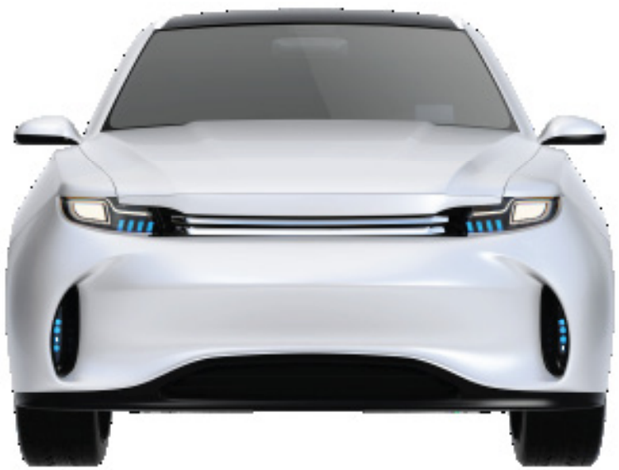
THE FOURTH REVOLUTION IS UPON US



IT'S THE NEWEST PHASE IN THE ONGOING INDUSTRIAL EVOLUTION OF THE HUMAN RACE. A PHASE THAT IS BEING USHERED IN AT LIGHT SPEED BY THE AUTOMOTIVE INDUSTRY AND ITS ENDLESS BYPRODUCTS AND SPIN-OFFS.

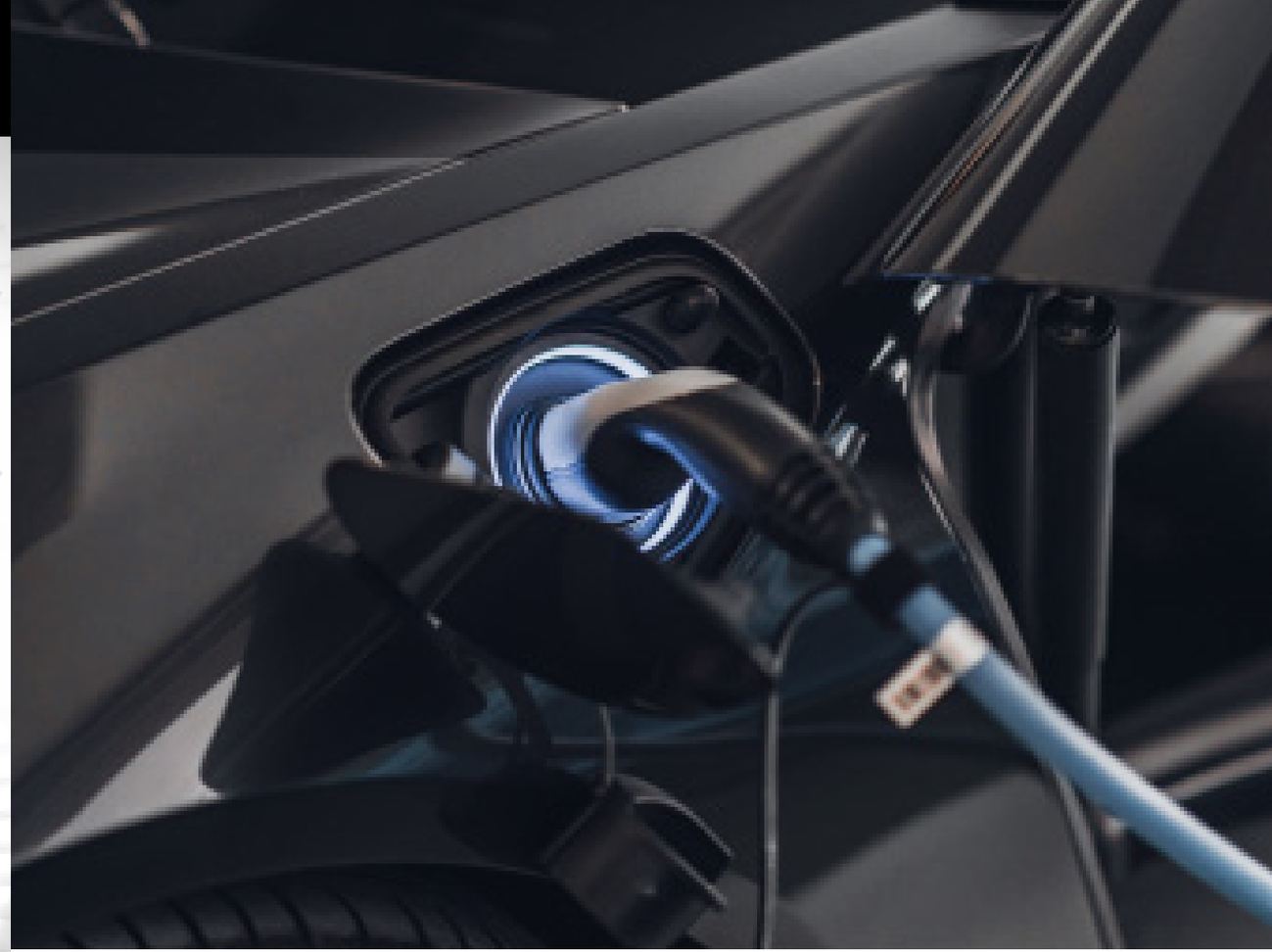
BY PATRICK MORLEY

It's called Industry 4.0. And it's happening right now.

First came the steam engine, followed by the 2.0 age of science and mass production and upward to the 3.0 rise of digital technology. We've now arrived at the newest industrial frontier: the age of the 4.0 cloud, the Internet of Things (IoT) and artificial intelligence (AI), massive data and analytics.

Centuries from now historians will identify 4.0 as the age of autonomous vehicles (AVs), where roads transformed into electronic conduits of ginormous data and humans thrived in a web of hyper interconnectivity.

The global automotive industry is currently facing its most profound disruption since Henry Ford built the assembly line. However, it's about more than the ways vehicles are made. It's about how technology, AI and the IoT will transform our relationship with the automobile.



"These are the biggest changes in the auto sector since the invention of the automobile," says David Muir, Director, Research and Development at National Research Council Canada. "The tech in the last five years has grown so much. In the next decade, we'll be seeing full connectivity between vehicles."

Muir is part of a team that recently unveiled a new $5-million manufacturing and automotive innovation hub in London. The hub will play a vital role in developing and maintaining London's reputation for high-tech automotive development and research. Much of this reputation depends on how quickly and efficiently the local auto scene can embrace the 4.0 world.

> "Canada is primed to take advantage of these changes. We have a huge IT network, we're well-regarded in cyber security and AI innovation."

Muir says much of the hub's focus is on mapping systems for self-driving cars, digital manufacturing used in parts production, use of new lightweight materials, making cars more environmentally friendly and improving plant efficiency and production.

How to embrace and utilize 4.0 is the number one issue facing the industry today. Recently, in Germany, intense competition from other low-cost markets forced Die Autoindustrie to declare a state of emergency. This emergency led to the rapid digitizing of their sector to meet the demands of the 4.0 world. It meant billions of Euros in investment and a total buy-in from the public and private sector. Germany is regarded as the global leader in automotive innovation.

Warren Ali, vice-president Innovation at the Automotive Parts Manufacturers Association, says that another benefit of going 4.0 is the flexibility it will afford manufacturers who will be able to augment production on a moment's notice to adapt to consumer demands. The production of the Chevy Cruze, for example, was halted overnight when sales fell below expectations.

"The auto sector is transforming in record time," says Ali. "Canada is primed to take advantage of these changes. We have a huge IT network, we're well-regarded in cyber security and AI innovation."

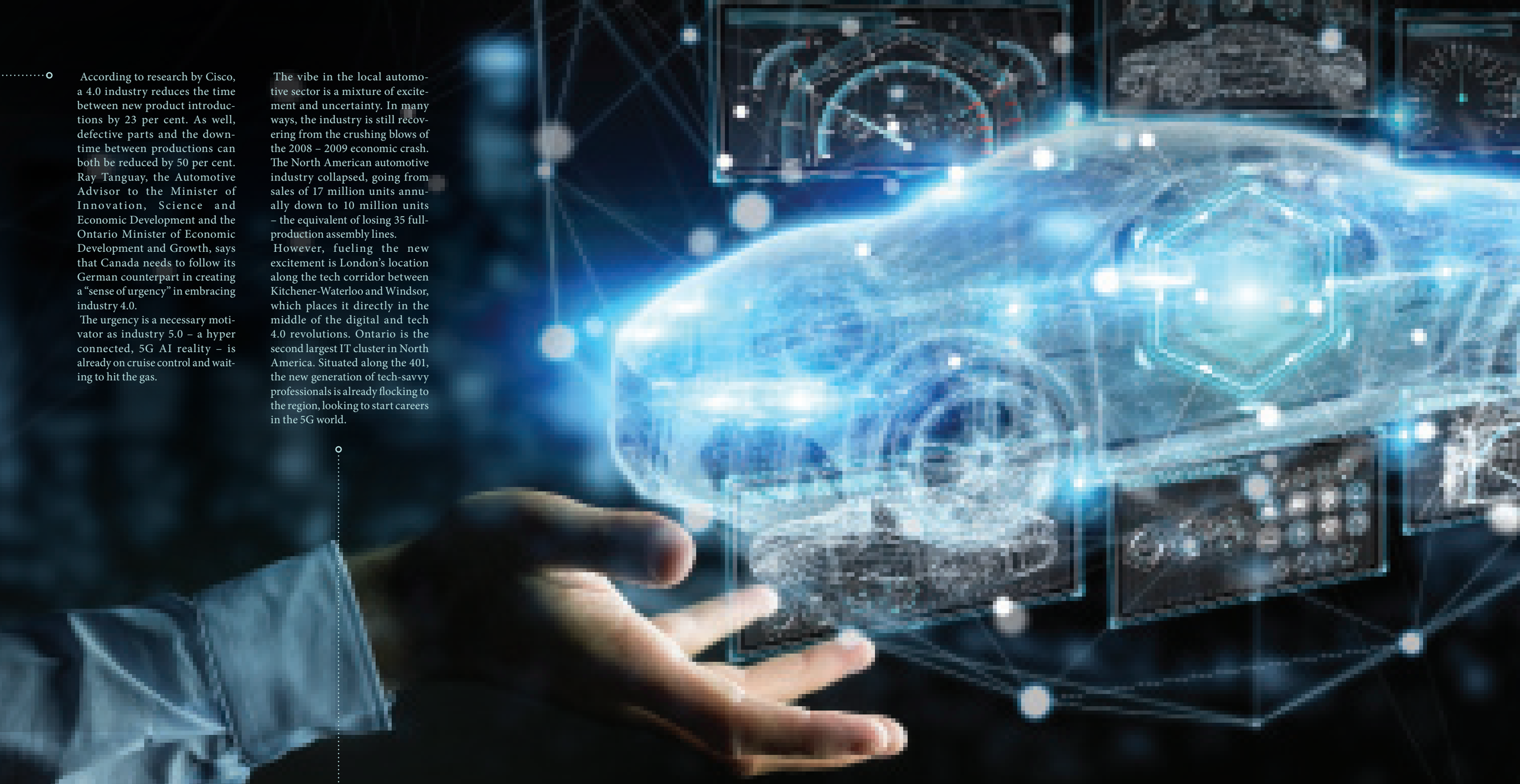
Ali says many of the transformations are happening with digitization. Parts companies can now create, test and modify their products by making digital versions first. Called digital twinning, this process saves time and money. As well, Ali says that analyzing big data is changing the way companies do business by increasing efficiency.

According to research by Cisco, a 4.0 industry reduces the time between new product introductions by 23 per cent. As well, defective parts and the downtime between productions can both be reduced by 50 per cent. Ray Tanguay, the Automotive Advisor to the Minister of Innovation, Science and Economic Development and the Ontario Minister of Economic Development and Growth, says that Canada needs to follow its German counterpart in creating a "sense of urgency" in embracing industry 4.0.

The urgency is a necessary motivator as industry 5.0 – a hyper connected, 5G AI reality – is already on cruise control and waiting to hit the gas.

The vibe in the local automotive sector is a mixture of excitement and uncertainty. In many ways, the industry is still recovering from the crushing blows of the 2008 – 2009 economic crash. The North American automotive industry collapsed, going from sales of 17 million units annually down to 10 million units – the equivalent of losing 35 full-production assembly lines.

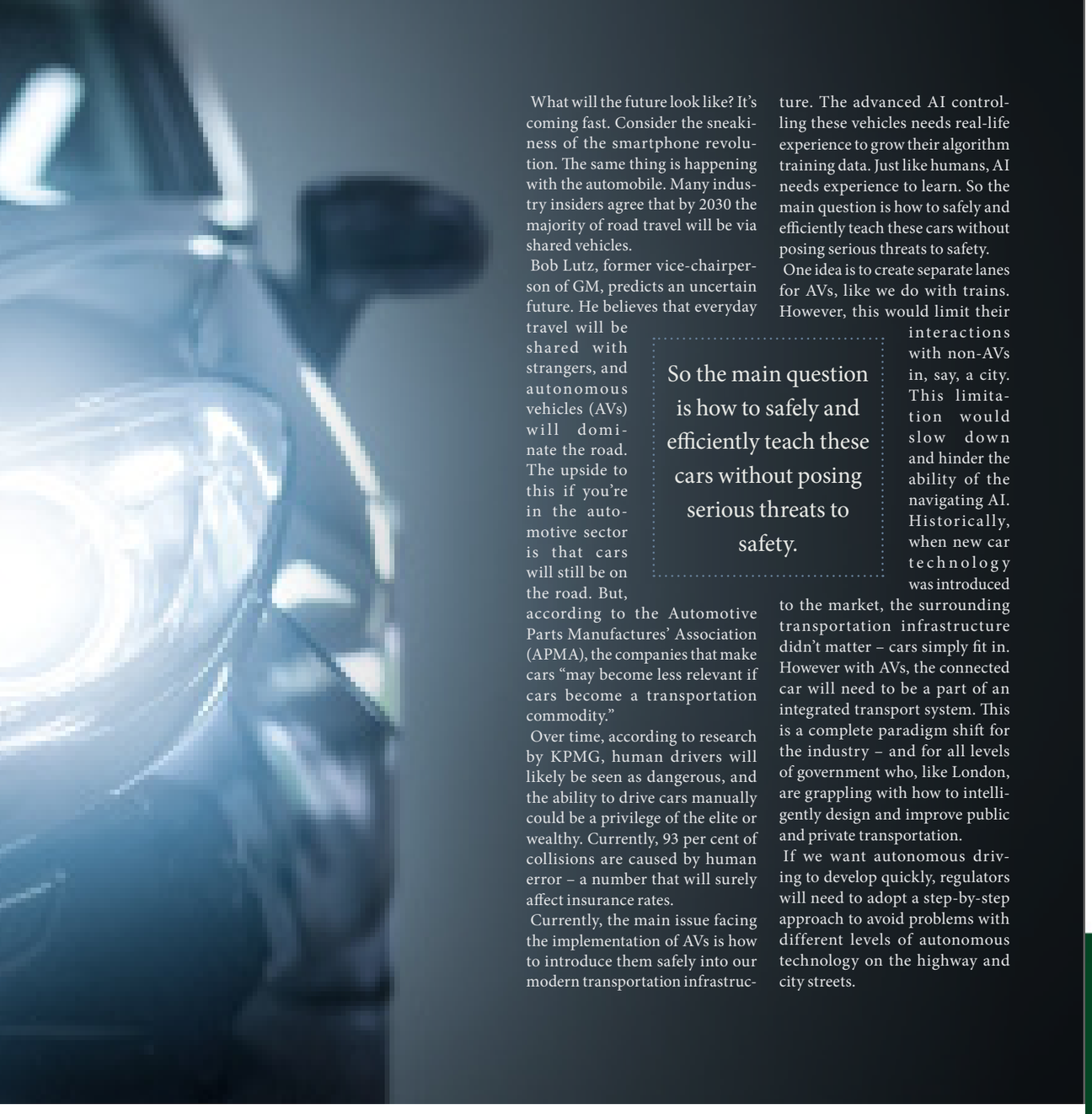
However, fueling the new excitement is London's location along the tech corridor between Kitchener-Waterloo and Windsor, which places it directly in the middle of the digital and tech 4.0 revolutions. Ontario is the second largest IT cluster in North America. Situated along the 401, the new generation of tech-savvy professionals is already flocking to the region, looking to start careers in the 5G world.



The uncertainty comes from the untraditional relationship the younger generation of consumers has with the automobile. Sales to aging Baby Boomers and urban Millennials are not what they used to be. Millennials are buying new vehicles at half the rate of the 35 to 54 age group and are making purchasing decisions for very different reasons.

"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."

The younger generations are also more interested in doing work on their phones or tablets while getting from point A to point B. And, most importantly, they aren't interested in the repair and upkeep expenses of owning a car. They expect, and are comfortable with, pay-per-use mobility with nearly 50 per cent of Gen Y consumers using a smartphone app for transport. In an Uber car sharing world, the car becomes far less important than the technology that drives it.



What will the future look like? It's coming fast. Consider the sneakiness of the smartphone revolution. The same thing is happening with the automobile. Many industry insiders agree that by 2030 the majority of road travel will be via shared vehicles.

Bob Lutz, former vice-chairperson of GM, predicts an uncertain future. He believes that everyday travel will be shared with strangers, and autonomous vehicles (AVs) will dominate the road. The upside to this if you're in the automotive sector is that cars will still be on the road. But, according to the Automotive Parts Manufactures' Association (APMA), the companies that make cars "may become less relevant if cars become a transportation commodity."

Over time, according to research by KPMG, human drivers will likely be seen as dangerous, and the ability to drive cars manually could be a privilege of the elite or wealthy. Currently, 93 per cent of collisions are caused by human error – a number that will surely affect insurance rates.

Currently, the main issue facing the implementation of AVs is how to introduce them safely into our modern transportation infrastructure. The advanced AI controlling these vehicles needs real-life experience to grow their algorithm training data. Just like humans, AI needs experience to learn. So the main question is how to safely and efficiently teach these cars without posing serious threats to safety.

> So the main question is how to safely and efficiently teach these cars without posing serious threats to safety.

One idea is to create separate lanes for AVs, like we do with trains. However, this would limit their interactions with non-AVs in, say, a city. This limitation would slow down and hinder the ability of the navigating AI. Historically, when new car technology was introduced to the market, the surrounding transportation infrastructure didn't matter – cars simply fit in. However with AVs, the connected car will need to be a part of an integrated transport system. This is a complete paradigm shift for the industry – and for all levels of government who, like London, are grappling with how to intelligently design and improve public and private transportation.

If we want autonomous driving to develop quickly, regulators will need to adopt a step-by-step approach to avoid problems with different levels of autonomous technology on the highway and city streets.

With such rapid and revolutionary change disrupting the auto sector, many industry insiders still believe in the personal and passionate relationship consumers can have with their vehicles. For generations, we have driven our children to their activities. We have driven our grandchildren to the market and taken family road trips to the East Coast. Our cities have been designed to accommodate our vehicles. In so many profound ways, our modern life has been shaped by the automobile.

Last year, a LaFerrari Aperta supercar sold for a record $10 million at an event in Italy marking the 70th anniversary of Ferrari. 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.

-BL