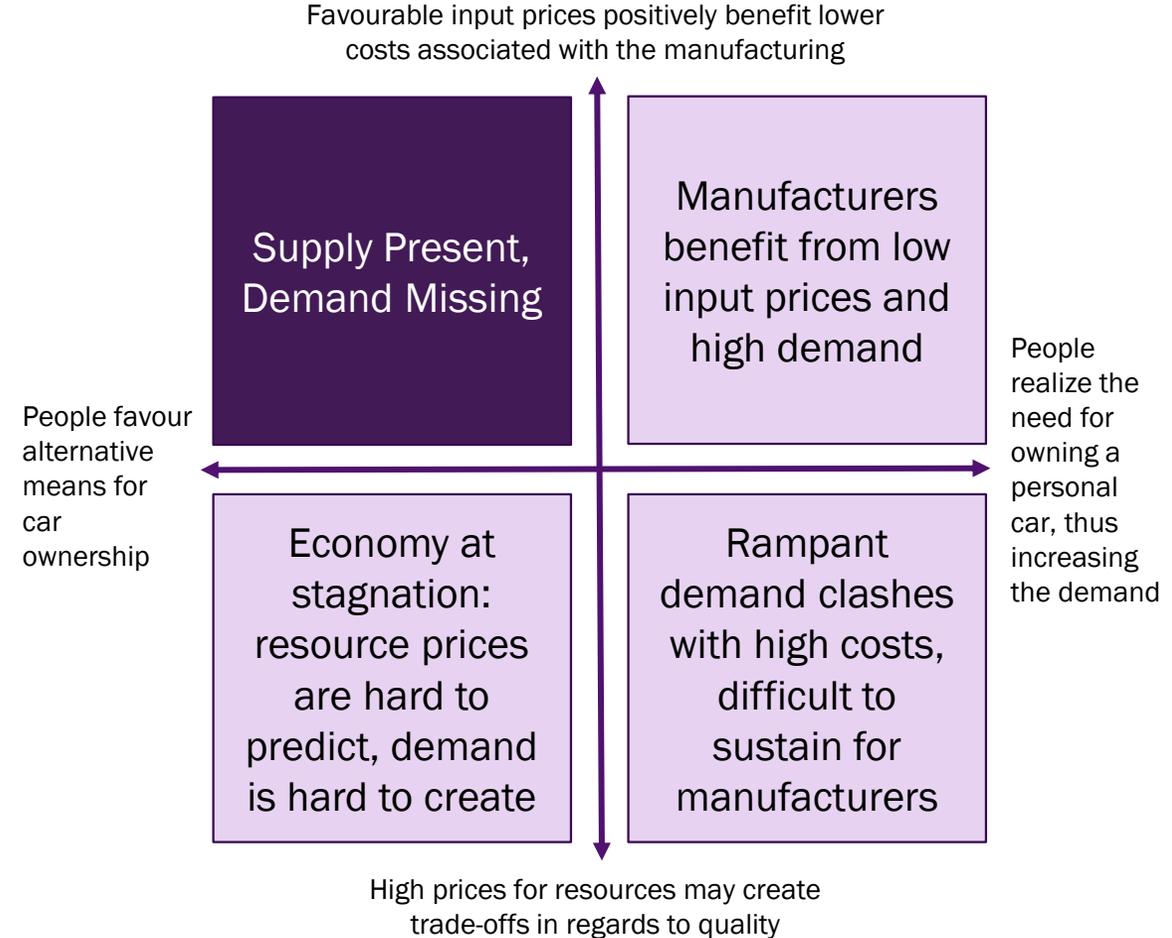
With an emergence of favourable government assistance programs, companies begin to realize the full potential of the electric vehicles market

This scenario assumes that the biggest automotive manufacturers will establish and develop a trend of electric vehicles, thus further encouraging auto parts manufacturers to establish new practices

Implications

- The industry will experiment with new manufacturing means, such as fuel cells and secondary-type batteries with a longer lifetime of chemical reactions that produce energy
- New raw materials will be required for batteries that are made of nickel-iron, nickel-zinc, zinc-chloride and lead-acid
- Government assistance and incentives should consider broadening the parties involved in the program (i.e. consumer side). For example, a national purchase incentive program by Transport Canada issues \$2,500-\$5,000 to Canadians who purchase electric vehicles

Scenario 2: Supply Present, Demand Missing



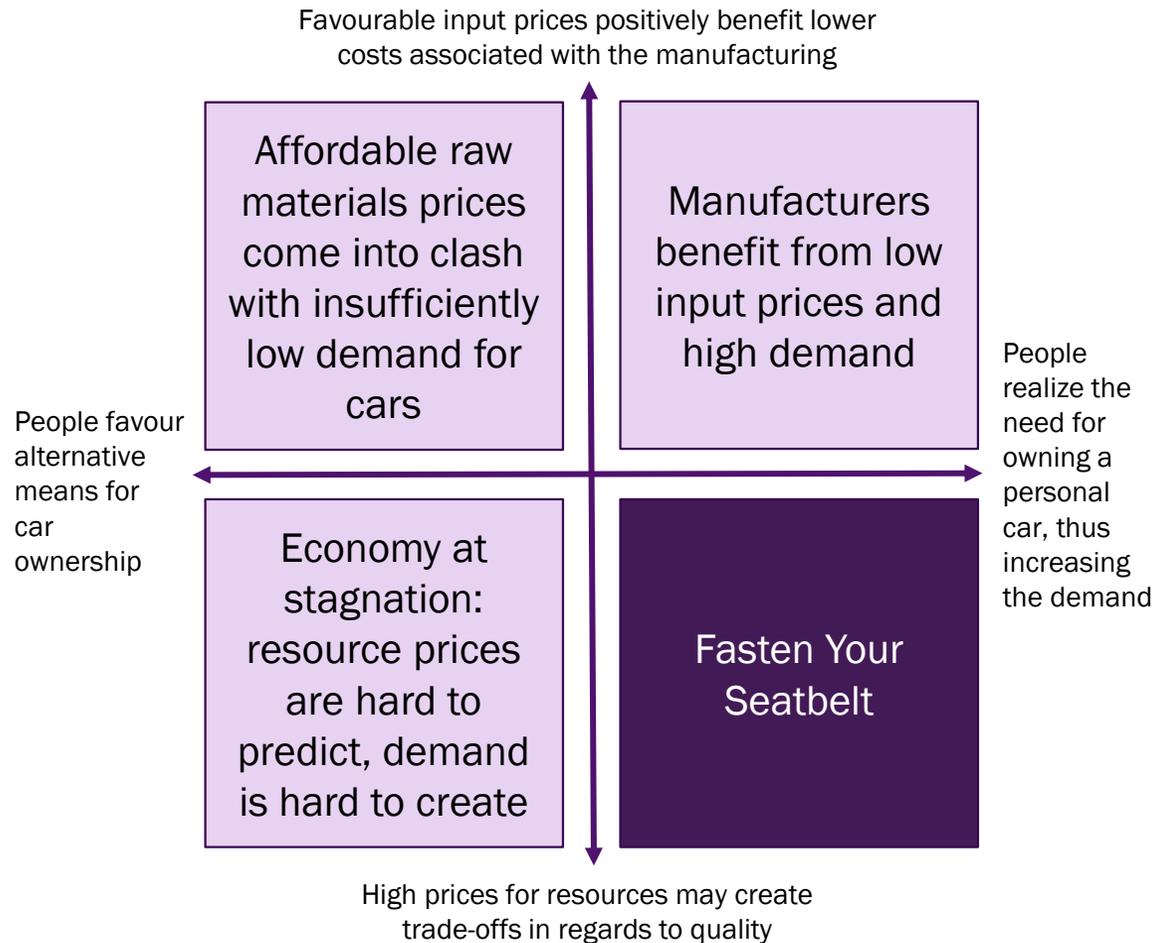
Manufacturers are able to take advantage of lower costs due to lower resource prices associated with production, such as oil and steel. However, consumers overlook the need for a personal vehicle

This scenario assumes that a production surplus will occur from an abundant supply of vehicles, unable to stimulate an equally high demand

Implications

- Lower oil prices benefit the users, such as consumers driving conventional cars and manufacturers using it in the production process. However, if the demand for oil declines due to people's preference shifting to economic vehicles, the economic state of the country may suffer severe implications
- Ride-sharing apps and taxis will satisfy the needs of a significant part of the urban population, thus creating a more beneficial and affordable option for personal transportation
- The future of urban transportation will rely heavily on technologies that facilitate information sharing and reduce asymmetries. It is up to regulatory bodies to certify that the associated efficiency gains will be maximized and distributed fairly among all involved parties

Scenario 3: Fasten your Seatbelt



Manufacturers suffer from high input prices and are unable to meet the high demand for cars

This scenario assumes that a production deficit will occur, resulting from insufficient supply to cover unprecedented high demand for cars, thus further impacting the auto parts market

Implications

- High input prices and/or volatile costs of steel, aluminium, oil, copper and plastics may be visible in the compression of gross margins for manufacturers
- Since raw materials contribute about 47% to the cost of a vehicle, manufacturers may prefer heavier and more affordable steel to durable and lighter aluminium
- With more customers being able to afford personal vehicles and increasing traffic congestion, air pollution levels are expected to increase. According to the Environmental Protection Agency, motor vehicles collectively in the USA only cause 75% of carbon monoxide pollution

Appendix



Industry Description



- The industry produces a wide variety of motor vehicle parts and accessories, including airbags, air conditioners, catalytic converters, engine exhaust systems, mufflers and resonators, radiators and radiator cores and wheels. The industry's performance is highly dependent on the performance of the downstream automotive industries, which are driven by macroeconomic patterns and factors that affect demand for automobiles. There are two main types of motor vehicle parts and accessories, which include those destined for original equipment manufacturers (OEMs) and parts for the aftermarket

Industry Structure

Industry Structure	Level	Trend
Revenue Volatility	High	Increasing
Industry Assistance	Low	Steady
Regulation Level	Medium	Steady
Barriers to Entry	Medium	Increasing
Technology Change	High	Increasing

- The key external drivers are new vehicle sales, Consumer Confidence Index, impacting the timing and quantity of purchases, Canadian effective exchange rate index and world price of crude oil
- The key success factors for auto parts manufacturers are access to the latest available and most efficient technology, effective cost controls, degree of globalization in the company and optimum capacity utilization

Importance to Canada

High-Performing Automotive Industry

- Employment of 125,000 professionals
- Total Revenue in 2019: \$7.4B

Innovation

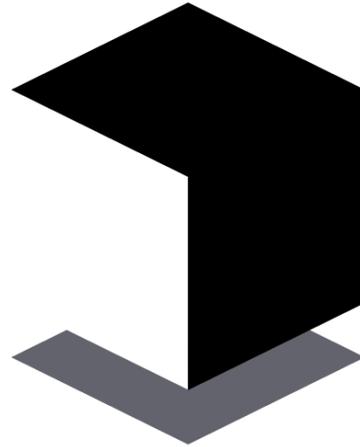
Canada is a leader in automotive technologies, lightweight materials, advanced safety systems, connected/autonomous vehicles, AI, and alternative powertrains

Significant Global Player

- 9th largest producer globally
- 800+ parts plants
- 60% of automotive parts are exported
- Significant players: Linamar, ABC Tech, Magna International

- A temporary interruption of auto parts manufacturing
 - Linamar Corp., and Martinrea International Inc. have changed gears to build medical equipment, ventilators and masks
- The post-coronavirus period is predicted to have an impact that is even worse than the 2008 financial crisis
 - Global auto sales are forecasted to plummet more than 12% from 2019, to 78.8 million units. This represents a downgrade of 10 million units compared to pre-coronavirus forecasts made in January 2020. A fall of 12% for 2020 would be considerably worse than the two-year peak-to-trough decline of 8.0% during the global recession in 2008-2009
 - 40-50% of discretionary consumer spending might not occur. People will cut back on purchases that can be postponed, which will create subdued demand for new vehicles and a possible increasing demand for used cars
- It is predicted that companies with either globally balanced footprints or companies with heavy footprints in China will experience a lower impact than others, as China is already slowly starting to recover
 - China is one of the largest manufacturers of automobile parts and accessories in the world, exporting approximately \$70 billion of car parts
 - Auto parts manufacturers in Canada tend to focus on final parts, which means that they require a lot of imports of component parts to facilitate final assembly. Lower cost of labour from developing countries enables a more efficient production of low value-added parts that act as inputs in more advanced systems

<p style="text-align: center;">Political</p> <ul style="list-style-type: none"> • Duty-free manufacturing tariff regime - Canada is the first country in the G-20 to offer a tariff-free zone for industrial manufacturers • Advanced Manufacturing Fund (AMF) is a \$200-million program from Southern Ontario which supports investments in activities that create innovative production methods 	<p style="text-align: center;">Environmental</p> <ul style="list-style-type: none"> • Stringent government regulations on emission requirements <ul style="list-style-type: none"> ○ The current U.S. administration ordered a review of the Corporate Average Fuel Economy (CAFE) standards to reduce the 2030 emissions target of average fleet fuel economy of 23.2 kilometers per litre
<p style="text-align: center;">Social</p> <ul style="list-style-type: none"> • Substitutes for car ownership <ul style="list-style-type: none"> ○ Changing attitudes towards vehicle ownership due to ride sharing and car renting ○ 57% of millennials believe having transportation is necessary but owning one is not ○ Nevertheless, a car still remains to be a status symbol in many countries, especially in Central and Eastern Europe, where after demise of socialism, private car ownership and use increased sharply • Accelerating requirement for manufacturers to possess soft skills <ul style="list-style-type: none"> ○ 74 percent of U.S. manufacturers reported that work force skill deficiencies (detected among machinists, operators, craft workers, distributors, technicians) have had a significant negative impact on their company's ability to expand operations and improve productivity 	<p style="text-align: center;">Technological</p> <ul style="list-style-type: none"> • Innovations are the driving force of the industry <ul style="list-style-type: none"> ○ January 2018, Linamar announced \$500 million to: support the production of advanced engine and drivetrain components, develop and produce electrified and connected vehicle technology and create a dedicated innovation centre focused on AI, machine learning and robotics • Creating more advanced and smarter cars with the following technologies – hydrogen fuel cells, bio-based materials, smart manufacturing and powertrain electrification • Increasing development of electric and autonomous vehicles <ul style="list-style-type: none"> ○ Is a threat if current facilities are not adapted to new technologies ○ Is an opportunity if taken advantage of the trend to offer high quality standards by firms with established reputations
<p style="text-align: center;">Economic</p> <ul style="list-style-type: none"> • Global per capita income level <ul style="list-style-type: none"> ○ The burgeoning middle classes in emerging economies have looked to purchase their own cars. As demand for new automobiles has risen, original equipment manufacturers have demanded more components from industry operators. • Global consumer sentiment index <ul style="list-style-type: none"> ○ As consumers increase their perceived confidence level, as expectations of future income improve, they tend to increase their rate of large purchasing. Moreover, expectations of improving consumer confidence stimulate automakers to ramp up production plans, which entails larger contracts for industry companies • World price of crude oil and steel, commonly used in production <ul style="list-style-type: none"> ○ Lower fuel prices tend to encourage more driving miles, which accelerates wear on vehicle components, speeding up the need for replacements ○ Steel is a primary input for auto parts manufacturing. On average, 900 kg of steel is used per vehicle 	



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