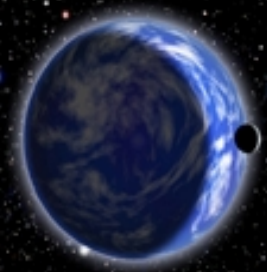


Smart Cities and Use Cases



**Dr. Joao Schwarz da Silva,
SnT, University of Luxembourg**

4th EU Summit on the Future Internet, 13-14 June 2013, Aveiro, Portugal

Our quest for Smartness entails

- Data analyses of economic activity, urban perception, human behaviour, mobility patterns, and resource consumption, coupled to findings of living laboratory experiments aim at:
 - ✓ influencing the interventions for existing cities and strategies for the development of new cities
 - ✓ identifying incentives for rebalancing of shared-use systems, and replacing the traditional one-size-fits-all urban service strategy with flexible options
 - ✓ responding in real-time to the needs of urban residents



Libelium Smart World

Air Pollution

Control of CO₂ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection

Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing

Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care

Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care

Vital signs monitoring in high performance centers and fields.

Structural Health

Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Smartphones Detection

Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control

Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels

Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels

Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion

Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads

Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting

Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping

Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps

Sound monitoring in bar areas and centric zones in real time.

Water Leakages

Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis

Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location

Search of individual items in big surfaces like warehouses or harbours.

Waste Management

Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking

Monitoring of parking spaces availability in the city.

Golf Courses

Selective irrigation in dry zones to reduce the water resources required in the green.

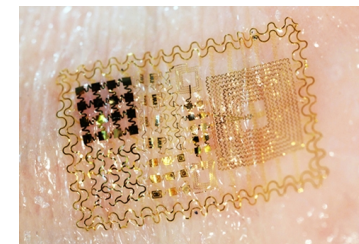
Water Quality

Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Quality of Shipment Conditions

Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Only 0,2 % of the Planet is connected today



Monitor Weather
& Air Quality

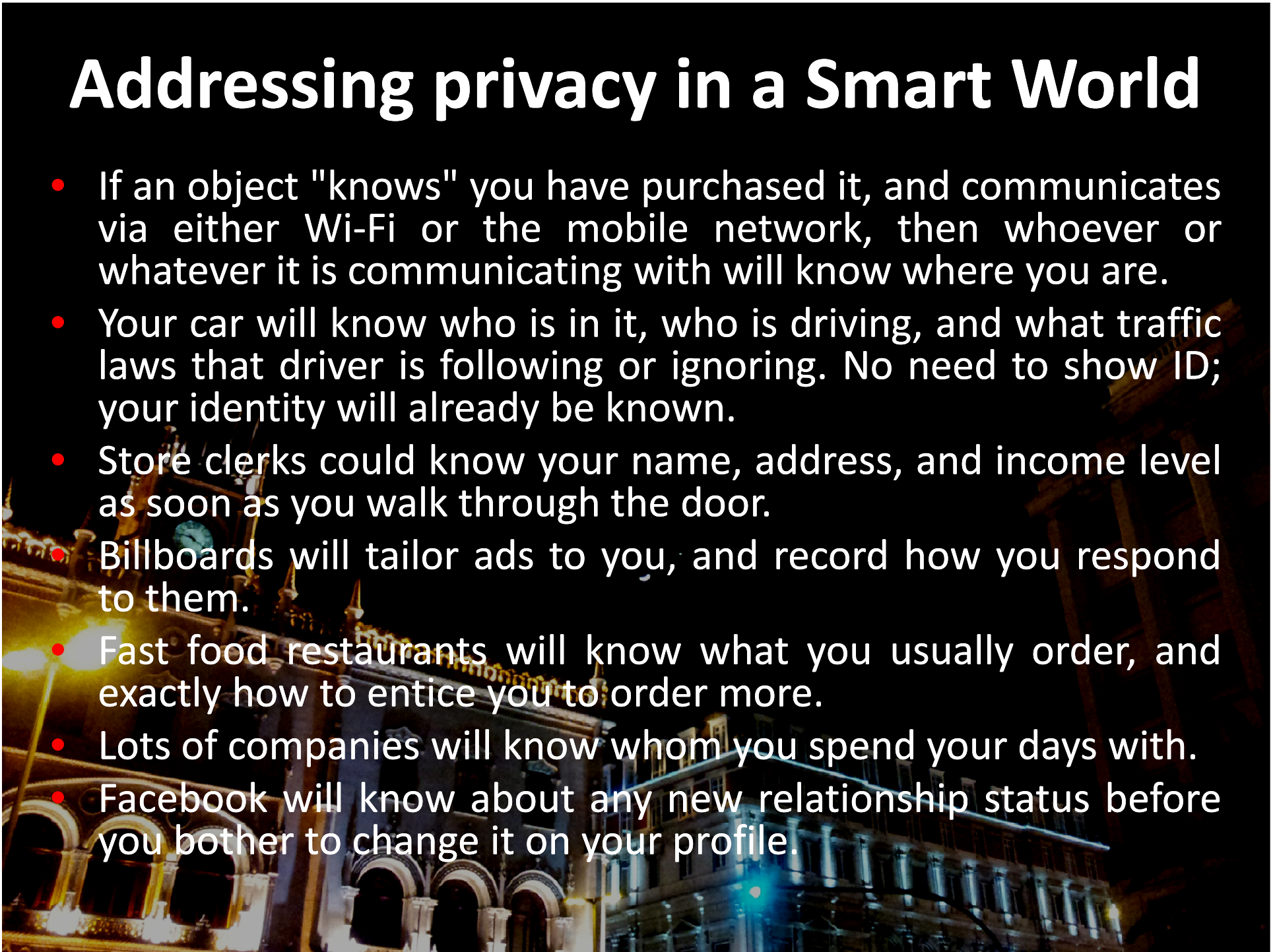


Challenges for a Smart World

- The number of 'connected things' will reach 50 billion by 2020
- Current mobile networks still lack ubiquitous coverage
- Devices are too expensive and service tariffs too high
- Some challenges that the industry has to solve:
 - ✓ How to manage a complex universe of multiple types of devices?
 - ✓ We need to sort out vital privacy and control issues
 - ✓ We need to deploy networks capable of handling traffic from things and devices
 - ✓ We need to use techniques for ubiquitous positioning of devices and things
 - ✓ We lack complete multi-industry offerings (management, security and big data issues)
 - ✓ We are not yet at the stage of suitable global connectivity solutions

Addressing privacy in a Smart World

- If an object "knows" you have purchased it, and communicates via either Wi-Fi or the mobile network, then whoever or whatever it is communicating with will know where you are.
- Your car will know who is in it, who is driving, and what traffic laws that driver is following or ignoring. No need to show ID; your identity will already be known.
- Store clerks could know your name, address, and income level as soon as you walk through the door.
- Billboards will tailor ads to you, and record how you respond to them.
- Fast food restaurants will know what you usually order, and exactly how to entice you to order more.
- Lots of companies will know whom you spend your days with.
- Facebook will know about any new relationship status before you bother to change it on your profile.



Fixing the inefficiency

- We tend to share the belief that with enough data about many complex aspects of life—including not just politics but also crime, traffic, and health—we can fix problems of inefficiency.
- For example, predictive software now analyzes crime statistics and helps police decide where to beef up patrols.
- Algorithms track website clicks and advise journalists on what kinds of stories to write.
 - ✓ Should “intuitive knowledge” about how to deploy resources be overruled by algorithms that can work only with hard data and can’t, of course, account for the data they don’t have?
 - ✓ Should we give in to the sub-optimal view of life arising out of crowd based solicitation?

Panel Participants

- Luis Munoz, University of Cantabria
- Ana Aguiar, FEUP
- Karl Rossegger, LINZ AG
- Haluk Gökmen, FISpace, Arçelik A.Ş.,
- Anastasius Gavras, FI-STAR, Eurescom
- Carlos Oliveira, Ubiwhere,

Issues for Discussion

- To examine the approaches currently being adopted by cities seeking to adopt Future Internet as an enabler
- To question the agenda of issues regarding Smart Cities
- To discuss visions and perspectives of Smart Cities
- To exchange knowledge resulting from on-going experiments and demonstrations.

Conclusion

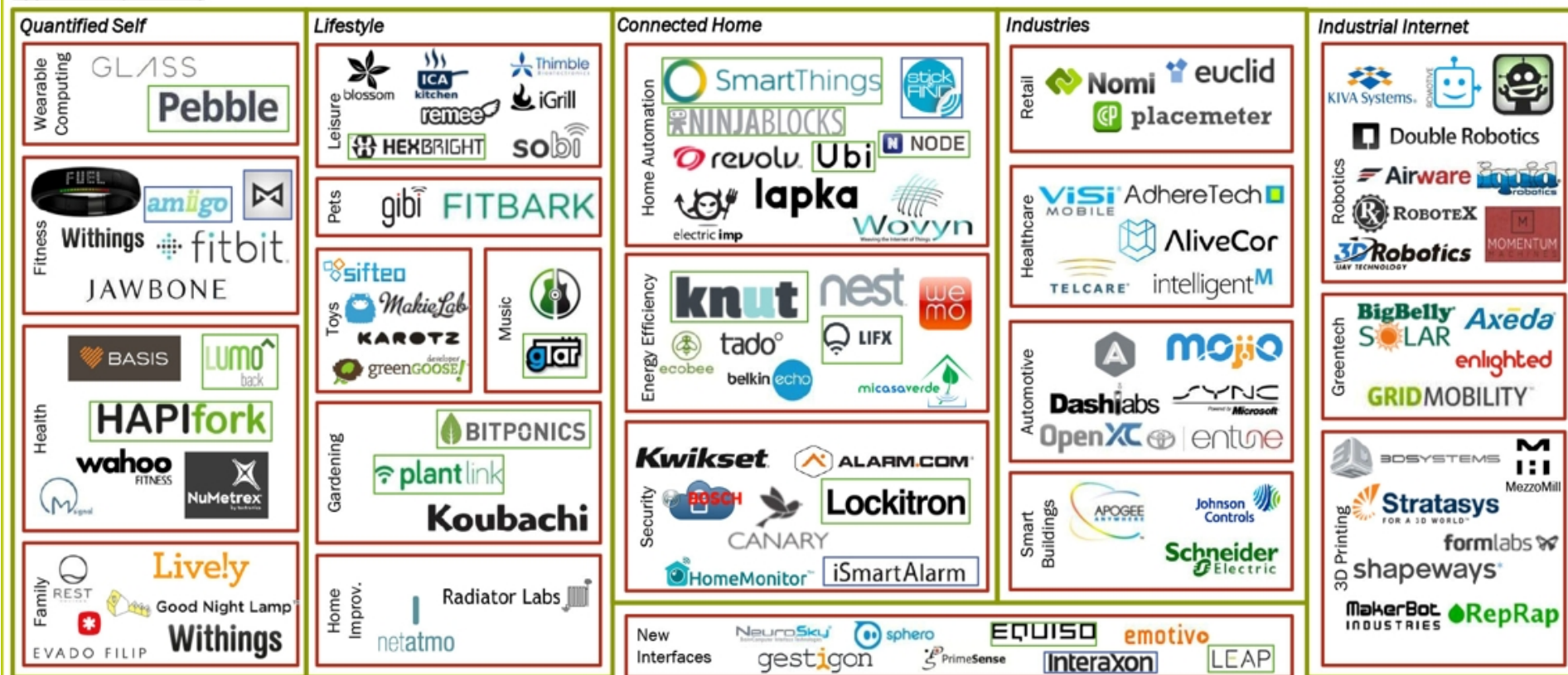


INTERNET OF THINGS LANDSCAPE

Platforms & Enablement (Horizontals)



Applications (Verticals)



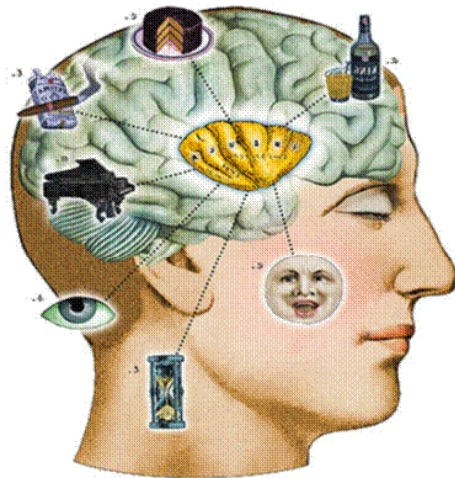
Building Blocks



How to deal with a smart world when

- Devices acting as our agents will be able to:

- ✓ Touch
- ✓ See
- ✓ Hear
- ✓ Taste
- ✓ Smell



- From perception we will move into action and interaction
- Extending human capabilities at which price?