

Smart Cities Initiatives

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Building a better
working world

Toronto... Smart to Brilliant

A smart city combines technology, data, the business eco system and citizen engagement to create a thriving, connected digital foundation.

- ▶ **Toronto is smart.** We didn't win the smart city challenge because we are already smart. Now we need to use our smarts, to become brilliant because that is our global opportunity. To be the most brilliant, inclusive city for citizens.

Connections enable society to tackle major social issues in “**Better**” more advanced, collaborative ways. Social inclusion, easy service delivery and citizen satisfaction are achievable in a connected city.



How does technology help drive better outcomes?

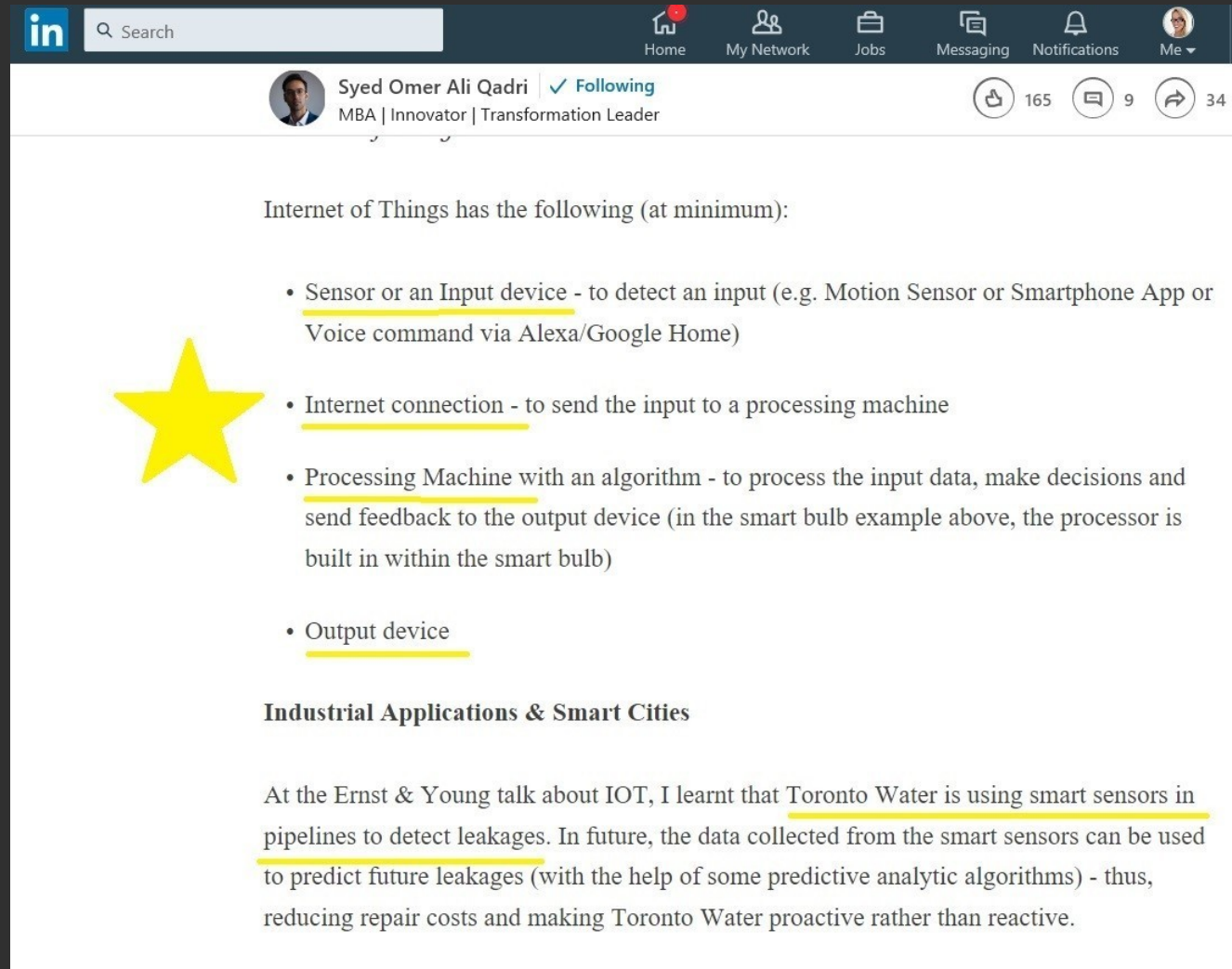
“Better” is the social outcome done with higher productivity; major technological applications are emerging every day that help address three fundamental dimensions of current delivery systems

1 | Technology helps us understand the issues better and intervene more effectively

2 | Technology enables our ability to work cooperatively with multi-player delivery systems

3 | Technology helps us measure, monitor and manage performance in a more rigorous and transparent manner

Smart City Basics



The image is a screenshot of a LinkedIn post. At the top, the LinkedIn navigation bar is visible with icons for Home, My Network, Jobs, Messaging, Notifications, and Me. The post is from Syed Omer Ali Qadri, who is followed by 165 people, has 9 comments, and 34 shares. The post content is as follows:

Internet of Things has the following (at minimum):

- Sensor or an Input device - to detect an input (e.g. Motion Sensor or Smartphone App or Voice command via Alexa/Google Home)
- Internet connection - to send the input to a processing machine
- Processing Machine with an algorithm - to process the input data, make decisions and send feedback to the output device (in the smart bulb example above, the processor is built in within the smart bulb)
- Output device

Industrial Applications & Smart Cities

At the Ernst & Young talk about IOT, I learnt that Toronto Water is using smart sensors in pipelines to detect leakages. In future, the data collected from the smart sensors can be used to predict future leakages (with the help of some predictive analytic algorithms) - thus, reducing repair costs and making Toronto Water proactive rather than reactive.



Global Smart City Examples

1. Smart Dubai - 6 dimensions, data rules, removing silos, strong foundation
2. 6 Cities in The Netherlands Area – open data for local climate policy change
3. Selangor, Malaysia – aggressive economic development – 5 clusters, adjacent to Kuala Lumpur
4. Tampere, Finland – T-Seniority: EU project: online service to assist the elderly
5. Reykjavik, Iceland – my Neighbourhood (70,000 people, 4,500 ideas, 420 ideas implemented)
6. Rijeka, Croatia – IURBAN city wide building and facility energy management program

Local Toronto: Smart Now – Getting Smarter

Past 10 years

- ▶ Revitalization projects in 7 communities, including Regent Park, Alexandra Park,
- ▶ Humber hospital sets a foundation
- ▶ Toronto Public Library, transit, parking P, biking, water program, coordinated road work, procurement 458,000 tech, thriving Fintech, quantum, AI, automotive sector– now tackling foundational elements of governance, digital infrastructure, privacy, data
- ▶ Waterfront: pioneers, high speed network, movie production networks (Bill Hutchison and EY)

Now

- ▶ SCWG: Councillor Thompson, S.Viegas - working group –collaboration, connections, forum for roundtables, Report, conference, 50 organizations, dialogue, smart city challenge support
- ▶ Digital Literacy: Councillor Holland, S.Viegas - 150 locations, 30 companies, T.Deleeuw to the city staff.
- ▶ Pedestrian Safety efforts, parking efforts, procurement efforts, experiments on King street, transit hubs

NEXT

- ▶ Amazon and Sidewalk labs and now others, smart city tech and data companies are **lining up to invest in Toronto and looking at new financing and funding models and new business models will help pay for the social change Toronto needs.**

Financing social change

We are facing a major opportunity to align advancement in technologies with the underleveraged pool of social & impact investing capital to deliver significant improvements in social outcomes.

We can't do it alone. We can't leave anyone behind. Inclusion and collaboration are the way forward.

Smart City + Social Investment = Brilliant Society

The time is right now for policy makers, investors, inventors, entrepreneurs, not for profits, private sector players, and citizens to work together to realize an enormous opportunity

Creative Ideas for the City to Address Major Social Change

Pedestrian Safety



Digital Literacy



Health + Wellness



Gigs & Job Growth



Citizen Engagement



- **New Solution Ideas**
- **New Business Models and Collectives**
- **New Funding and Financing Hybrids**
- **Eco system inclusion and innovation**

Hybrid Finance: Pedestrian Safety Collaborative

The promise of innovation is that we can be evermore creative in how we define the opportunity to deliver higher social outcomes through not only new technology, but new investment and business delivery models

- Incremental investment by government in public safety
- Potential for a value trade in data access for providers
- Offset value in productivity gain
- Incremental investment by government in sustainable economic participation
- Offset value in productivity gain
- Potential for value transfer between employers and providers
- Offset value driven by preventative health services
- Potential for value transfer from insurers to providers
- Social market opportunity with individual payments

Defining new roles in the Smart Society ecosystem

Social investment at its core is about the *outcome* rather than the *service*

Collaborative Financing and Funding Models

emerge from
within the
eco system

Investors
ROI
is determined
by meeting
new outcomes

Providers
Payment is
directly
linked to
new service levels

Policy Makers
Focus on the
demand side
rather than the
supply side

Social Markets
Government
enables/regulates and
pays along with
consumers

Impact Investing
Payment for outcomes
as net investment
and/or offsets

Value Trading
Provision of service
for a non-cash value
trade (e.g. data
concessions)

Payers
Taxation
Consumers
Philanthropists

Providers
Public sector
Not-for-profit
Private sector

Investors
Expected returns
Certainty
Trust & enforcement

Thank You!

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Brilliant, Inclusive Toronto A Way Forward

Social Impact in a Smart City

► **Connected citizens provide a new way to deliver new services to achieve essential outcomes**

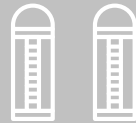


A digital advantage for the disadvantaged benefits everyone
Smart tech enables brilliant new life changing services for citizens

Elder: Housing, social, healthy, transportation, monitoring, wearables, blood testing, meds tracking, social interaction assurance, fall coverage, general safety

At Risk: (Youth, kids, 55+, new Canadians, special needs)
Education, apprenticeships, job matching, training, Companionship, living, family, dance, walk, Community events
Mobility, food security, financial support

Medical care: Info access, single point of care, personal support, video support, Post op, homecare, remote monitoring, telemedicine



A connected city and it's eco system help citizens thrive and become happier

Issue: Cross silo services require sharing, are live, need automation, are complex, need governance



Citizen Centric

Simple single interface for all services, personal

Safe Easy Roads

Decongested, shared, flowing and fast, convenient

Sustainable

Green, Net zero, shared, resilient, open, inclusive

Efficient + Scalable

Agile, diverse, collaborative, unified, automated

Happy

Easier, safer, inclusive, serving, secure, measurable

Healthy

Active, fed, mentally well, hopeful, cared for

Wealthy

Sheltered, employed, included, opportunity, network

Wise

Digitally literate, skilled, informed, knowledgeable

Move Through

Transit, bikes, robots, sharing, incidents

Around

Suburban flow, visitors, delivery, GIS info, trade

Up

Drones, spectrum use, WIFI, cameras, air control, 5G, cloud

Down

Sub-terrain sensing, road and water maintenance



Grandma in the City

Keeping seniors fit, mobile, fed, included and well is critical for a happy city. Data sharing and digital connections are key..

Smart Street Corners

Digital street devices, stacked together, covering areas below,

at and above grade will radically improve flow, operations and costs.



Sharing plans and resources is key

Smart Intersections = Safety for Pedestrians

What if....?

Tech organizations contributed devices and tech to make each intersection super advanced with cameras and IoT and the best automation – and data was **SHARED**.

- Safer roads with pedestrian detection
- Brighter lights at night
- Traffic controls change based on traffic types
- Loud audio cues for drivers and people
- Integration with smart cars + breaks
- Lower cost to the City



Smart Corner Street Alliance

- ▶ Pain and priority for everyone
- ▶ Co-invest in exchange for rights to live data, content and info
- ▶ Ongoing: co-optimize with collective SLA

Private Sector Partners	Government Departments and Agencies
Citizens	Transit
Couriers	Police (flow control, safety)
Delivery	Revenue enforcement (ticketing)
Trucking	Water
Advertising	Waste
Taxi companies	Roads
Canada Post	Child safety departments
Tech vendors	School Boards
Autonomous vehicle manufacturers	Eldercare departments
Data vendors, analytics, app creators	Bike, pedestrian, vehicle, robots: city planners
Banks	

Pedestrian Safety with Private Capital and Collaboration



New Business Model

- Participating companies have (paid) access to data and information (privacy protected)
- Government departments pay for data
- Some Government departments fund part of the operations
- Citizen financial participation is optional

Outcomes

Efficient

- ▶ Coordinated
- ▶ Connected
- ▶ Cognisant
- ▶ Faster, safer
- ▶ Controlled
- ▶ Optimized assets
- ▶ Eco friendly
- ▶ Life saving

Enhanced

- ▶ Real-time info
- ▶ Easy to move
- ▶ Accessible
- ▶ No congestion
- ▶ Smart delivery options
- ▶ Scalable
- ▶ Smart signs



160K new people/yr.



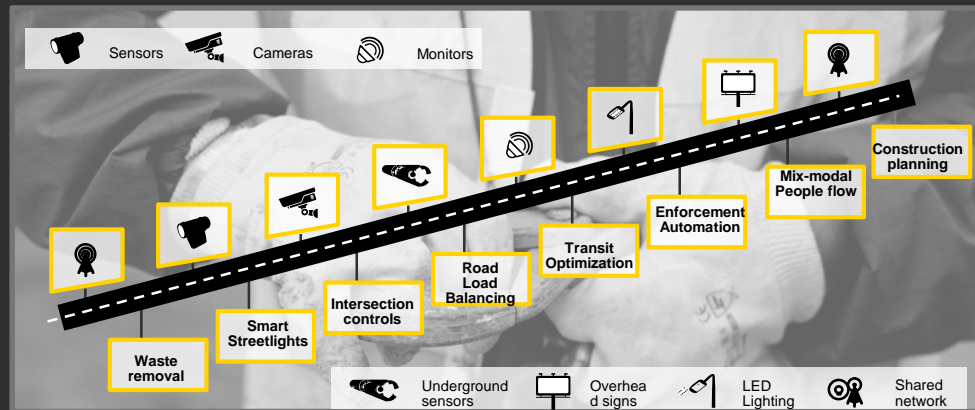
More types of traffic



People connect 24/7 for info



Schedule smooth



Issue: Disparate systems and silo' d solutions won't achieve ROI or shared efficiencies

Outcomes

Extensible

- ▶ Waste, Police, Parks, Fire, Water, Utilities can scale
- ▶ Eldercare & accessibility
- ▶ Ready for Mobility Innovation
- ▶ Open, shared
- ▶ Ready for ideas

Economic Advantage

- ▶ Innovative
- ▶ Attractive
- ▶ Quality of Life
- ▶ Data for commercial use
- ▶ Intelligent connectivity
- ▶ Resilient
- ▶ Agile
- ▶ Conducive to growth
- ▶ Community inclusiveness

Digital Literacy: Youth and Employment

What if....?

A SHARED digital literacy platform was created by private enterprise, with private and public sector education partners and large employers – who provided learning content for jobs?

- Youth have a pathway to exciting careers
- Private and Public Sector organizations have re-training for staff and executive
- Families stay digital literate and employable
- New tech training is always available
- Testing, course creation, collaboration is easy



Literacy Alliance

- ▶ Collectively address the skills shortage and skills righting issues facing society.
- ▶ Ensure available training on new tech (support ecosystem, adoption)
- ▶ Gap in professional credentials as technology changes how the profession works
- ▶ New skills for emerging technologies and 4th industrial revolution innovations

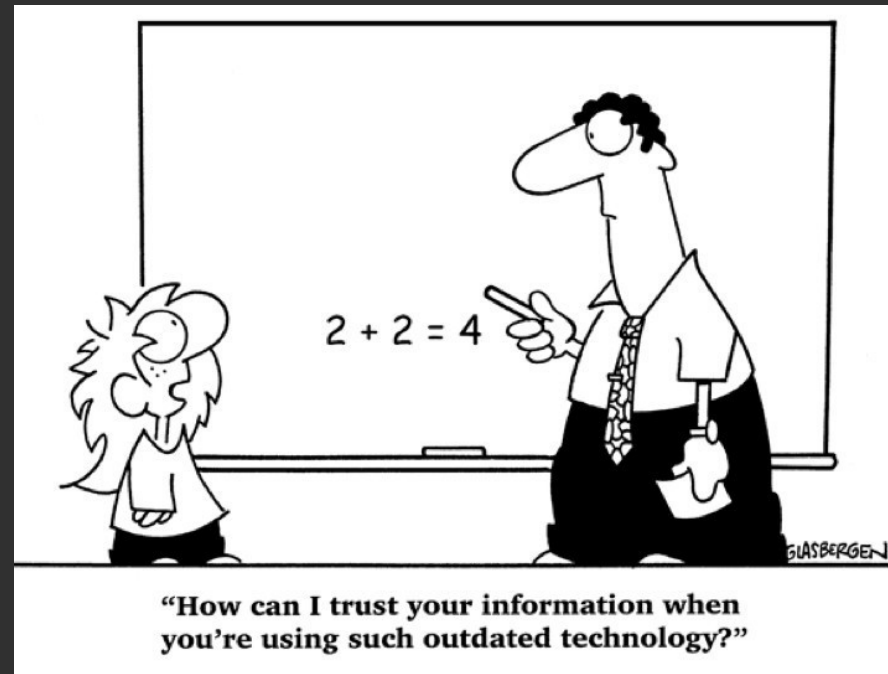
Private Sector	Government
Networking companies (Cisco, Nokia, Bell)	Military
Private Universities and Trade Schedules	Police
Technology companies	HR (re-education)
Private sector + NGO: code skills, kids, gaming	Youth Services
Consumer products and retail companies	Schools + Universities
Automotive companies	Healthcare professionals
Call center/ Support Operators	Customer service (supporting new smart tech)

Digital Literacy: Work Together to Win

New Business Model

- **Private sector** would finance the start-up and contribute content and 'pay for use' as patrons
- **Tech companies** deliver training on new products, sponsor @risk youth, kids, new Canadians
- **Government organizations** would pay to use the system for their employee re-training ; offer tax credits/incentives for companies to provide training to @ risk youth

1. **Participant have paid access to blind user data:**
 - live data, trends, emerging issues
2. **Students use Google glasses, tablets, computers and smartphones to do coursework and participate in classes**
3. **Students need WIFI or a cell plan or a LAN connections or may participate through TPL systems and other community access points**



Digital Literacy Platform Utility

- Content host
- Online learning course
- Personalized learning
- Aptitude testing
- Testing, homework
- Subscription
- Order and Payment processing
- Email and participation reminder system
- File sharing
- Whiteboard
- Streaming video, podcast
- Bi-directional glasses support
- Remote learning programs
- Tutors
- Peer support
- Live Q+A
- Study groups
- Extreme data analytics
- Self study and group collaboration and real world simulation

Happy + Healthy Aging @ Home

What if....?

Pharma companies, Doctors, private healthcare providers and Hospitals **'tricked out'** Grandma with wearables, apps, monitoring, testing and alerts and data was **SHARED.**

- Seniors stay @ home longer with better care
- Connected seniors are included and active
- Family helps monitor, care and include seniors
- Testing, drug conflicts, pre and post op care
- Coordinated care with private care givers
- Lower cost to the Province, City and Feds



Happy @ Home Aging Alliance

▶ Connected Granny knows of social events, food programs, fitness and activity programs and education programs to help keep them included, active and feeling sharp and healthy.

▶ Granny has the means to connect with children, youth and others their own age and feel included

▶ Private companies co-invest in exchange for rights to live data, content and info

▶ Ongoing: Co-optimize with collective SLA between Gov't, Private Companies, NGOs

Insurance	Geriatric device manufacturers
Telco companies	Consumer products companies
Pharmacies	Tech companies making wearables
Pharma drug companies	Telco and network providers
Uber + Lyft	Community colleges (elder care programs)
University studies (data, trials and experiments)	Geriatric device manufacturers
All levels of Gov't	Families
Hospital	Urban planning
Telemedicine	Transit
Homecare	Citizen services, social programs
Eldercare facilities (future planning)	Libraries

Health + Wellness Thing String for Easier, Happier Aging



New Business Model

- Grandma 'OPTS IN' and has wearables, in-suite cameras, apps, tablet
- Participating companies have (paid) access to data and information (privacy protected)
- Some Government departments fund part of the operations
- Citizen financial participation is optional

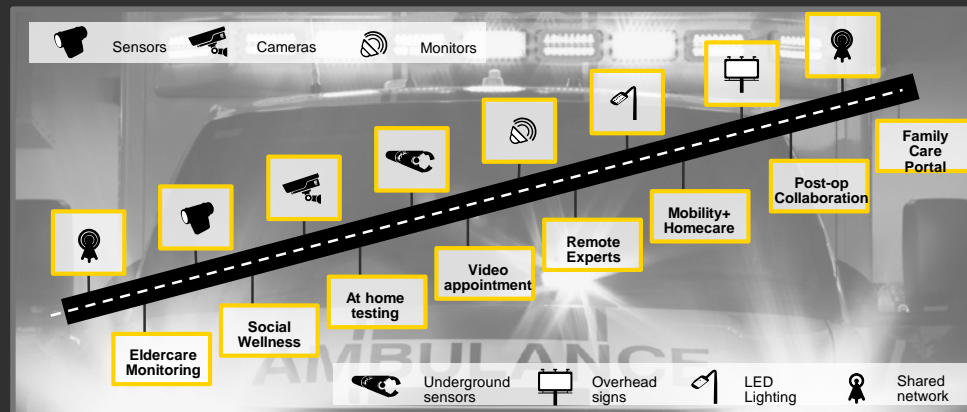
Outcomes

Best Care

- ▶ Holistic, team
- ▶ Protocols, shared plan
- ▶ Pre-emptive, monitored
- ▶ Emergency response AI
- ▶ Fast dispatch
- ▶ Nearest, best service choice

Scalable + Agile

- ▶ Reduced drain
- ▶ Optimize care for elders
- ▶ AI Diagnostics
- ▶ Secure info
- ▶ Shared Care alternatives
- ▶ 24/7 testing



Issue: Location based care creates bottlenecks, is costly to operate, hard to scale, is not connected

Solution:

- ▶ Digital Health + Wellness Thing String: Connected Care Platform
- ▶ City Thing String: Network, cloud, data, analytics, governance, visualization, sharing
- ▶ Shared operations model: tech, business, resources, standards, security, P3 plan
- ▶ Departments: Hospitals, Homecare, Transport, Testing Labs, Family Services, Rehab

Outcomes

Effectiveness

- ▶ Data driven, automated, self service, streamlined
- ▶ Asset utilization, event response, accuracy, MRO
- ▶ Inclusive, accessible, lean, collaborative, optimized

Quality of Life and Care

- ▶ Improve social, mental, fitness, food, financial wellness in life
- ▶ Reduce health risks, hospital stay, stress, costs with monitoring
- ▶ Help Drs and Nurses care for more people, fast, better and easier



Smart City + Social Investment = Smart Society

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