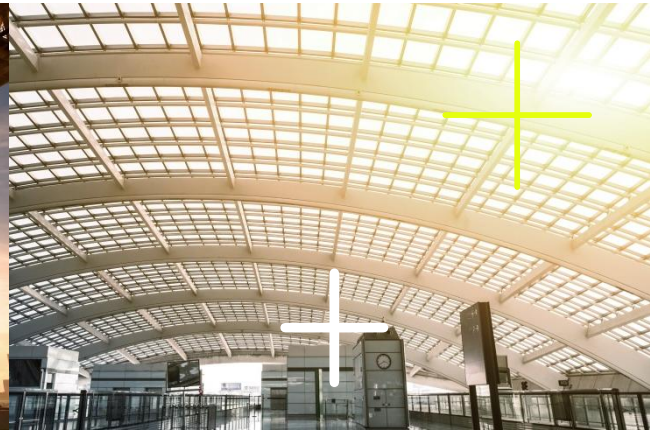
The Smart City – It's Not Just the Technology!



Carl Bodimeade, P.Eng.

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Agenda

- Why Smart Cities?
- Examples of Smart City Approaches
- Smart City Challenges; Canada and US
- Applications in the Project Lifecycle
- Barriers to Adoption
- Discussion

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Why Smart Cities?

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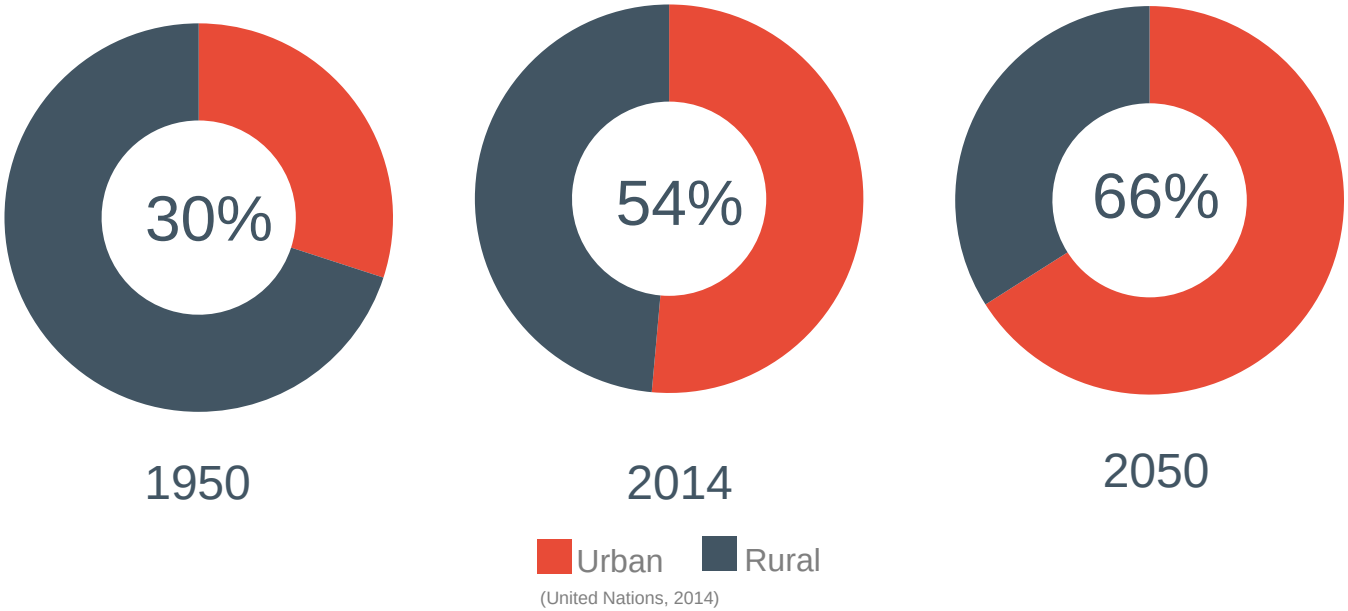
Increasing Urbanization



(United Nations, 2014)

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Economic Multiplier of Cities

- The **top 10 metropolitan regions**, by economic activity, account for more than **20% of global economic activity** while housing just **2.6% of the world's population**

- The **top 50 metropolitan regions**, by economic activity, account for nearly **40% of global economic activity** while housing just **7% of the world's population**

Florida, Mellander & Gulden, 2009

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Drivers for Smarter Cities

- Demographic changes
- Economic competitiveness
- Attractiveness to capital and talent
- Increased efficiency / reduced cost
- Climate change (mitigation, adaptation & resiliency)

Sustained, Improved Quality of Life

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Examples of Smart City Approaches

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Smart Transportation - ITS, Toronto

- Combination of computers, communications and sensor technologies to assist and/or to increase mobility for users of transportation networks
- U of T modelled use of ITS to “optimize” the performance of traffic signals could:
  - **reduce wait times by 40 to 70%.**
  - **decrease of up to 30% in emissions**
- Part of City’s Congestion Management Plan, 2014-2018
- **Dallas-Fort Worth’s ITS strategy resulted in an estimated 30% capacity increase**

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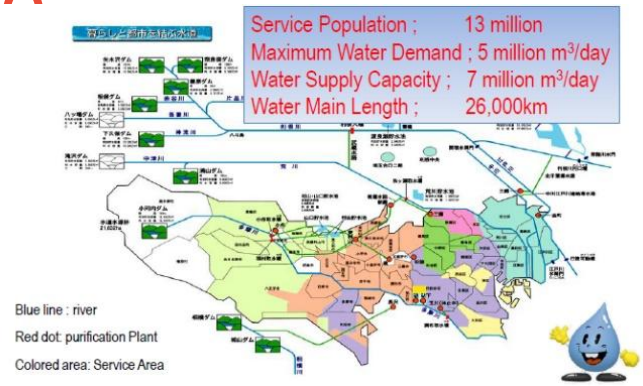
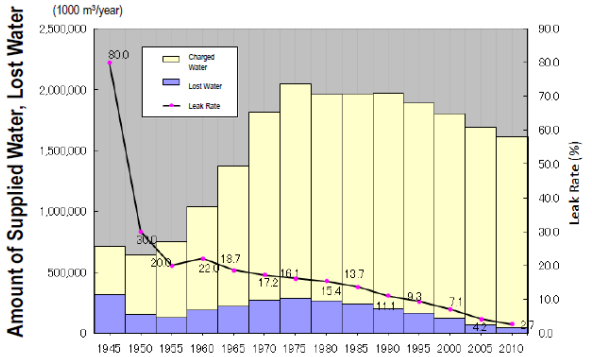
Smart Water – Water Loss Reduction, Tokyo

- Integrated asset management approach
- Advanced leak detection technologies
- Predictive failures and replacement
- **Water losses down to 2.7% from 15%**





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Smart Energy – Deep Lake Water Cooling, Toronto

- Lake water drawn into Island WTP is used to cool Enwave's closed chilled water supply loop.
- Serves 30 facilities over 24 sq. km. of downtown Toronto
- **Electricity usage is 10% of conventional cooling systems**
- **Reduced downtown peak demand by up to 61 MW**
- Enwave is planning 40% expansion of system.

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Shared Capacity

- Temporal management of capacity usage.
- Pay as you use.
- Operations management effort streamlined through technology.
- Improved user experience and relative attractiveness of service.
- Examples:
  - Uber
  - Paris bike share
  - Bi-directional roads

UBER

Is ownership a thing of the past? Capacity on demand …

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Philadelphia *Green Cities, Clean Waters* Program

- 13.5 to 16 billion gallons of sewer overflows annually due to storm events
- *Green Cities, Clean Waters* Program will reduce that by more than half and reduce urban flooding
- $2.4B Budget (25 years)
  - Green Infrastructure: $1.67B
  - WWTP Upgrades: $345M
  - Adaptive Management: $420M
- **For every $1 invested in GI, $2 return based on TBL**
- **$2.8B in societal benefits**

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Commonalities

- Optimize and leverage existing capacity and resources
- A better way to do things – *innovation, not "business as usual"*
- Proactive planning supported by real data
- More integration of a number of city services
- Technology as an enabler to enable these to happen

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Smart …What?

- There is a strong Smart Cities movement but in many instances, the world hasn't yet come to grips with what it is all about.
- ICT is leading the charge and showing the greatest amount of leadership at present → selling technology.
- Different views, different definitions → many cities involved in Smart City initiatives, but don’t have integrated Smart City programs.

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Smart City Challenges Canada and US

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Canada - Objectives

- To empower communities across the country to address local issues through new partnerships, using a smart cities approach.
- Achieving meaningful outcomes for residents through the use of data and connected technology.
- Encourage municipal / private sector / civic partnerships
- Act as a catalyst for smart city initiatives (existing and new)
- Impact Canada Challenge Platform https://impact.canada.ca/en/challenges/smart-cities

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Canada - Overview

- Who can apply?
  - Municipalities, local or regional governments
  - Indigenous communities
  - Groups of organisations above
- Prizes
  - One prize of up to $50 million – *no population criteria*
  - Two prizes of up to $10 million each - *<500,000 pop*
  - One prize of up to $5 million - *<30,000 pop*
- First of three challenges over ten(?) years

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Canada - Schedule

Finalists receive $250,000 grant to prepare final proposal

Anticipated to be 2-5 years

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US - Beyond Traffic

The USDOT encouraged cities to put forward their **best and most creative ideas** to answer the questions raised in *Beyond Traffic 2045: Trends and Choices*

How will we move?

More than **half of applicants** wanted to implement an autonomous low-speed shuttle or podcar by **2019**

How will we move better?

Almost **half of applicants** proposed shared-use mobility (rideshare, carshare, or bikeshare)

How will we move things?

Almost **half of applicants** wanted to use data to dynamically improve freight movements

How will we adapt?

Almost **half** of cities proposed installing **electric vehicle charging** infrastructure

How will we align decisions and dollars?

New **sensors** will allow cities to monitor **vehicle traffic, parking availability**, and even **pedestrian and bicyclist counts** to make better decisions

U.S. Department of Transportation

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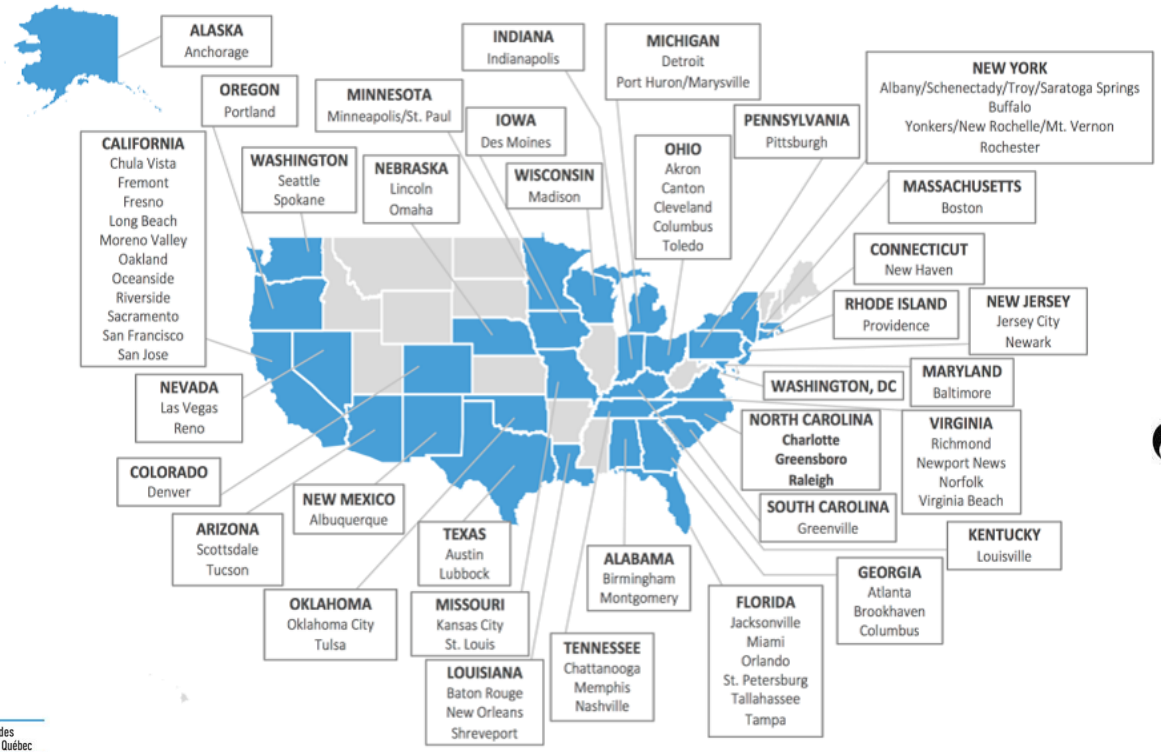
US - Applicants

78 applications representing **85 cities** *(including 4 joint applications)* in **36 states**



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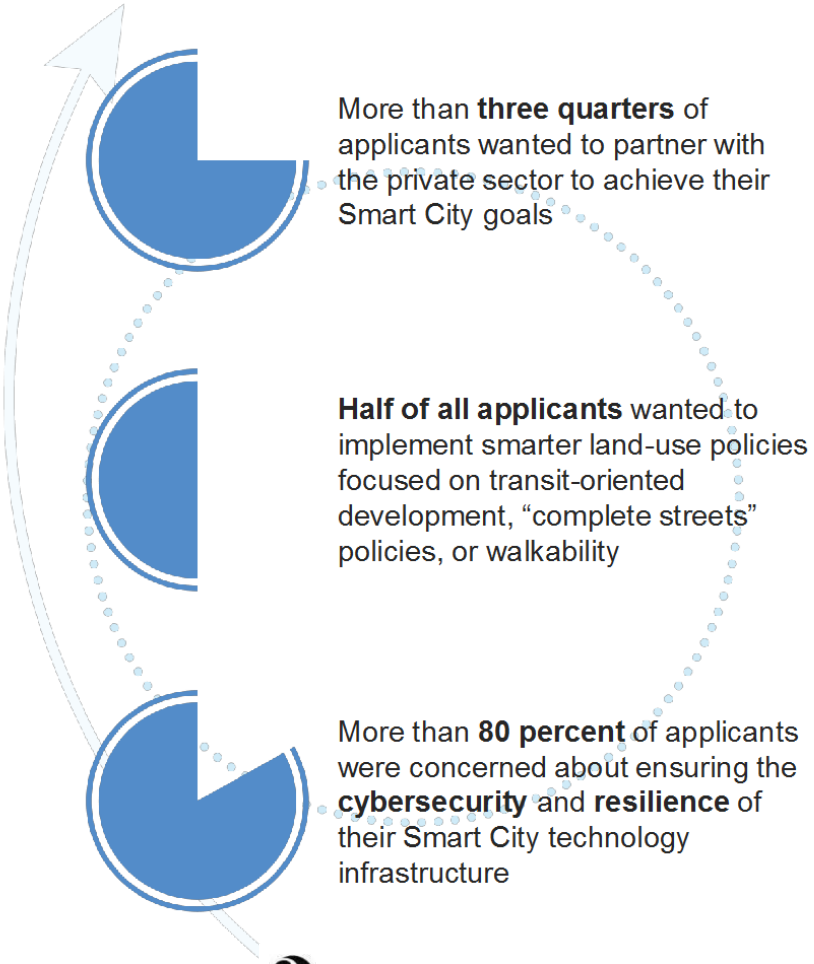
US - Shared Priorities

The 78 Smart City Challenge applications shared several priorities



More than **three quarters** of applicants wanted to partner with the private sector to achieve their Smart City goals

Half of all applicants wanted to implement smarter land-use policies focused on transit-oriented development, “complete streets” policies, or walkability

More than **80 percent** of applicants were concerned about ensuring the **cybersecurity** and **resilience** of their Smart City technology infrastructure

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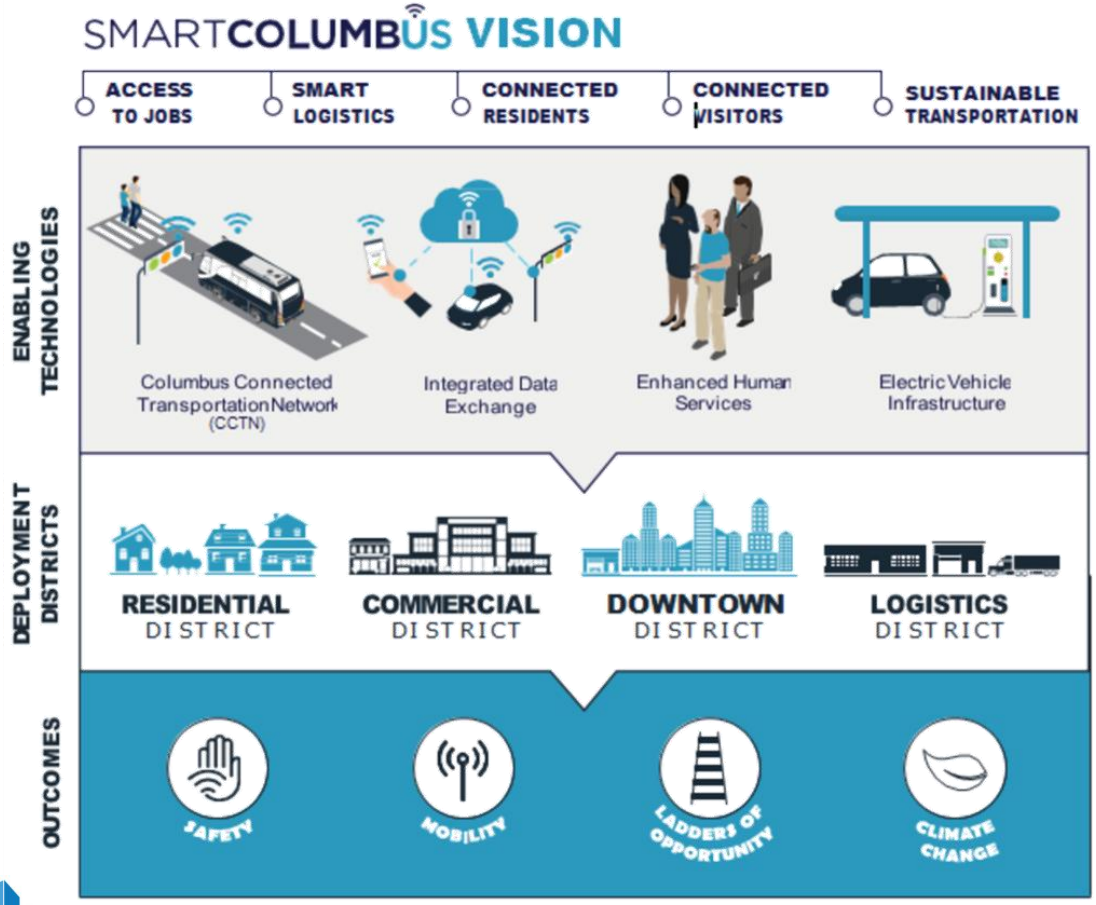

Columbus Smart City Challenge Implementation Vision

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Applications in the Project Lifecycle

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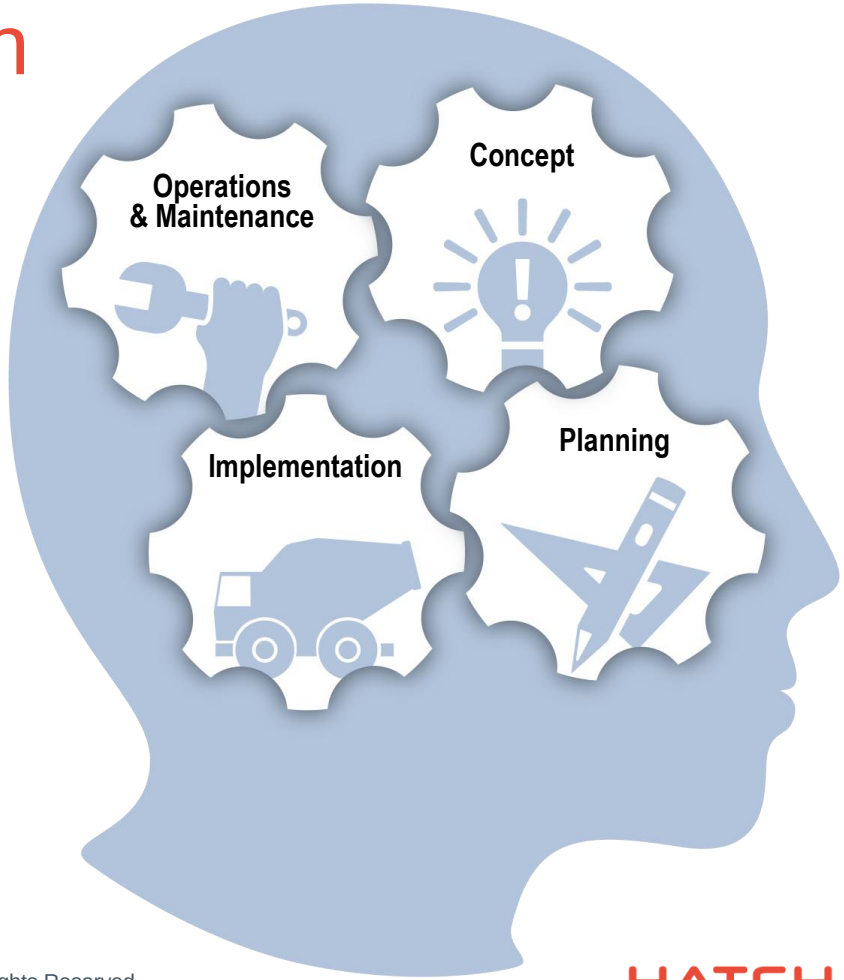
Where is Smart Cities in the Project Lifecycle?



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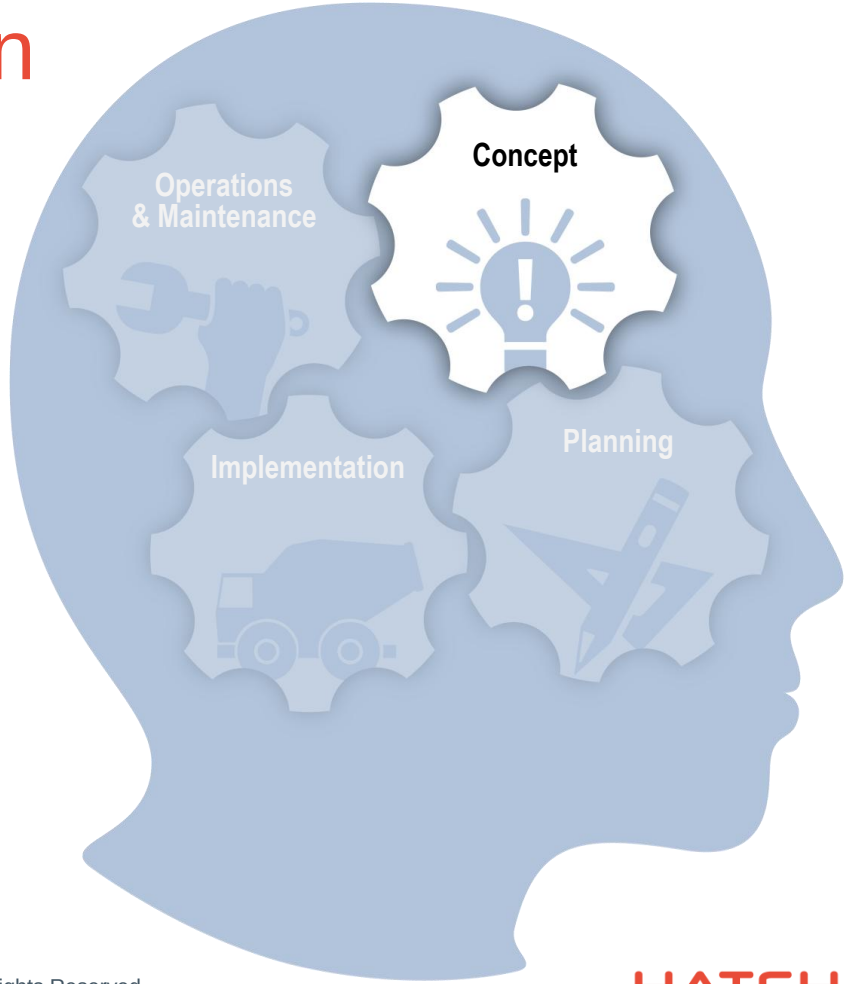
Where is Smart Cities in the Project Lifecycle?

Concept

- Concept development
- Business case evaluation
- Funding identification
- ……..



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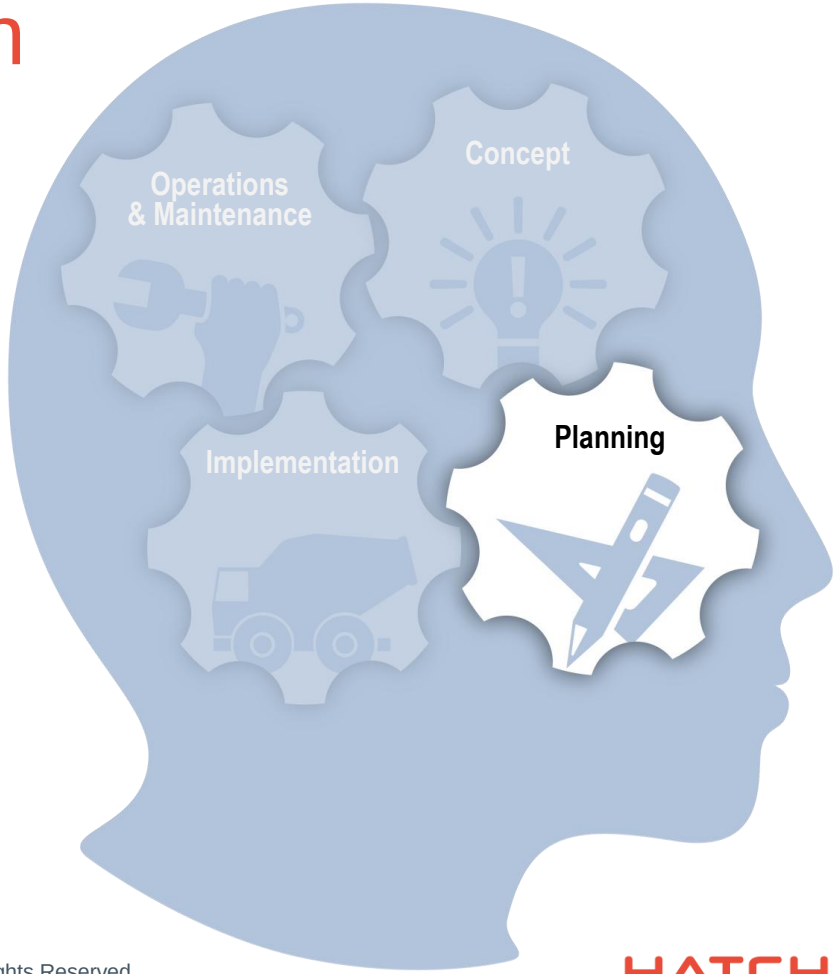
Where is Smart Cities in the Project Lifecycle?

Planning

- Options analysis
- Stakeholder facilitation
- Incorporation of resiliency
- Data availability leads to evidence based planning
- …….



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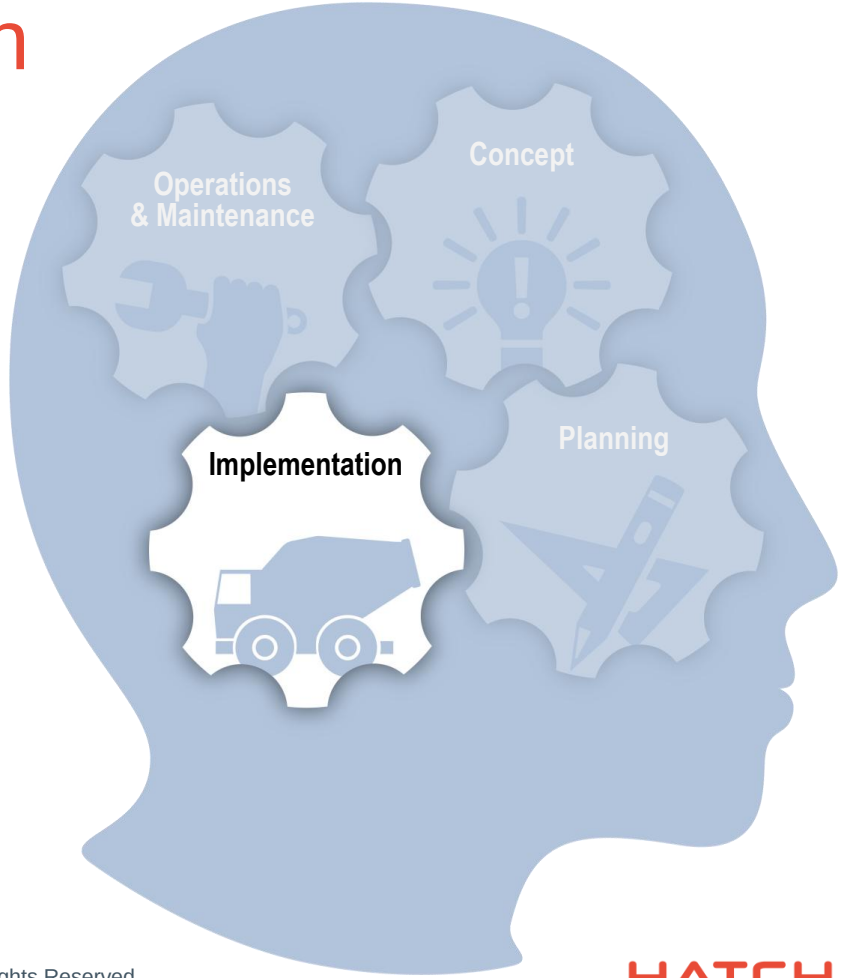
Where is Smart Cities in the Project Lifecycle?

Implementation

- Data-centric delivery
- Innovative methods and materials
- Life-cycle and sustainability evaluation
- ……..



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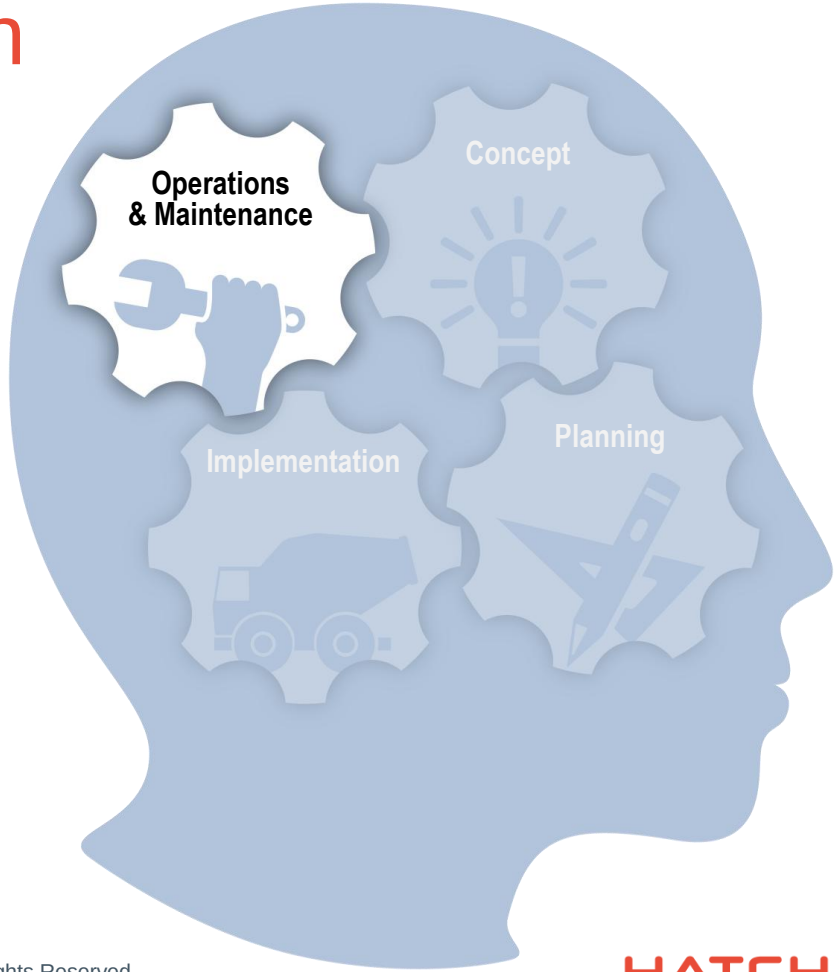
Where is Smart Cities in the Project Lifecycle?

Operations & Maintenance

- Efficiency / capacity improvements
- Asset management
- User accessibility
- ……..



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Barriers to Adoption

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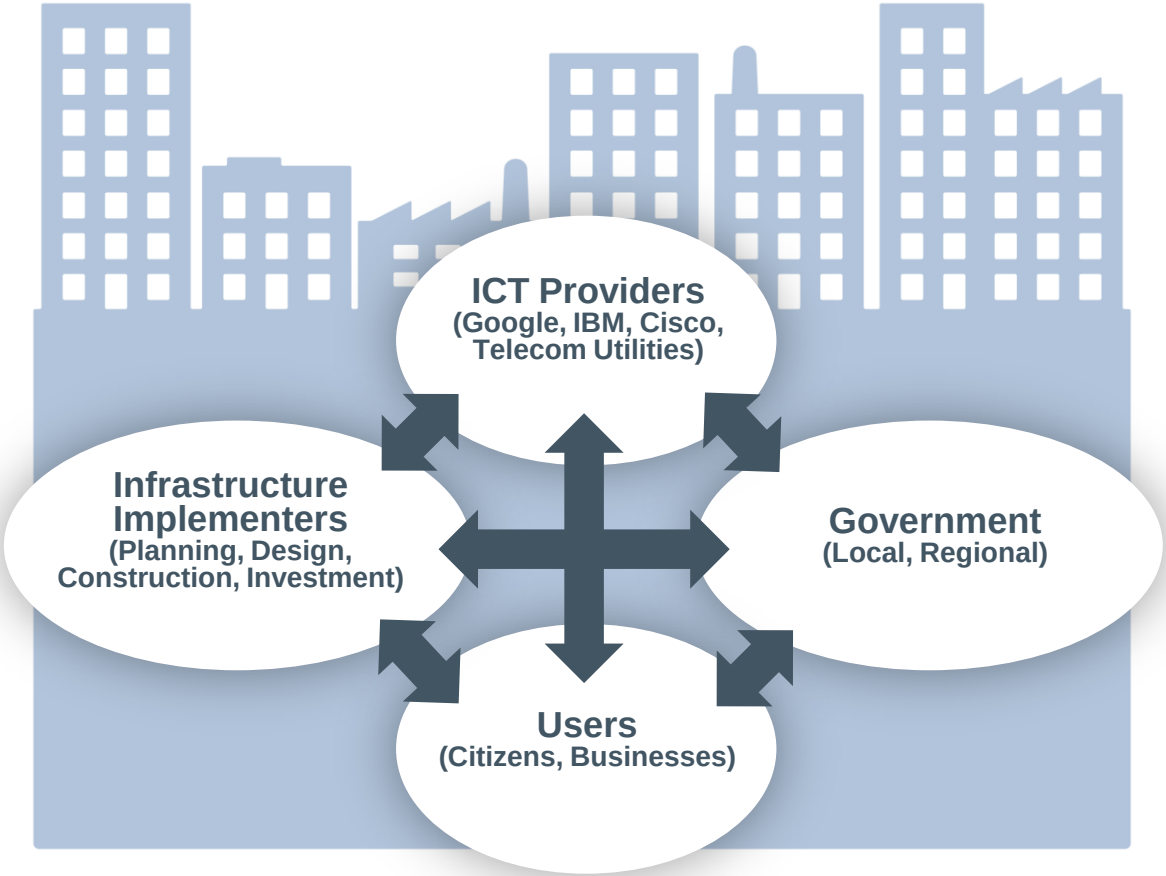

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- Usual Relationship Between Cities ar Vendors/Contractors/Suppliers
- Municipal Constraints
  - Procurement Policies
  - Internal Resources
  - Need for Change to Internal Process
- Vendor Approach
  - Clash of Cultures
  - Recognition of Potential Issues (e.g. privacy)
- Requires Public-Private, plus Civic and Academia, Collaboration

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Closing Thoughts

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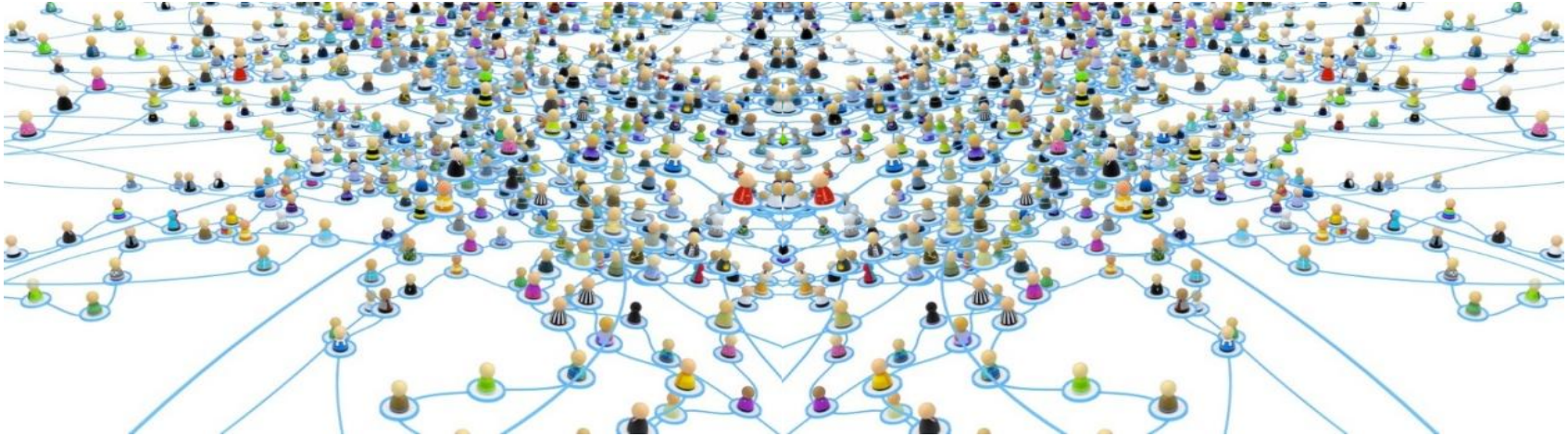
Smart Cities ≠ Technology Alone

- Focus on the outcomes to users – citizens, businesses
- Data, information and technology are critical enablers



It takes more than bits and bytes to build a Smart City

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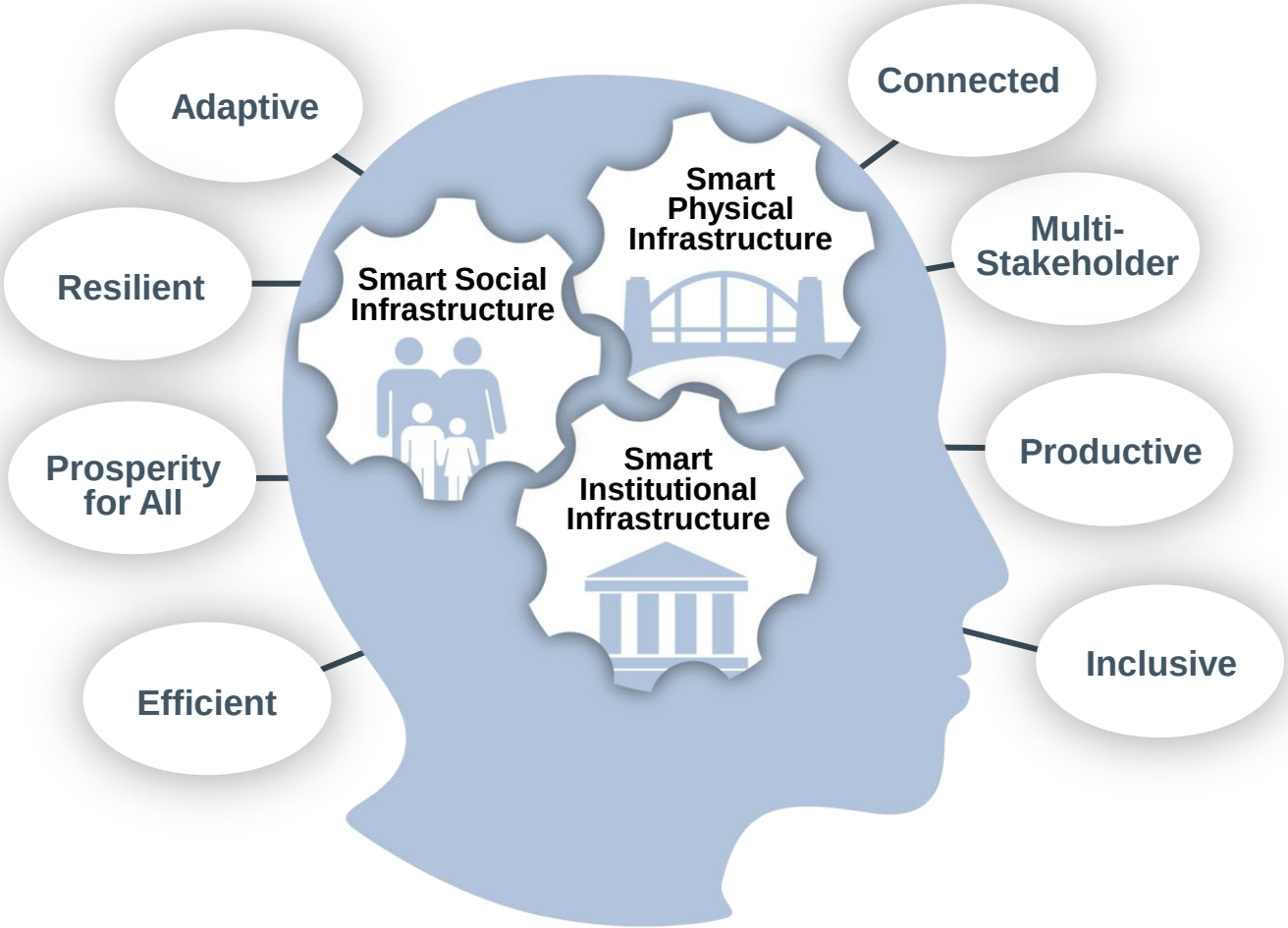

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Smart Cities is a Journey, Not a Destination

Continuing technological evolution means that there is no "end-point"

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Questions?

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