IoT and Smart Cities – some roadblocks

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Kees van der Klauw

Chair AIOTI MB

The Promise of the Internet of Things

"Everything becomes 'smart': <u>cities</u>, farming, healthcare, industry, living, energy..."

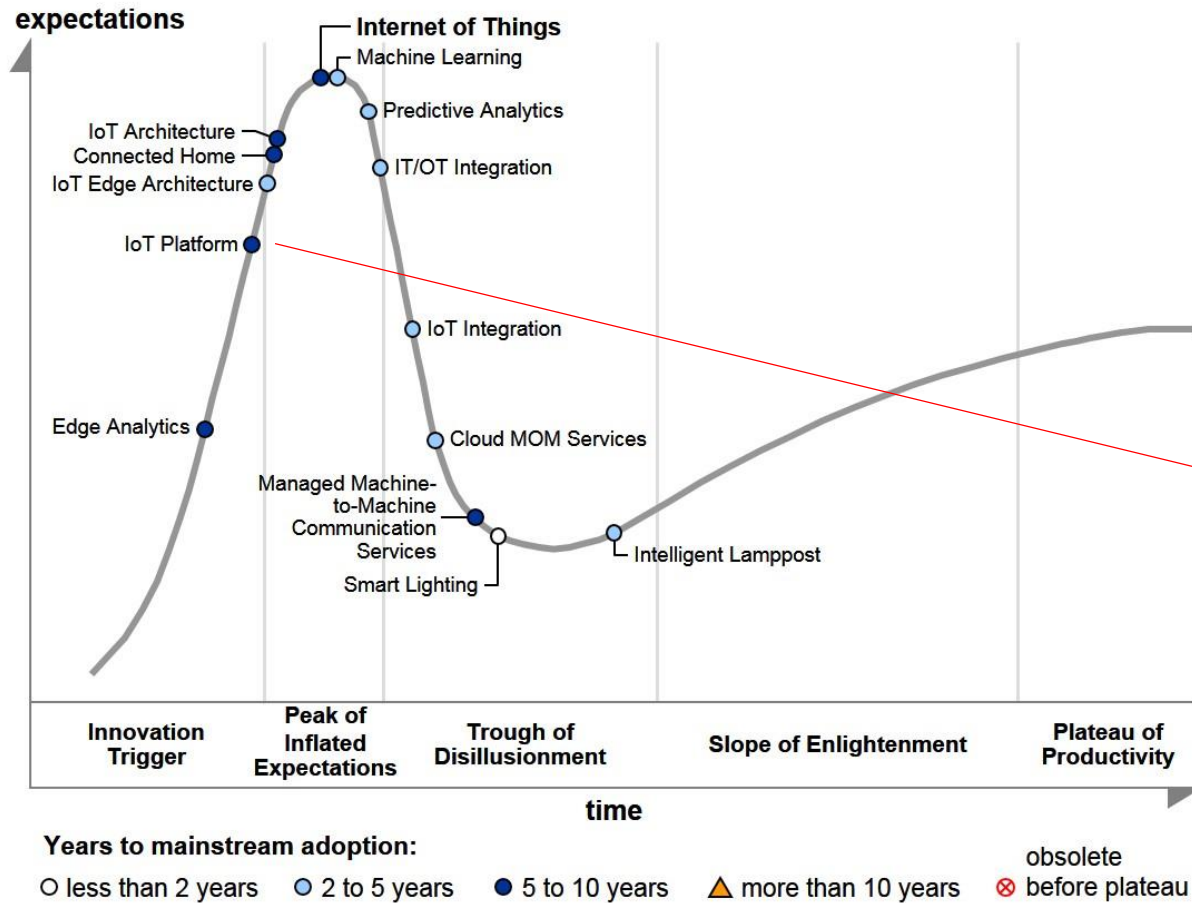*"Computers and robots become even smarter than people"*

"The IoT will solve societal challenges"

- Growth opportunities for components, IT and communications industries
- New business opportunities based on applications and data
- Interesting R&D topics for academia
- <u>Happy society</u>

So, why isn't it taking up rapidly in the Smart City domain?

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The promises of IoT - The Gartner Hype Curve * July 2017, are things moving?

Some key inhibitors:

- Cities and city departments are working in silos
- Insufficient attention for non-functional aspects
- IoT Platforms are underdeveloped while they are essential to carry smart city use cases

Source: Gartner July 2017

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3

Cities and city departments working in silos

- Dedicated aldermen, departments, scopes and budgets
- IoT enabling integral use cases across. Who takes care?
- Insufficient education in opportunities and limitations
- Ecosystems building required: local and between cities (OASC)
- Political leadership in managing uncertainty

Cities and city departments working in silos
redistribution of value and budget across city departments

- Redistribution of value is a concern for city departments
- City governments usually budget on yearly cycles
- Longer term return on investment, but not necessarily with the investing department
- Political leadership required (over generations of politicians, elections)
  to *create* new value
- Teaming up of cities in EU (OASC)
  - Establishing critical mass
  - Learning
  - Communication to stakeholders, educating them

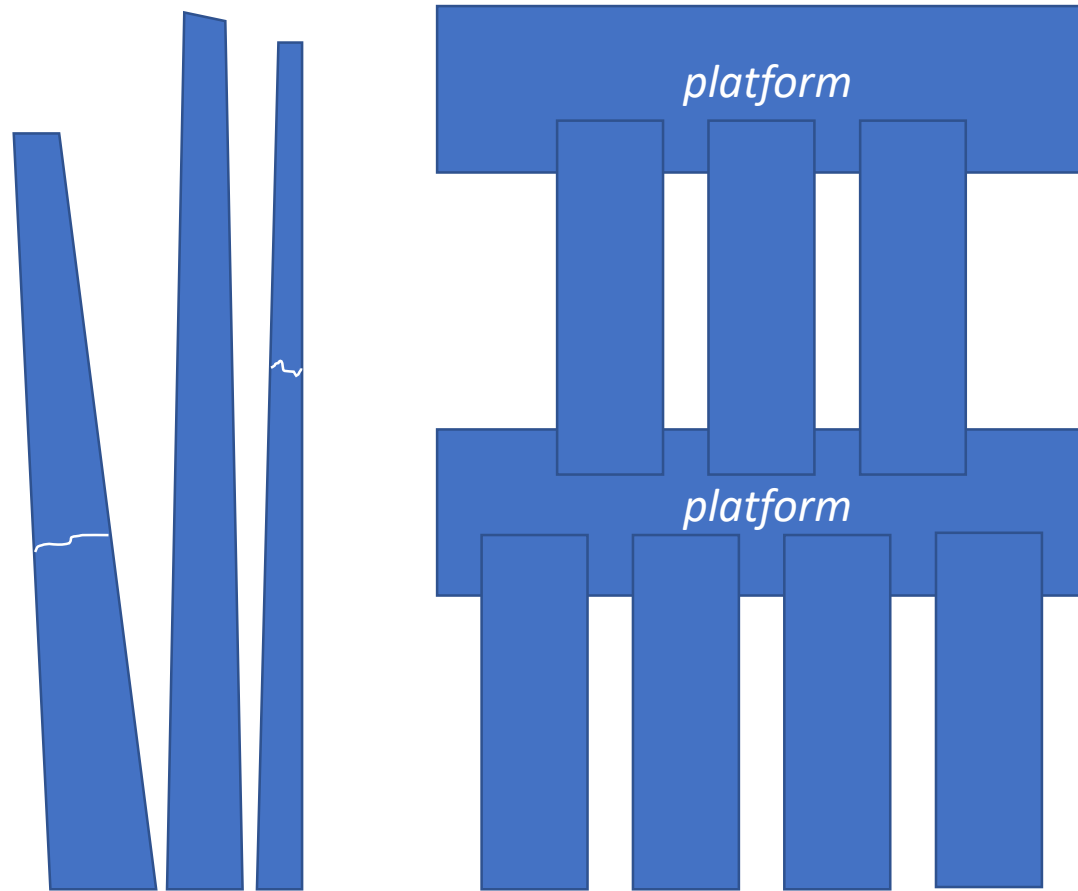# Insufficient attention for non-functional aspects

-ities

- Reliability, safety, privacy, security, flexibility, portability…
- Highly underestimated and undervalued
- Functionalities easy to copy, non-functionalities as differentiator?
- Time to value. Not (yet) a purchase decision, but just wait…
- Trust is strongly linked to non-functional aspects, but not entirely
- Upfront involvement of end-users

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IoT platforms are underdeveloped

- A smart city needs fixed infrastructure platforms
- Too many IoT applications cannot be rapidly/economically tested
- Too many IoT applications do not scale, by lack of a platform
- Platforms beyond technology:
  - Multi-stakeholder involvement
  - Common policies and procedures
  - Use cases including non-functional aspects
  - Learning and sharing
- Professionally managed 24/7/365

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IoT Platforms are underdeveloped
Platforms are essential for Smart Cities – mutual interests

platform

platform

- SME's and most cities cannot economically create and maintain platforms, cities lack competency

- Only large companies/organisations levering across many (or very large) cities can

- Platforms need economical justification by _applications_

- Large companies often lack the agility and all the domain knowledge to develop them

- but SME's and digital start-ups often can

- … if they only had a platform!

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IoT Platforms are underdeveloped
What is keeping the platform development?

- Cities afraid of vendor lock-in

- Open software suggested as alternative… but this is unrelated!

- No single, central platform will serve all. Ecosystems of distributed will

- A bag of software components does not make a platform

- No/little competencies with city governments

- No one wants to own it, everyone wants to enjoy it: teaming up!

- Can we establish a 'Linux model' for FiWare? Biz opportunities!

- Can we establish a full open API multi vendor platform?

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Some positive examples
Netherlands (and likely more from other countries)

- Eindhoven and Amsterdam digital city principles have become recommended reference across all cities (VNG)

- From software to platform initiative Eindhoven
  - Contains many policy instruments
  - Based on 5 years experience, platformised FiWare
  - Available for free www.smartcitystarterkit.c
  - Professional maintenance by ATOS
  - Fits EU reference architectures

Alliance for Internet of Things Innovation