Smart cities as technology experimentation platforms

Sari Mäenpää 28.1.2020

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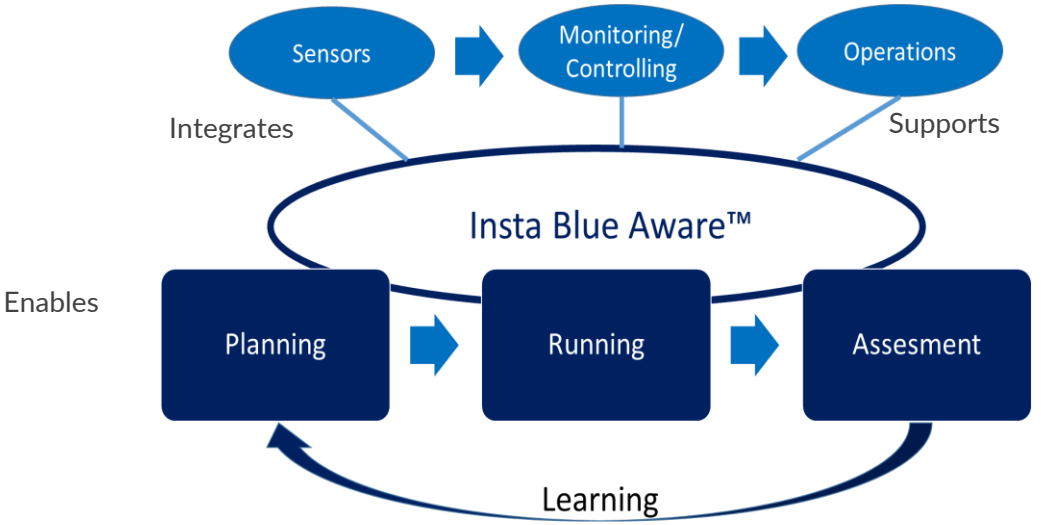
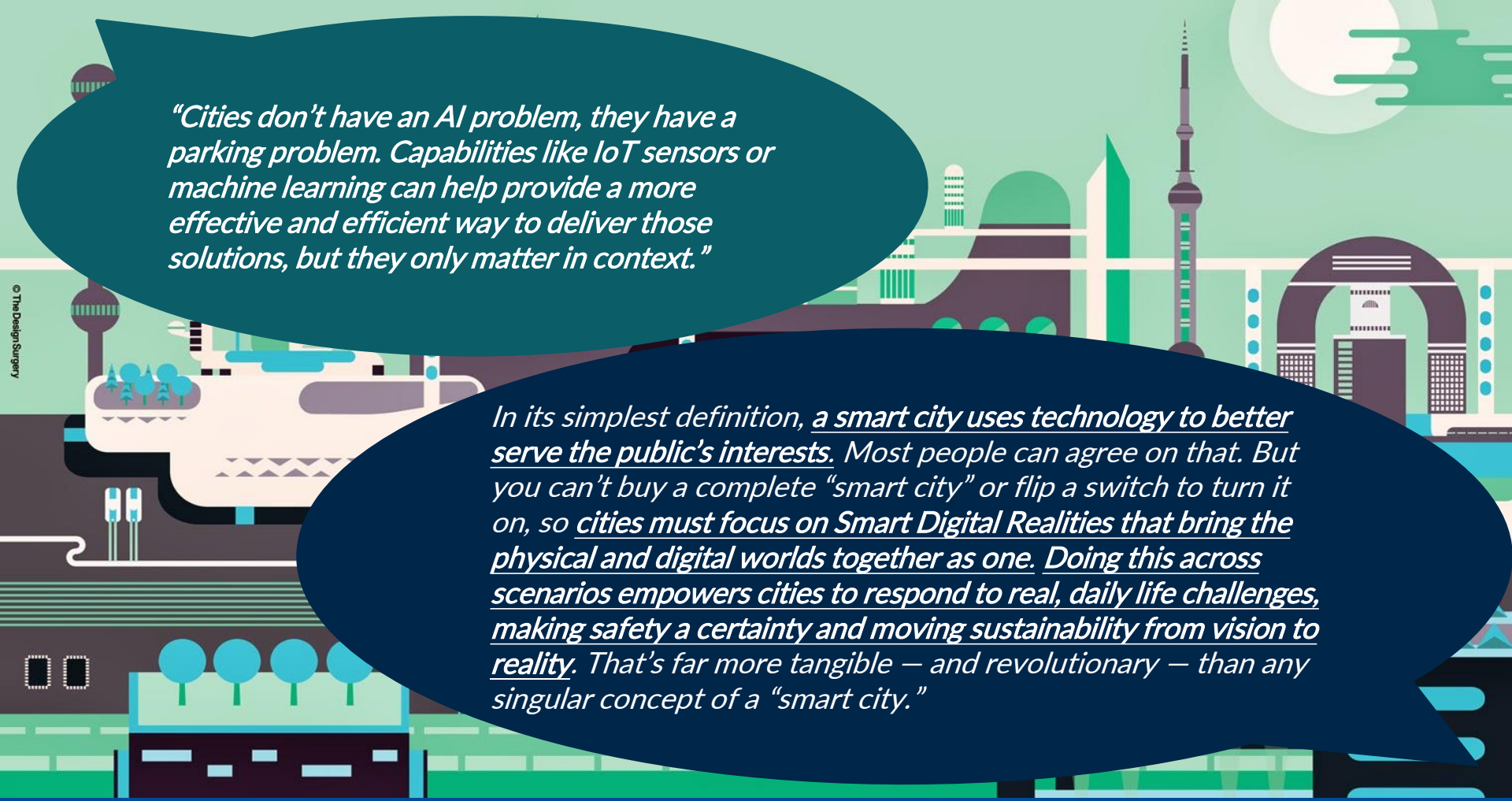
Mindtrek to situation awareness

https://www.youtube.com/watch?v=-VbaJdBCNP4





"Cities don't have an AI problem, they have a parking problem. Capabilities like IoT sensors or machine learning can help provide a more effective and efficient way to deliver those solutions, but they only matter in context."

*In its simplest definition, **a smart city uses technology to better serve the public's interests**. Most people can agree on that. But you can't buy a complete "smart city" or flip a switch to turn it on, so **cities must focus on Smart Digital Realities that bring the physical and digital worlds together as one**. **Doing this across scenarios empowers cities to respond to real, daily life challenges, making safety a certainty and moving sustainability from vision to reality**. That's far more tangible — and revolutionary — than any singular concept of a "smart city."*

Why this topic?

- All over Europe cities want to become ‘smart cities’ **by using data and smart information technologies**.
- Smart technologies offer opportunities for **improving the quality of life in cities**, for **reducing ecological footprint** and for **creating new urban commons**.
- Technological innovation should not be an end in itself.
- A smart city is only really **smart if data collection and AI/ML are steered by values such as democracy, connectedness, human dignity, privacy, sustainability, equality**
- The city of Tampere has also many smart city initiatives – one of them is SURE (Smart Urban Security and Event Resilience) project

(www.smartcitycharter.eu)



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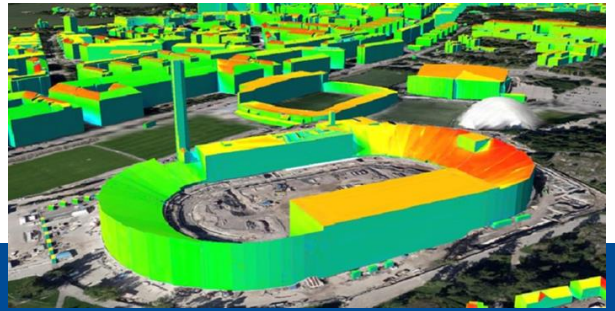
Why this topic?

- In **SURE – Smart Urban Security and Event Resilience** project the objective is to **improve the security of residents and visitors** in Tampere **by developing smart security solutions and technology experimentations in urban context**
- Insta as a technology partner brings technological building bricks to enable and support smart security solutions for the needs of urban security and safety, for city planning, for event safety and security and for situation management
- Insta also brings knowhow and experience in situation awareness and management, cyber security and information systems, simulation, training and public authority collaboration in critical infrastructure
- I wanted to contemplate the real project and literature to recognize possibilities and challenges in such technology experimentation initiative in a smart city context



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What is a smart city?

A city aiming to optimize its performance and services by means of modern digital technologies

A city assested by **data and digital technology**

A city with **ability to collect data from various sources and to analyze data to improve diverse city services**

(Hämäläinen & Tyrväinen, 2016; Giffinger et al., 2007)

What is a smart city?

Smart city is also **safe, secure and smooth city.**

- A **smooth city** is an environment where **safety and flexibility of operations are in balance.**
- Video surveillance, gunmen and security controls may even increase the feeling of insecurity.

Traditional infrastructure + Technological infrastructure + Smart applications + Public usage = Smart city

Features of smart cities market

- The **global smart cities market is segmented based on functional area**. The market is categorized into **smart governance & smart education, smart energy, smart infrastructure, smart mobility, smart healthcare, smart building, and others**.
- The **growth of the global smart cities market** is driven by **proactive government smart cities initiatives, growing urbanization, and rising need of better-quality life**.
- However, **security and privacy concerns** of smart cities solutions **are expected to slow down or even prevent the market growth**.

(McKinsey Smart City 2018)

Why are smart cities interesting businesswise?

Due to urbanization **the role of cities is growing**

Increased amount of issues to be solved conserning safety, security, performance, sustainability

Cities offer **opportunities for technological development and experimentations**

Cities do not have capabilities to **govern** complex smart city **ecosystems and manage rapidly changing digital technologies** in urban setting.

Challenges of smart city initiatives

Too narrow focus

- Many **smart-city initiatives are created around a vertical industry or emphasize the goals of a single vertical theme**, such as energy efficiency, traffic/mobility, housing or health care.
- Focusing only on particular vertical restricted data silos may emerge. The big picture is not seen, can lead to sub-optimization.

Public funding ending

- Many experimental platforms suffer from the **lack of sustainable value creation model after project funding has been used up** to set the platform. Continuity is not ensured.

Challenges of smart city initiatives

Lack of experimental culture

- Plans and programmes develop and alter, therefore **continuous innovation and re-focusing are needed**
- How to support experimental culture in, sometimes stiff and bureaucratic, public context?

Facing cost, failure and security issues

- In many cases, technology is in use for the first time in smart city context, therefore **unexpected failures and development costs may occure**
- Issues about cyber security and privacy, data integrity and storage, data usage may prevent/slow down smart city market growth.

Why are smart cities good experimentation platforms?

City-level experiments enable ICT developers and other **stakeholders to** iteratively **assess and validate** immature or nearly market ready IoT **services and applications**

In SURE technological solutions and operations for smart urban security are verified and further developed in real context

For digital platforms, **scalability and network effect** (the more users the more value) **act as a foundation for further growth**

In SURE the main focus is on two event areas in the middle of Tampere (Keskustori and Ratina). However, scaling up the solutions for city-wide use at new locations is included in the project.

By **engaging real users** to early IoT services or application development processes the **developers** also **receive valuable hints of usefulness and acceptance of technology solutions** during the iterations

In SURE we expect to get valuable feedback from real users and real events by collaborating with security authorities along the project and by clarifying event customers' feeling of security

(Hämäläinen & Tyrväinen, 2016)

Why is Finland good experimentation environment?

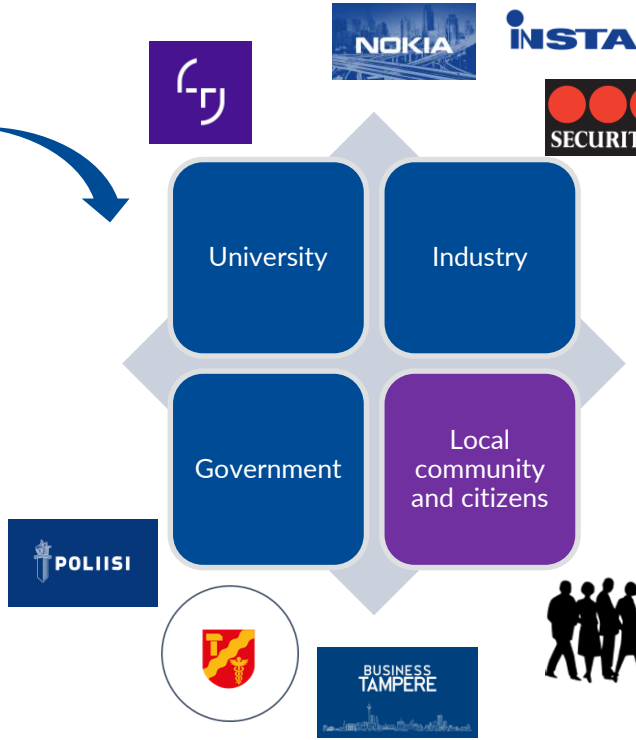
- Well-functioning public-private co-operation makes Finland one of leading smart city innovators and an attractive testing area for new innovations and piloting different solutions.
- In Finland, the basic infrastructure is highly functional and the education system is one of the best in the world.
- Finland also has an impartial, compact and stable society that allows testing and development platforms, as well as a high number of leading technology experts.

(Klemettinen/Business Finland, 2019)

Extending collaboration in smart city context

University-industry-government (triple-helix) partnership has been the dominant collaboration model in the smart cities

Forming quadraple helix partnerships by **integrating local community and citizens** to urban development **the city strengthens** bottom-up **smart city development and improves technology acceptance** among the citizens



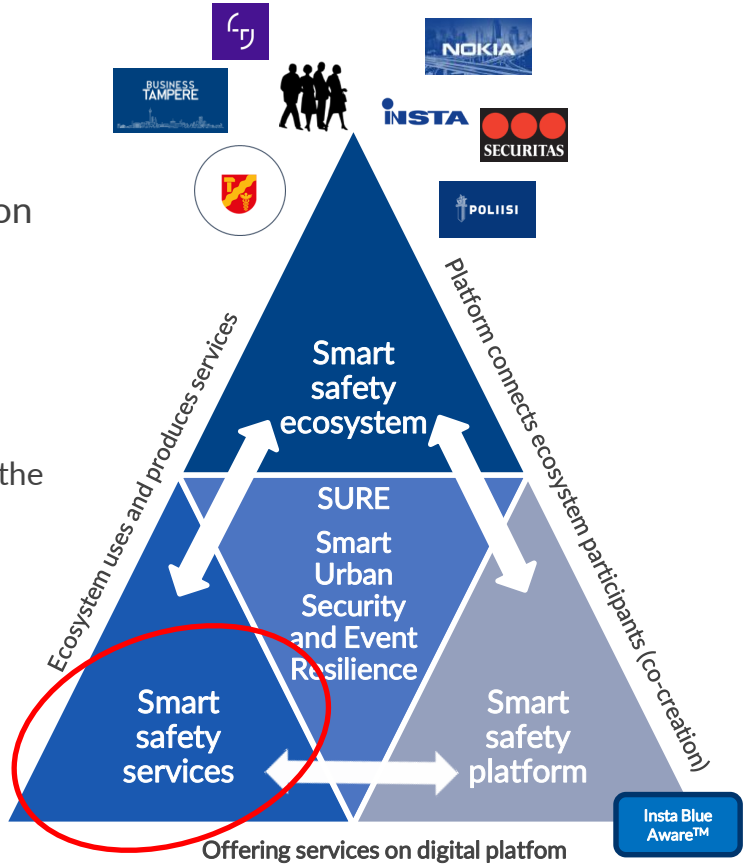
(Hämäläinen & Tyrväinen, 2018)

SURE-partnerships

Smart city is about co-creation

- Three key characteristics to succeed and reach a leading position in smart city context:
  1. **ecosystem co-creation** through resource integration and service exchange for responding to market demands
  2. **a digital platform** is critical to create the necessary knowledge for resource integration and service exchange
  3. **smart services** glue the ecosystem and platform together and create the outcome that solves the defined business problem.
- Open approach and co-creation is also needed
  - **cities and public sector are natural owners of applications, however, innovations and investments are needed from private actors**
  - furthermore, **the applications need users and must be designed for the users**

(Pulkkinen et al., 2019)



Elements of success

Focus on society and users	• **Integrating community and users results in more sustainable outcomes** than technological or infrastructure-driven projects
Focus on co-operative experiments	• Technology-oriented testbeds with quadraple-helix collaboration appear **attractive to private stakeholders to invest in**
Wide horizontal and vertical scope	• Having stakeholders from multiple industries and from technology providers to end users will **increase the number of participants**
Focus on openness	• Reaching the critical mass and **opening platform interfaces** to third parties **results in sustainable and expanding platform**
Focus on cyber security	• **Solving cyber security issues advances smart city market growth**

(Hämäläinen & Tyrväinen, 2016)

Smart Cities answer the challenges of the future

Urbanization, fast technological development and communal challenges call for smart city initiatives.

So far the focus has been on specific functional areas. However, **cross-functional focus is needed** to avoid sub-optimization.

Also, **cyber security and privacy issues need to be solved** to enable the growth of smart city market.

Public-private partnership, co-creation and trust within ecosystem are essential to succeed in smart city context.

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THANK YOU!

sari.maenpaa@insta.fi
040 7595528
https://www.linkedin.com/in/sari-mäenpää/