



RVZ

TODAY'S MOST PRESSING CHALLENGES IN THE SMART CITY, MOBILITY AND LOGISTICS SECTOR

**And the role of startups in
addressing current gaps**

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PREFACE

As technologies continue to transform economies and societies at a rapid pace, it is becoming clear that the ways in which cities are currently managed are falling out of step with the times. Cities are expanding beyond their borders and each municipality is competing to offer residents a higher quality of life, with shorter commutes and better live-work ratios. On the other hand, municipalities are also aiming to appeal to investors and attract more businesses to their jurisdiction in order to create job opportunities that retain the workforce in their region.

These efforts, however, are contributing to the deterioration of urban infrastructure, urging cities to come up with new ways of adding efficiencies in the movement of goods and people. At the same time, the gradual migration of people from rural areas to cities is also shifting the urban paradigm by putting pressure on municipalities and corporations to develop new solutions to existing problems. Logistic inefficiencies, supply chain disruptions, traffic congestion and worsening air quality have already started to reshape urban development as we know it, while driving the demand for smart-city systems that are designed for a more sustainable world.

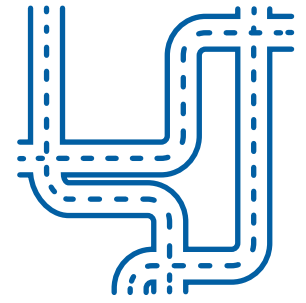
Ryerson Venture Zone in Brampton is on a mission to gain a better understanding of the challenges plaguing today's cities in order to help spur innovation among startups and entrepreneurs.

For this reason, we sought input from key industry partners and stakeholders about the most prominent problems businesses are currently facing in the smart city, mobility and logistics sector. The conversations that came about during the "Problem Lab Discussion Group" revealed a number of areas of concern for business owners – from supply chain disruptions, driver retention and worker safety, to last mile challenges and infrastructure shortage for traffic management. It is concluded that none of these problems exist in isolation, and that finding a solution to one will likely mitigate the effects of others.

At the centre of this initiative has been the City of Brampton, home to the Brampton Intermodal Terminal and neighbour to the Toronto Pearson International Airport. As a joint partnership between the City of Brampton and Ryerson University, RVZ is excited to share the fascinating insights revealed to us by subject matter experts. It is our hope that these insights will encourage startups in Brampton and beyond to think strategically, to identify which problems are most worth solving and further define their target audience.

It is our belief that by empowering technology startups in our community with the industry knowledge that they need, we are contributing to solving ongoing problems facing our world and creating a more livable future for everyone.

How can municipalities ensure a more efficient movement of goods?



WHO PAYS: Municipalities and corporations

WHO BENEFITS: Citizens, consumers and retailers

Cities need better infrastructure.

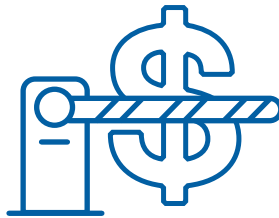
Today's municipalities need better infrastructure to enable a more efficient movement of goods, which is contributing to congestion and affecting road transportation. Specifically, they need to identify and implement business models that would facilitate ongoing investment into cities. One of the biggest challenges they are facing is the lack of funding for innovation, as there is no sustainable way of funding programs at scale.

At present, cities do not have the budgets to finance large-scale infrastructure projects.

Regional municipalities that have jurisdiction over many arterial roads can be a key player in assisting and facilitating movement of goods, but they need to be convinced to play a larger role.

A major factor that contributes to the complexity of the funding problem is the lack of clarity about who stands to gain from community infrastructure – citizens or corporations? While corporations are able to come up

with some solutions, most lack the funds necessary to finance large scale projects which have traditionally been financed by taxpayers.



According to [Deloitte](#), several factors make it challenging to finance smart cities initiatives. One common obstacle involves technology risk, as the project may be the first to deploy a particular technology. In the absence of demonstrable proof of concept, investors are less likely to have confidence in its integration, usability and benefit monetization. Other impediments include uncertain ROI, and lack of a clear path to steady revenue.

This current quagmire demotivates stakeholders on both sides as the need for better infrastructure will continue to rise: [The Freight Analysis Framework](#) estimates that tonnage will increase at about 1.2 per cent per year between 2018 and 2045.

In 2018, the U.S. transportation system moved a daily average of about **51 million tons** of freight valued at more than **\$51.8 billion**.

Bridging the disconnect between the public and private sector on freight delivery, and determining which jurisdiction this falls under, will continue to be a major challenge of our time. Startups can help bridge this disconnect by harnessing transformative technologies to provide government agencies with actionable insights about their community needs, corporate priorities and infrastructure planning.

RVZ is currently working with nine startups that are building solutions in the smart city, mobility, and logistics space as part of the Launch program:

Scooty: Shared electric scooters for personal last-mile transportation

Parsedata: EV charging and V2G tokenized marketplace

Bluicity: Logistics tagging and collection IoT device for goods movement in transit

Transpots: Affordable process automation tools and software for independently-owned trucking fleets

Preparie: Enabling local chefs with delivering authentic, home-made meals to local communities

Bryskit: Just-in-time, on-demand delivery for small businesses

Ecosystem Informatics: IoT air quality monitoring and management for local municipalities

Pumpkin Kart: Long-distance ethnic food and grocery delivery

Reindeere Robotics: Autonomous robotic on-demand delivery

How can companies retain talent, engage employees and build teams in a remote environment?



WHO PAYS: Corporations

WHO BENEFITS: Corporations and employees

Connectivity tools have unlocked outsourcing opportunities, leading many companies to hire talent outside of Canada to maximize corporate resources and make their teams available 24/7 in order to meet client needs. While the pandemic has further accelerated the pivot from physical to digital spaces favored by a large percentage of leaders and employees, remote work has also brought on a number of challenges.



Organizations are struggling to identify and implement technology equipment to ensure that their outsourced teams have the right resources needed to succeed in their roles.



Teams with larger generational gaps see that tech adoption is a challenge for some employees who dislike the “work from home environment.”



Many lack a true meeting place for collective collaboration where teams can informally brainstorm and

exchange ideas as if they were sharing the same space. Although there are many collaborative tools for the digital workplace, an effective electronic whiteboard platform at an affordable rate that meets multigenerational needs is lacking.



Remote work is changing the way people collaborate and impacting employee relationships. Employees are unable to socialize in the same way they did prior to the pandemic – they are unable to meet for quick coffee breaks or drinks after work. This jeopardizes enterprises’ efforts aimed at integrating their company’s culture in order to foster engagement and reduce turnover.

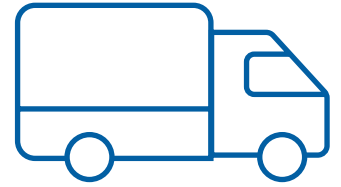
Employees who are not engaged end up costing their company the equivalent of 18% of their annual salary, according to [Gallup](#), while the average cost of a new hire hovers at about [\\$4,000](#), not including the hidden onboarding costs.

The ability to establish connections is needed now

more than ever as the demand for cross functional skills and working knowledge of all business departments rises, in order to steer companies towards profitable goals. While younger employees have shown greater resilience in adapting to changing circumstances than their older counterparts, the impact is felt in their cohort as well.

Many younger employees in need of guidance have not been able to find mentors in the new normal. The question on everyone’s mind comes down to this: How can employees adapt to a team environment in which there is no water cooler for people to gather around?

How can truck companies reduce emissions and reduce road fatalities without evading drivers' privacy?



WHO PAYS: Manufacturers and distributors

WHO BENEFITS: Drivers, other drivers on the roads and pedestrians

Reducing emissions. Traffic congestion caused by delivery vehicles has long been referred to as the urban menace.

Without intervention, the number of delivery vehicles in the largest 100 cities globally will increase by 36 per cent over the next decade.



Under this “business as usual” scenario, planet-warming carbon dioxide emissions from delivery traffic would increase by 32 per cent, or about 6 million tons, according to a report released by the [World Economic Forum](#).

Cities are increasingly pressured to reduce congestion, but the pressure is applied from all sides. Businesses want municipalities to enable a more efficient movement of goods, particularly through reducing congestion at the intersections of main corridors that cause localized bottlenecks. Citizens, on the other hand, are demanding solutions that will

reduce pollution and preserve the space for public use and community character.

According to [The United Nations Environment Programme](#), Paris Accord significantly improved air quality for its citizens after barring the most polluting vehicles from entering the centre, banishing cars from the Seine River quayside and reclaiming road space for trees and pedestrians. New York City, Seoul and Bogota have announced ambitious pollution-reducing initiatives, however, to what extent they prove successful remains to be seen.

Adopting monitoring and control tools. A total of [4,119 people died in large truck crashes in 2019](#), yet many truck drivers and Uber drivers have [refused to accept self-facing cameras](#).

While these cameras are designed to improve the health and safety on roads, they are also viewed as control mechanisms and tools for privacy invasion.

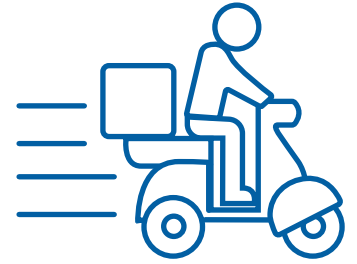
Cameras can monitor if drivers are keeping their eyes on the road or looking down for too long, how long they are sitting idle, if they are wearing a mask, how often they stop, how fast they are driving and how often they take bathroom breaks. Although these cameras can reduce the number of road accidents, drivers are worried that the cost may be too great as the technology is becoming too intrusive for comfort.

Bigger players such as FedEx have already implemented this type of technology, but smaller and mid-size players are nowhere near it. Uber drivers, for example, have refused to implement AI tools in their vehicles. Yet smaller outfits stand to benefit a great deal from self-facing cameras and AI Tools which would drive down their insurance costs. [Intact Insurance's my Drive program](#) uses technology to keep track of whether the drivers are driving within speed limits, braking and accelerating smoothly and remaining focused on the road while avoiding phone use. Drivers who do, save up to 25 per cent on their car insurance. So, how can more transportation companies



be incentivized to adopt these solutions as technology becomes more ubiquitous and baked into systems from the start?

Improving supply chain strategies: How can companies build more resilience into their supply chains?



WHO PAYS: Corporations

WHO BENEFITS: Consumers and corporations who gain customer loyalty

Facilitating provenance and authentication for the reseller economy.

Resellers and second-hand stores are gaining ground with Gen Z consumers who care about protecting the environment by moving away from industrial production. The second-hand clothing market, currently worth [\\$30 million](#), is estimated to grow annually by 18 per cent through 2024 and, by the next decade, will comprise a mid-teen percentage of the overall apparel market.

Authentication is a major decision factor for consumers interested in merchandise that has had prior history with other consumers. Lack of provenance is particularly an ongoing problem in the global second-hand furniture market, which is poised to reach [\\$1.66 billion](#) by the end of 2025 from about \$1 billion in 2017.



Slashing last-mile delivery costs.

The last leg of the delivery eats up around 41 per cent of total supply chain expenses and 53 per cent of the overall shipping costs.

This makes last-mile delivery the most inefficient process in the entire supply chain. In order to stay competitive, companies are pressured to boost efficiency and reduce costs to justify their last mile shipping logistics. Autonomous vehicles, cited as a possible antidote to this problem, are not complete solutions when a package needs to be delivered to the consumer's front door. What solutions will make this possible?

Another challenge for big players is covering large geographical regions, which is becoming less cost-effective for their final mile as new regional players enter the market and disrupt the industry.

Last-mile delivery also negatively affects drivers, expedited by a shortage of tech tools in their

delivery to both commercial and residential units. Autonomous vehicles making deliveries need parcel tags to ensure items don't reach the wrong customer, while the shortage of parking spaces compels a great deal of drivers to park illegally, resulting in parking fines and increased stress for the drivers.

Optimizing first-mile delivery.

Companies need to be able to pick up online orders from smaller players, bring the products to a hub and sort them out with enough capacity to complete the final mile. In many cases, however, there is not enough customer density in a single area to justify order deliveries. Harnessing data to gain more visibility with real-time views will be beneficial for smaller players that continue to use data sources that are fragmented and unconsolidated. In a nutshell, companies need to collect better data and holistically standardize the way they aggregate it.



Overcoming worsening weather conditions. Extreme weather events have increased in frequency and intensified in severity, revealing huge vulnerabilities in supply chains. Tornadoes, hurricanes, wildfires and floods are disrupting global logistics, resulting in halted productions, elevated costs and prices and decreased revenues.



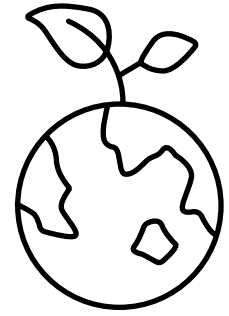
A dozen weather-related disasters were recorded in 2018, each totaling net business losses in excess of \$1 billion.

Companies that have traditionally relied on resources available in other countries or continents will have to build greater resilience by unlocking access to economical and localized manufacturing resources and materials.

In addition, weather hazards are contributing to a shortage of drivers by compromising their productivity and safety. Drivers are required to deliver hundreds of packages a day against weather, time and traffic constraints. Aside from their duties, they are required to determine the destination of every package—all while facing a very low margin of error. Driver shortage is particularly evident in delivery within the last mile, when a great deal of deliveries go missing or are delivered to wrong addresses.

There is a need for preventive solutions that can be embedded into existing technologies. They would help reduce costs associated with missed deliveries and redelivery costs of [\\$15 per delivery](#), as well as boost customer retention. A study by [Voxware](#) has revealed that 69 per cent of customers will not shop at a retailer if an item they purchased is not delivered within two days of the date promised.

How can we reduce the carbon footprint caused by transportation?



WHO PAYS: Municipalities and retailers

WHO BENEFITS: Everyone

Reducing the carbon footprint of transportation. After the customer has returned an item more than three times, it is neither cost-effective for the retailer nor beneficial for the environment.

As customers grow more mindful of the impact their shopping habits have on the environment, retailers must find the sweet spot of giving consumers the flexibility they need and reducing their carbon footprint.

According to the EPA, [26 per cent of all US greenhouse emissions](#) are attributed to the transportation industry, which includes logistics and delivery. Can the inventory data at a retailer and a distribution center of a particular brand be leveraged better to increase efficiency?

The need for smart city infrastructure. Today, more than half of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050, according to the [United Nations](#). As urban



populations continue to grow, cities will need infrastructure that reduces congestion and increases safety. However, until the trifecta of cities, corporations and residents successfully determine which problems fall under which jurisdiction, municipalities will need to embrace short-term solutions, such as the use of electric vehicles and convincing more residents to walk and bike.



In the meantime, cities must also gather funding for more public transport systems that may not be able to economically sustain themselves. The challenge for organizations, on the other hand, will be to conduct more

last-mile deliveries with electric cars, not knowing whether cities can accommodate the road infrastructure to support this initiative. Some businesses see merit in proposing dedicated quarters for goods movement. They argue that municipal segmentation would enable more micro-fulfillment centres to be built closer to the people ordering the merchandise and greatly reduce transit times.

How do we bridge the gap and accelerate the development of cities when funding is limited? Enter Mobility 4.0.

Mobility in respect to urban development is defined as “the physical and digital movement of goods, people, data and energy across land, air, sea and space.”

Assembly Ventures defines Mobility 4.0 as “modern transport and logistics systems that span various modes, offering customers the right one at the right time, responsive to their needs. The systems find themselves in constant transformation, as they are exposed to societal,

economic, ecological and regulatory influence.” When establishing Mobility 4.0, the core innovation stakeholders were focused on improving connectivity and digitization. Current mobility options that are being considered include multimodal, partly autonomous and highly flexible options. However, the main challenge that remains to be addressed while supporting these considerations is ensuring flexible and autonomous options that require real-time orchestration, which is an on-going development. (See figure below - Assembly Ventures).

As Ontario and Canada continue the on-going development of our mobility ecosystem, startups play a key role in bridging the disconnect between the public and private sector.

Currently, there are over 300 registered firms in Ontario developing technologies across the smart mobility space. Technologies include connected/autonomous vehicles, electrification (EVs, batteries, infrastructure), ride hailing/sharing, micromobility and logistics. The Ontario Ministry of Economic Development, Job Creation

MOBILITY

MOBILITY REVOLUTIONS IN THE WESTERN WORLD

TECHNOLOGICAL ADVANCES KICKED OFF PROFOUND MOBILITY TRANSFORMATIONS THRICE

 MOBILITY 1.0	 MOBILITY 2.0	 MOBILITY 3.0	 MOBILITY 4.0
<p>CORE INNOVATION —</p> <p>MOBILITY OPTIONS HORSE, CARRIAGE, SHIP, WALKING</p> <p>MAIN CHALLENGE FRAGMENTED, LOW-TECHNOLOGY MOBILITY IS NOT SCALABLE</p>	<p>CORE INNOVATION STEAM ENGINE</p> <p>MOBILITY OPTIONS RAIL, SHIP, HORSE, PUBLIC TRANSPORT</p> <p>MAIN CHALLENGE TECHNOLOGIES ONLY SUITABLE FOR EXPENSIVE, HIGH-VOLUME SYSTEMS</p>	<p>CORE INNOVATION COMBUSTION ENGINE</p> <p>MOBILITY OPTIONS CAR, TRUCK, RAIL, PLANE, SHIP</p> <p>MAIN CHALLENGE SILOED SYSTEMS AND LIMITED OPTIONS EXPOSE INEFFICIENCIES</p>	<p>CORE INNOVATION CONNECTIVITY, DIGITALIZATION</p> <p>MOBILITY OPTIONS MULTIMODAL, PARTLY AUTONOMOUS & HIGHLY FLEXIBLE SYSTEMS</p> <p>MAIN CHALLENGE FLEXIBLE, AUTONOMOUS SYSTEMS REQUIRE REAL-TIME ORCHESTRATION</p>

WE ARE ENTERING MOBILITY 4.0.

MAKING THE CHANGE HAS ENORMOUS POTENTIAL. BUT MANY OPEN QUESTIONS REMAIN TO BE ADDRESSED.

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and Trade has reported that **intelligent mobility technologies are expected to account for 40 per cent of Ontario's automotive industry profits by 2035.**

RVZ is excited to contribute to growing Brampton's Smart Mobility space by working with nine startups including [Scooty](#) (shared electric scooters for personal last-mile transportation), [Parsedata](#) (EV charging and V2G tokenized marketplace) and [Bluicity](#) (IoT device in logistics chains to manage tags and data collection between locations and during transit) among others.



In order for these startups to continue to thrive in the City of Brampton and work towards bridging the gap between the private and public sector while accelerating development, they must operate in municipalities that are open sourced and willing to break traditional procurement methods. This means reducing red tape and leveraging the relationships that municipalities have with larger private enterprises. These organizations may become partners to startups by helping them with funding, customers or community access.



The provincial government is already making commitments to startups by providing access to capital and partners.

As reported by [Invest Ontario](#), "The 2021 Budget [Ontario's Action Plan: Protecting People's Health and Our Economy](#) announced the government's \$56.4 million investment from 2021 to 2024 to launch the [Ontario Vehicle Innovation Network](#) (OVIN). Combined with the province's \$85 million investment in the previous Autonomous Vehicle Innovation Network (AVIN), Ontario's total investment in this flagship initiative is almost \$142 million."

General Motors is a great example of a global market leader that is starting to help pave the way for electrified cargo delivery. The company launched its new

business BrightDrop, an electric cargo delivery van for first to last mile delivery, with Canadian logistics company FedEx in December 2021. In addition to General Motors, Ford Motor Company, BlackBerry's QNX and Rensas have contributed over \$1 billion in investment capital across the provinces to connected/ autonomous vehicles.

With global corporate enterprises making investments in emerging startups, the next support these startups will need is access to a community where they can attract, engage and retain talent to develop faster. The challenge these startups face is competing for the same talent as their respective global corporate counterparts with much bigger pockets.

ACKNOWLEDGEMENTS

In 2022, cities will continue to advance relationships between their elected officials, residents, and corporations with the input of available technologies. They will invest in new mechanisms to improve infrastructure and enhance the delivery of services, which is vital in increasing the daily quality of life for citizens. Accelerated in part by COVID-19, smart-city interventions based on AI will increasingly play a role in the development of these mechanisms.

Realizing the importance of smart-city trends as a means of addressing urbanization issues such as economic development, job creation and climate change, we are grateful for the time dedicated to this discussion by 12 leaders from key organizations in Brampton.

The publication of this white paper was kindly supported by experts from Rogers, eShipper, Seaport Intermodal, DHL, Smart Freight Center, Dropoff AI, DB Schenker, Cadillac Fairview, CNRail, Wittington Ventures, The City of Brampton City Planning and Transportation Policy branch and Sheridan College for Smart City Initiatives.

ABOUT RVZ

Ryerson Venture Zone in Brampton* is a non-equity incubator that focuses on launching high potential problem-discovery to market-ready startups in Brampton. We enable connections between aspiring entrepreneurs, current founders, industry experts, corporates, and customers to build solutions that address hyperlocal issues in the community.

RVZ operates within a culture that fosters a mindset of growth and provides entrepreneurs with deeper industry knowledge and upskilling opportunities through programming, mentorship, workshops and access to the resources they need to create new ventures. Our virtual programming teaches founders the foundations of new venture creation, help them document their lessons learned, and develops their playbook for success and growth beyond RVZ.

ZONE LEARNING

RVZ is an initiative of [Zone Learning](#) at Ryerson University*

[*To be renamed](#)

Zone Learning is a collection of academic courses, innovation workshops and incubation programs where anyone can learn the entrepreneurial mindset and skills that gets you ahead in your industry. Our world-leading incubator network is a community of collaborators who work at the forefront of emerging industries and technologies to tackle big problems with inventive solutions to influence the world.

Our 10 on-campus startup incubators (“zones”) are enthusiastic communities invested in tackling real world problems with innovative solutions. Since 2010, our zones have incubated more than 4,700 startups supported by more than 6,000 innovators, creating more than 4,400 jobs and raising more than \$1 billion in funding. Our efforts also extend to local and international innovation ecosystems, including regional and national innovation programs, corporate partnerships and the advancement of inclusive practices in entrepreneurship.

Use the zones to launch a startup, get some work experience or to expand your network by visiting ryerson.ca/zonelearning today.

To stay up to date on RVZ and our industry sectors, follow us on social media!

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